Preliminary Stormwater Quality Control Plan

For

Future Industrial Building

407 Spreckles Avenue
Manteca, CA 95336

APN: 221-250-350-000

April 12, 2024

Prepared For:

Prologis, LP

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615 International Parkway
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Manteca, CA 95336

Senior Associate: Michael Basilios, P.E.

KW Job Number: A24057

Prepared By:

_____

Michael Bassilios, P.E. Date

Kier & Wright Civil Engineers

Contents

Contents 3
1. Project Overview 4
1.1 Project Description 4
2. Regulatory Requirements 5
2.1 Site Assessment 5
2.1.1 Pollutants of Concern 6
2.1.2 Site Planning 6
2.1.3 Site Design Measures 6
2.2 Source Control Measures 7
2.3 Stormwater Treatment Control Measures 7
2.3.1 Stormwater Design Volume Calculations 7
2.3.2 Design of Bioretention Planters 8
3. Maintenance Plan and Responsibility 9
3.1 Treatment Description and Maintenance Plan 9
3.2 Site Inspection 10
3.3 Housekeeping 12
4. Attachments 13

1. Project Overview

This Project Stormwater Quality Control Plan (Plan) was prepared for Prologis, LP by Kier & Wright Civil Engineers & Surveyors. This plan is intended to comply with all requirements specified in the Multi-Agency Post-Construction Stormwater Standards Manual (Stormwater Standards Manual), dated June 2015 for new development and redevelopment projects.

1.1 PROJECT DESCRIPTION

The Project consists of constructing a 278,213 square feet (SF) speculative industrial building and associated site improvements on a 645,971± SF (14.8294± Acres) lot. The site improvements will include approximately 178 auto stalls, 83 trailer stalls, 12 bike racks, and various landscaping features. The project site is located at 407 Spreckles Avenue in the City of Manteca. See Figure 1, Vicinity Map below and refer to Attachment 1 'Basic Project Information' for further site details.

Figure 1. Vicinity Map for 407 Spreckles Avenue, Manteca, CA.

2. Regulatory Requirements

Per the Stormwater Standard Manual, the Phase II General Permit specifies three types of projects required to implement post-construction stormwater standards: 1) Small Projects, 2) Regulated Projects, and 3) Hydromodification Management Projects. Using the flow chart shown in Figure 1-1, our project is considered a 'Hydromodification Management Project' defined as a project that creates and/or replaces greater than 1 acre of impervious surface. Additionally, the entire project site is subject to stormwater requirements since the project results in an increase of more than 50% impervious surface area over the existing development.

Consequently, this project incorporates the required site assessment and planning, site design control measures, source control measures, and treatment control measures. The following sections provide further details and information on each measure.

2.1 SITE ASSESSMENT

As described in Section 1.1, the Project is located at 407 Spreckles Avenue in Manteca, CA, to the west of Spreckles Avenue between Dupont Court and Phoenix Drive. Situated just northwest of the Highway 120 and Highway 99 intersection, the surrounding developments consist of a mix of commercial businesses, industrial buildings, and single-family residential homes. The current zoning is LI – Light Industrial. The proposed zoning is BIP – Business Industrial Park and the proposed building will be an industrial warehouse.

The total project area is 645,971± SF. The total pre-project impervious area is approximately 0 SF and post-project impervious area is approximately 585,344 SF. The information is also listed in Attachment 2 – Site Assessment Worksheet.

The project is delineated into two (2) drainage management areas (DMA). One (1) area drains to a bioretention planter (see Section 2.3.2) and one (1) area is treated in an underground infiltration basin (see Section 2.3.3). For DMA 1, the rainfall is picked up by catch basins throughout the site and is routed to the underground infiltration basin by an underground storm drain line. The runoff then percolates into the ground in typical storms or overflows to the City system in large events. For DMA 2, rainfall is routed and captured by the bioretention planter and picked up by an underground storm drain line. This onsite storm drain line then combines with the infiltration basin overflow and ties into the existing 48" storm main running south on Spreckles Avenue. Refer to the sheet C6.0 Stormwater Quality Control Plan showing the delineation of DMAs for the proposed project site.

The geotechnical report for this project site was completed by Engeo dated January 24, 2017 and has been included as Appendix 8 in this Stormwater Quality Control Measures Plan. The report includes information on the existing site conditions including the groundwater table, infiltration rates, stormwater considerations, and recommendations.

2.1.1 Pollutants of Concern

As a result of development, the Project has several potential pollutants of concern during and after construction. The project will potentially generate pollutants consistent with vehicle usage and storage, as well as loading docks. Per Table 3-2 of the Stormwater Standards Manual, these may include sediment from parking areas, driveways, and construction, oil and grease from vehicles, oxygen demanding substances from lawns areas, nutrients from landscape fertilizers, and trash and debris from the trash enclosure.

2.1.2 Site Planning

The trees at the project frontage are to be protected in place. Otherwise, there are no sensitive areas that need to be left undisturbed since the project site is an exposed dirt lot. The building and hardscape will be clustered together and interspersed with landscape areas throughout the site. The hardscape runoff will be directed to pervious areas or an infiltration basin located onsite to promote percolation. There are no known wetlands or riparian habitats near the project site.

Another consideration was the existing drainage of the site. The overland release at the southeast corner of the site has been maintained and the implementation of a bioretention planter and underground infiltration basin will help detain the runoff in the post-project condition to match the pre-project condition. See Attachment 3 – Site Planning Worksheet for further information.

2.1.3 Site Design Measures

Based on the site assessment and planning, certain site design measures were selected for this project to reduce pollution and minimize impacts of the proposed development.

The project chose to improve the existing soil conditions by importing fill for bioretention planters and the top few inches of the landscape areas. Additionally, the project proposes to plant climate-appropriate trees throughout the parking areas and protect in place the existing trees at the project frontage. Furthermore, roof drainage and impervious areas will be directed to the bioretention planter and infiltration basin for treatment before discharging to the public storm drain system. Lastly, the project was designed to minimize earthwork activities and balance the site.

2.2 SOURCE CONTROL MEASURES

The project proposes to implement source control measures to prevent pollutants from stormwater runoff. The landscape irrigation will adhere to the Water Efficient Landscape Ordinance (WELO) requirements and the system will be designed to conserve and prevent water leaving the designated area.

Potential pollutant-generating activities for this project are as follows:

- Parking/Storage Areas and Maintenance
- Landscape / outdoor pesticide use
- Building and grounds maintenance
- Interior floor drains
- Fire sprinkler test water
- Drain or wash water from drainage sumps
- Loading Docks

The above pollutant-generating activities and the associated best management practices for source control measures are described in Appendix E of the Stormwater Standard Manual. Also see Attachment 4 – Source Control Measures for more information.

2.3 STORMWATER TREATMENT CONTROL MEASURES

The Project proposes to implement stormwater treatment control measures to comply with the requirements set forth in the Stormwater Standards Manual. All Regulated Projects must mitigate the volume of stormwater runoff produced by the 85th percentile, 24-hour storm event based on historic rainfall records. The calculations are presented in Section 5.2 of the Stormwater Standards Manual and our results for the Project are described below.

2.3.1 Stormwater Design Volume Calculations

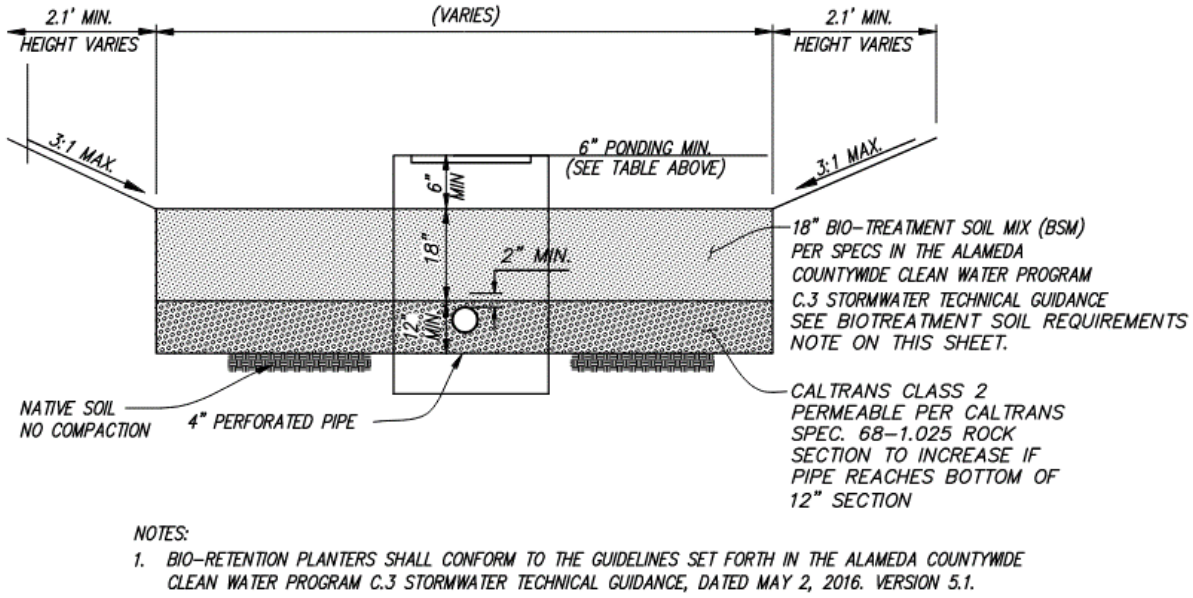
The stormwater design volume for each DMA was calculated using the Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998), which is further described in the Stormwater Standards Manual. Please refer to Attachment 5 – Drainage Management Area Worksheets for the step-by-step calculation procedures of computing the stormwater design volume for each DMA. A summary table of the required stormwater volume per DMA is shown below:

Drainage Management Area	Stormwater Design Volume (cf)
DMA 1	28,788
DMA 2	898

Table 1 – Summary of SDV per DMA.

2.3.2 Design of Bioretention Planter

The project proposes to implement bioretention facilities as the approved Low Impact Development (LID) stormwater control measure. The bioretention planter was designed per the criteria described in Section 6.2 of the Stormwater Standards Manual. Bioretention planters receive, retain, and infiltrate stormwater runoff through biological processes. The planters have three zones – ponding zone, planting media, and drain rock. They also consist of a perforated drain in the rock section of the planter and an overflow device such as an area drain or catch basin. The depth of the ponding zone for the bioretention planter is 6", with a planting media depth of 18" and a gravel layer of 12" minimum. See the cross section of the bioretention planter below:



SECTION - IN GROUND BIO RETENTION 1

NOT TO SCALE

The bioretention planter also detains runoff and therefore helps provide the required storage capacity. The area of the treatment planter was calculated to meet the required SDV. See Attachment 7 – Stormwater Treatment Design Worksheets. A summary of the required area versus the provided area is shown below:

Drainage Management Area (DMA)	Required Treatment Area (sf)	Provided Treatment Area (sf)
DMA 2	665	2,510

The provided treatment area is greater than the required area and therefore, the stormwater design volume required for the project site is met.

2.3.3 Design of Underground Infiltration Basin

The project also proposes to implement an underground infiltration basin as an alternative stormwater treatment control measure per the Stormwater Standards Manual. The underground infiltration basin was designed per the criteria described in Appendix F (section LID-1) of the Stormwater Standards Manual. Infiltration Basins retain and infiltrate stormwater runoff using permeable soil. The proposed infiltration basin consists of a series of buried perforated Corrugated Metal Pipes (CMP) that are backfilled with permeable drain rock. This allows storm water onsite to be routed to the basin and infiltrated in a small footprint. See Attachment 9 for location and preliminary underground infiltration basin design.

The infiltration basin is also designed to retain runoff and therefore helps provide the required storage capacity. The volume of the infiltration basin was calculated to meet the required SDV. See Attachment 7 – Stormwater Treatment Design Worksheets. A summary of the required volume versus the provided volume is shown below:

Drainage Management Area (DMA)	Required Treatment Volume (cf)	Provided Treatment Volume (cf)
DMA 1	28,788	28,788

The provided treatment volume together with the associated infiltration rate (2 in/hr) is greater than/equal to the required volume. The basin also meets the drawdown requirement (48 hours) with an infiltration rate of 2 in/hr. Therefore, the stormwater design volume required for the project site is met.

3. Maintenance Plan and Responsibility

Prologis, LP is the property owner and is also responsible for the operations and maintenance of the stormwater treatment devices herein.

3.1 TREATMENT DESCRIPTION AND MAINTENANCE PLAN

The stormwater control measures used for this project consist of one (1) bioretention planter and one (1) underground infiltration basin. A bioretention planter is a vegetated depression that is designed to receive, retain, and infiltrate rainwater runoff from sheet flow. The bioretention planter provides a vegetated surface underlain with planting media, gravel, and a subsurface drainpipe. The underground infiltration basin consists of a series of buried perforated Corrugated Metal Pipes (CMP) that are backfilled with permeable drain rock, which allows retention and percolation of collected stormwater.

BMP 1 – Underground Infiltration Basin with Overflow is located at the southwest corner of the project site.

BMP 2 – Bioretention Planter without Underdrain is located along the western edge of the site along the project frontage.

Routine Maintenance Activities for Bioretention Planter		
No.	**Maintenance Activity**	**Frequency**
1	Remulch void areas and remove sediment	As needed
2	Treat diseased trees and shrubs	As needed
3	Water plants daily for two weeks	At project completion
4	Inspect soil and repair eroded areas	Monthly
5	Remove litter and debris	Monthly
6	Remove and replace dead and diseased vegetation	Twice per year
7	Add additional mulch	Once per year
8	Replace tree stakes and wire	Once per year

Routine Maintenance Activities for Underground Infiltration Basin		
No.	**Maintenance Activity**	**Frequency**
1	Remove litter and debris	As needed
2	Remove accumulated Sediment	Annually
3	Rinse system if Salting/de-icing agents observed	As Needed

3.2 SITE INSPECTION

Inspection Schedule for Bioretention Planter		
No.	**Inspection Activity**	**Frequency**
1	Inspect soil and repair eroded areas	Monthly
2	Inspect for erosion or damage to vegetation, preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the planters are ready for winter. However, additional inspections after periods of heavy runoff is desirable.	Semi-annually
3	Check for debris and litter, and areas of sediment accumulation	Semi-annually
4	Inspect health of trees and shrubs	Semi-annually
5	Replace tree stakes and wire	Once per year

Inspection Schedule for Underground Infiltration Basin		
No.	**Inspection Activity**	**Frequency**
1	Inspect Manholes/Pavement for damage	Sem-annually
2	Check for debris and litter, and areas of sediment accumulation inside the infiltration basin	Semi-annually
3	Check for debris and litter, and areas of sediment accumulation in inlet/outlet pipes and associated structures	Semi-annually

Further inspection and maintenance activities which shall be completed as needed are:

1. Perform annual testing of any mechanical or electrical devices prior to wet weather.
2. Report any significant changes in stormwater control measures to the site management. As appropriate, assure mechanical devices are working properly and/or landscaped BMP plantings are irrigated and nurtured to promote think growth.
3. Note any significant maintenance requirements due to spills or unexpected discharges.
4. As appropriate, perform maintenance and replacements as scheduled and as needed in a timely manner to assure stormwater control measures are performing as designed and approved.
5. Assure unauthorized low-flow discharges from the property do not by-pass stormwater control measures.
6. Perform an annual assessment of each pollution generation operation and its associated stormwater control measures to determine if any part of the pollution reduction train can be improved.

The property owner, Prologis, LP, shall be responsible for the maintenance of the above control measures. At this time there is no indication of any pending transfer of the ownership, and thereby the responsibility, of this property.

The property owner contact information is as follows:

Prologis, LP
615 International Parkway
Tracy, CA 95377
Phone 906.673.8727

3.3 HOUSEKEEPING

Site Maintenance Schedule		
No.	**Inspection Activity**	**Frequency**
1	Store hazardous materials and wastes in covered containers and protect from vandalism.	As needed
2	Place a stockpile of cleanup materials where it will be readily accessible.	As needed
3	Train employees in spill prevention and cleanup.	As needed
4	Designate responsible individuals to oversee and enforce control measures.	As needed
5	Sweep hardscape clean of sediment or refuse. Dispose to refuse in trash containers located on the adjacent site.	Monthly
6	If maintenance or fueling of vehicles or equipment must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the run-off of spills.	As needed
7	Regularly inspect onsite vehicles and equipment for leaks and repair immediately.	As needed
8	Check incoming vehicles and equipment for leaking oil and fluids. DO not allow leaking vehicles or equipment onsite.	As needed
9	Always use secondary containment such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.	As needed
10	Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.	As needed
11	Discourage "topping-off" of fuel tanks.	As needed

In order to prohibit illicit discharges or potential illicit discharges to the storm drain, area is to be swept on a monthly basis and refuse is to be disposed of in receptacles located on the adjacent property to the east.

Equipment needed for maintenance includes but is not limited to:

- Shovel
- Broom
- Planting media
- Gravel
- Vegetation (as needed)
- Absorbent inert material

4. Attachments

Attachment 1	Basic Project Information
Attachment 2	Site Assessment Worksheet
Attachment 3	Site Planning Worksheet
Attachment 4	Source Control Measures
Attachment 5	Drainage Management Area Worksheet
Attachment 6	Site Design Measures
Attachment 7	Stormwater Treatment Control Measures
Attachment 8	Geotechnical Report
Attachment 9	Site Layout Plan (Stormwater Quality Control Plan)
Attachment 10	Operations and Maintenance Plan

Section 1: Basic Project Information

This worksheet must be filled out for all projects required to implement the *2015 Post-Construction Stormwater Standards Manual*. A licensed professional engineer or landscape architect is not required for the development of the project plan for Small Projects.

Project Site Address	
Owner Information	
Name	Nicole Torstvet
Title, if applicable	Director, Development
Company or Affiliation	Prologis, LP
Address	615 International Parkway, Tracy, CA 95377
Telephone Number	906-673-8727
Email Address	ntorstvet@prologis.com
Professional Engineer/Landscape Architect Information (not required for Small Projects)	
Name	Michael Bassilios, PE
Title	Senior Associate
Company or Affiliation	Kier & Wright Civil Engineers & Surveyors, Inc.
Address	2850 Collier Canyon Rd. Livermore CA 94551
Telephone Number	925-245-8788
Email Address	mbassilios@kierwright.com
Professional Engineer/ Landscape Architect Stamp and Signature	

Type of Project

Is the proposed project:

- □ A linear underground/overhead utility project (LUP) that creates and/or replaces at least 2,500, but less than 5,000 square feet of impervious surface?
- □ A detached single-family home that is not part of a common plan of development?
- □ A routine maintenance or repair project that maintains the original line and grade, hydraulic capacity, and original purpose of the facility?
    - □ Exterior wall surface replacement
    - □ Pavement resurfacing within an existing footprint
    - □ Replacement of damaged pavement (e.g., pothole repair, short-non-contiguous sections of roadway)
    - □ Re-roofing regardless of whether it is a full roof replacement or an overlay
- □ Interior remodels that do not modify the existing footprint?
- □ Excavation, trenching, and resurfacing associated with LUPs?
- □ Pavement grinding and resurfacing of existing roadways and parking lots?
- □ Construction of new sidewalks, pedestrian ramps, or bicycle lanes on existing roadways?
- □ Construction of sidewalks and bicycle lanes built as part of new streets or roads that are graded to runoff to adjacent vegetated areas?
- □ Construction of impervious trails that are graded to runoff to adjacent vegetated areas or other non-erodible areas?
- □ Construction of sidewalks, bicycle lanes, and trails with permeable surfaces?

none of the above

The above projects are exempt from the requirements of the *2015 Post-Construction Stormwater Standards Manual*. See Section 1.5 of the *2015 Post-Construction Stormwater Standards Manual* for details on project exceptions. Submit Section 1 of the Project Stormwater Plan as part of the application submittal.

If the proposed project is not exempt as identified above, identify the type of project:

- ☐ Small Project – These are projects that create and/or replace at least 2,500, but less than 5,000 square feet of impervious surface; or detached single-family homes that create and/or replace a minimum of 2,500 square feet of impervious surface and are not part of a larger plan of development.
- ☐ Regulated Project – These are projects that create and/or replace greater than or equal to 5,000 square feet of impervious surface and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surfaces.
  - ☐ New development
  - ☐ Redevelopment that increases the impervious surface area by 50 percent or more of the existing development
  - ☐ Redevelopment that increases the impervious surface area by less than 50 percent of the existing development
- ☒ Hydromodification Management Projects – These are projects that create and/or replace one acre or more of impervious surface and result in a net increase of impervious surface

Description of the Project

Provide a description of the proposed project.

The Project consists of constructing a 278,213 square feet (SF) speculative industrial building and associated site improvements on a 645,971± SF (14.8294± Acres) lot. The site improvements will include approximately 178 auto stalls, 83 trailer stalls, 12 bike racks, and various landscaping features.

Owner Certification and Signature

The undersigned owner of the subject property is responsible for the implementation of the provisions of this Project Stormwater Plan consistent with the requirements of the 2015 Post-Construction Stormwater Standards Manual, City of Manteca, County of San Joaquin and Provision E.12 of the California State Water Resources Control Board Phase II Permit (Order No. 2013-0001-DWQ). If the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement the Project Stormwater Plan. A copy of the final signed and fully approved Project Stormwater Plan shall be available on the subject site throughout the course of the development.

Owner Signature _____

Date _____

Site Assessment Worksheet

General Project Site Information

Latitude: 37°47'30.98"N | Longitude: 121°11'57.80"W | Elevation: 42' (NGVD29)

Total Project Area (A_T) (ft^2): 645,971

Total Existing Impervious Area (ft^2): 0

Total Post-Project Impervious Area (ft^2): 585,344

Receiving Water(s): Lone Tree Creek - San Joaquin River

Describe location(s) of discharge from the project site.

The existing topographic survey indicates runoff generally drains east to west across the site by sheet flow. The proposed drainage will be routed to a bioretention area and an infiltration basin. The combined treated flows will then be routed to the existing 48" SD on Spreckles Ave.

Describe Environmentally Sensitive Areas, if applicable.

N/A

Pollutants of Concern

Post-Project Land Use Type(s): BIP - Business Industrial Park

Describe expected pollutant-generating activities.

Pre-project: Construction activities

Post-project: Vehicle usage through parking areas and driveways, landscape maintenance, trash collection

Identify pollutants of concern.

Sediment from construction activities and from parking areas, oil / grease from vehicles, oxygen demanding substances from lawn areas, nutrients from landscape fertilizers, trash / debris.

Site Planning Worksheet

Describe how the following site planning principles were considered and implemented in developing and optimizing the site layout for the project.

Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.

The project site does not have any sensitive areas required protection. The building and hardscape were clustered together and interspersed with landscape area.

Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.

The majority of the project site has good permeability. Therefore, there was no consideration to preserve a specific area.

Limit overall impervious coverage of the site with paving and roofs.

Landscape areas are scattered throughout the site and the drainage from impervious surfaces are directed to the pervious areas.

Set back development from creeks, wetlands, and riparian habitats.

There are no creeks with direct runoff adjacent to the site. Additionally, there are no known wetlands or riparian habitats to be protected onsite.

Preserve significant trees.

The only existing trees at the site are located along Spreckles Avenue at the project frontage. The majority of the existing trees at the frontage will be protected in place.

Conform the site layout along natural landforms.

Not applicable as the site is flat.

Avoid excessive grading and disturbance of vegetation and soils.

Site is designed to minimize earthwork.

Replicate the site's natural drainage patterns.

The proposed project replicates the natural topography of the land.

Detain and retain stormwater runoff throughout the site.

The project proposes to implement bioretention planter and an underground infiltration basin which act as storage in large storm events.

Source Control Measures Worksheet

Describe source control measures to be implemented for each potential pollutant generating activity or source present at the project site. If a potential pollutant generating activity or source is not present at the project site, indicate it as “N/A”.

Parking/storage areas and maintenance

Label drains, remove and dispose of trash/debris regularly, sweep/clean parking regularly, block storm drain for wet cleaning

Landscape/outdoor pesticide use

Implement an integrated pest management program. Only use pesticides if there is an actual pest problem and not on a regular basis. Don't use pesticides if rain is expected.

Building and grounds maintenance

Label drains, use non-toxic chemicals for maintenance when possible, cover storm drains, clean tools, when washing large structures collect water and discharge to landscape.

Refuse areas

Label drains, sweep/clean regularly, provide adequate number of trash containers w/covers, provide secondary containment for hazardous chemicals if applicable.

Outdoor storage of equipment or materials

During construction, keep outdoor equipment clean and orderly, mobilize potential pollutants of concern. Minimize inventory. Cover materials.

Vehicle and equipment cleaning

N/A

Vehicle and equipment repair and maintenance

N/A

Fuel dispensing areas

N/A

Pools, spas, ponds, decorative fountains, and other water features

N/A

Source Control Measures Worksheet (cont'd)

Indoor and structural pest control

N/A

Accidental spills or leaks

N/A

Restaurants, grocery stores, and other food service operations

N/A

Interior floor drains

Label floor drains, identify drains on a facilities map, direct water to sanitary sewer system, train personnel.

Industrial processes

N/A

Loading docks

Park in designated areas to contain spills, limit exposure of material to precipitation, label drains, develop an operations plan for loading, train personnel.

Fire sprinkler test water

Sweep or vacuum the area where the water is antipated to flow to - remove trash and debris, temporarily plug drains, direct fire water to vegetated areas, train personnel.

Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources

Direct drain or wash water from boiler drain lines, etc to vegetated areas.

Unauthorized non-stormwater discharges

Label drains, develop protocol for identifying, investigating, and responding to unauthorized non-stormwater discharges. Collect samples.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 1

Type of DMA:

- □ Self-treating area
- □ Self-retaining area
- □ Areas draining to self-retaining areas
- ☒ Areas draining to ~~bioretention facility~~ Infiltration Basin

Describe the DMA: DMA 1 consists of the proposed building, adjacent sidewalk, and landscape area.

Total Drainage Area (ft^2)	606,068		
Existing Impervious Area (ft^2)	0	Soil Type	A
Post-Project Impervious Area (ft^2)	563,317	Infiltration Rate (in/hr)	2 in/hr
Mean Annual Runoff-Producing Rainfall Depth (P_6) (in)			0.37
Drawdown time (t_{max}) (hr) (48)			48
Regression constant (a) (1.963 for 48-hr drawdown)			1.963

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	0
Stormwater runoff coefficient (C) = $0.858 \times i^3 - 0.78 \times i^2 + 0.774 \times i + 0.04$	0.04
Unit stormwater volume (P_0) (in) = a x C x P_6	0.03
Stormwater Runoff Volume for the DMA (ft^3)	1,515

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	0.93
Stormwater runoff coefficient (C) = $0.858 \times i^3 - 0.78 \times i^2 + 0.774 \times i + 0.04$	0.78
Unit stormwater volume (P_0) (in) = a x C x P_6	0.57
Stormwater Design Volume for the DMA (SDV) (ft^3) = A x P_0 ÷ 12	28,788

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 2

Type of DMA:

- □ Self-treating area
- □ Self-retaining area
- □ Areas draining to self-retaining areas
- ☒ Areas draining to bioretention facility

Describe the DMA: DMA 2 is located at the east parking and landscape area along the project frontage.

Total Drainage Area (ft^2)	39,903		
Existing Impervious Area (ft^2)	0	Soil Type	A
Post-Project Impervious Area (ft^2)	22,027	Infiltration Rate (in/hr)	
Mean Annual Runoff-Producing Rainfall Depth (P_6) (in)			0.37
Drawdown time (t_{max}) (hr) (48)			48
Regression constant (a) (1.963 for 48-hr drawdown)			1.963

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	0
Stormwater runoff coefficient (C) = $0.858 \times i^3 - 0.78 \times i^2 + 0.774 \times i + 0.04$	0.04
Unit stormwater volume (P_0) (in) = $a \times C \times P_6$	0.03
Stormwater Runoff Volume for the DMA (ft^3)	100

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	0.55
Stormwater runoff coefficient (C) = $0.858 \times i^3 - 0.78 \times i^2 + 0.774 \times i + 0.04$	0.37
Unit stormwater volume (P_0) (in) = $a \times C \times P_6$	0.27
Stormwater Design Volume for the DMA (SDV) (ft^3) = $A \times P_0 \div 12$	898

Site Design Measure Worksheet

Drainage Management Area (DMA) # 1

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft^3) = SDV 28,788

Stormwater Design Volume with credits (ft^3) = SDV_{adj} = SDV - SDM_{credit}
(This volume must be treated by stormwater treatment control measures.) _____

Do proposed site design measures completely manage the SDV for this DMA?

- □ Yes, stormwater management requirement met for this DMA.
- ☒ No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft^3)
□ Stream setbacks and buffers	
☒ Soil quality improvement and maintenance	
☒ Tree planting and preservation	
☒ Rooftop and impervious area disconnection	
□ Porous pavement	
□ Vegetated swales	
□ Rain barrels/cisterns	
Total Stormwater Runoff Volume Credit (SDM_{credit})	

For site design measures not implemented for this DMA, describe why they are not selected.

Not feasible

Site Design Measure Worksheet

Drainage Management Area (DMA) # 2

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft^3) = SDV 898

Stormwater Design Volume with credits (ft^3) = SDV_{adj} = SDV - SDM_{credit}
(This volume must be treated by stormwater treatment control measures.) _____

Do proposed site design measures completely manage the SDV for this DMA?

- □ Yes, stormwater management requirement met for this DMA.
- ☒ No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft^3)
□ Stream setbacks and buffers	
☒ Soil quality improvement and maintenance	
☒ Tree planting and preservation	
☒ Rooftop and impervious area disconnection	
□ Porous pavement	
□ Vegetated swales	
□ Rain barrels/cisterns	
Total Stormwater Runoff Volume Credit (SDM_{credit})	

For site design measures not implemented for this DMA, describe why they are not selected.

Not feasible

Stormwater Treatment and Baseline Hydromodification Control Measure Design Worksheet

For each drainage management area (DMA), in which proposed site design measures did not fully manage the difference in pre- and post-project stormwater runoff volume, complete this worksheet.

Drainage Management Area (DMA) # 1

Design bioretention facility to manage the adjusted stormwater design volume (SDV_{adj}). Calculate the bottom surface area of a bioretention facility:

Stormwater Design Volume for the DMA (SDV) (ft^3) See Drainage Management Area Worksheet.	28,788
Total Stormwater Runoff Credit Volume (SDM_{credit}) (ft^3) See Site Design Measure Worksheet.	0
Adjusted Stormwater Design Volume (SDV_{adj}) (ft^3) = SDV - SDM_{credit}	28,788
Design infiltration rate of underlying soils (f_{design}) (in/hr)	2 in/hr
Ponding zone depth (d_{pz}) (ft) (0.5-1.5 ft)	N/A
Planting media layer depth (d_{pm}) (ft) (min 1.5 ft)	N/A
Planting media porosity (η_{pm})	N/A
Gravel layer depth (d_{gl}) (ft) (min 1 ft)	N/A
Gravel layer porosity (η_{gl})	N/A
Bottom surface area of a ~~bioretention facility~~ Infiltration Basin (ft^2) = $\frac{SDV_{adj}}{d_{pz}+(\eta_{pm}\times d_{pm})+(\eta_{gl}\times d_{gl})}$	6,633

Verify that: $d_{pz} + (\eta_{pm} \times d_{pm}) + (\eta_{gl} \times d_{gl}) \leq f_{design} \times t_{max} \div 12$. If not, redesign factors above.

Verify that the DMA has adequate space to implement bioretention facility sized above. If not, redesign factors above or provide additional stormwater treatment control measures to manage remaining portion of the SDV.

Describe and provide justification for any variations to the bioretention facility for site-specific conditions. See Section 6.2 of the *2015 Post-Construction Stormwater Standards Manual* for more information.

An underground infiltration basin is proposed as an alternative to bioretention areas for this DMA due to space constraints.

Stormwater Treatment and Baseline Hydromodification Control Measure Design Worksheet

For each drainage management area (DMA), in which proposed site design measures did not fully manage the difference in pre- and post-project stormwater runoff volume, complete this worksheet.

Drainage Management Area (DMA) # 2

Design bioretention facility to manage the adjusted stormwater design volume (SDV_{adj}). Calculate the bottom surface area of a bioretention facility:

Stormwater Design Volume for the DMA (SDV) (ft^3) See Drainage Management Area Worksheet.	898
Total Stormwater Runoff Credit Volume (SDM_{credit}) (ft^3) See Site Design Measure Worksheet.	0
Adjusted Stormwater Design Volume (SDV_{adj}) (ft^3) = SDV - SDM_{credit}	898
Design infiltration rate of underlying soils (f_{design}) (in/hr)	2
Ponding zone depth (d_{pz}) (ft) (0.5-1.5 ft)	0.5
Planting media layer depth (d_{pm}) (ft) (min 1.5 ft)	1.5
Planting media porosity (η_{pm})	30%
Gravel layer depth (d_{gl}) (ft) (min 1 ft)	1
Gravel layer porosity (η_{gl})	40%
Bottom surface area of a bioretention facility (ft^2) = $\frac{SDV_{adj}}{d_{pz}+(\eta_{pm}\times d_{pm})+(\eta_{gl}\times d_{gl})}$	665

Verify that: $d_{pz} + (\eta_{pm} \times d_{pm}) + (\eta_{gl} \times d_{gl}) \leq f_{design} \times t_{max} \div 12$. If not, redesign factors above.

Verify that the DMA has adequate space to implement bioretention facility sized above. If not, redesign factors above or provide additional stormwater treatment control measures to manage remaining portion of the SDV.

Describe and provide justification for any variations to the bioretention facility for site-specific conditions. See Section 6.2 of the *2015 Post-Construction Stormwater Standards Manual* for more information.

407 SPRECKELS AVENUE
MANTECA, CALIFORNIA

GEOTECHNICAL EXPLORATION

Submitted to
Ms. Terri Allen
DCT Industrial
12 Corporate Plaza, Suite 150
Newport Beach, CA 92660

Prepared by
ENGEO Incorporated

January 24, 2017

Project No.
13618.000.000

ENGEO
Expect Excellence

Project No.
13618.000.000

January 24, 2017

Ms. Terri Allen
DCT Industrial
12 Corporate Plaza, Suite 150
Newport Beach, CA 92660

Subject: 407 Spreckels Avenue
Manteca, California

GEOTECHNICAL EXPLORATION

Dear Ms. Allen:

ENGEO is pleased to present this geotechnical report for the Spreckels Avenue project as outlined in our agreement dated December 9, 2016. We characterized the subsurface conditions at the site to provide the enclosed geotechnical recommendations for design.

Our experience and that of our profession clearly indicate that the risk of costly design, construction, and maintenance problems can be significantly lowered by retaining the design geotechnical engineering firm to review the project plans and specifications and provide geotechnical observation and testing services during construction. Please let us know when working drawings are nearing completion, and we will be glad to discuss these additional services with you.

If you have any questions or comments regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Christopher Stouffer, EIT
cs/sh/jf

Steve Harris, GE

TABLE OF CONTENTS

Letter of Transmittal

1.0 INTRODUCTION 1

1.1 PURPOSE AND SCOPE 1
1.2 PROJECT LOCATION 1
1.3 PROJECT DESCRIPTION 1

2.0 FINDINGS 2

2.1 SITE BACKGROUND 2
2.2 FIELD EXPLORATION 3
2.2.1 Borings 3
2.2.2 Cone Penetration Tests 3
2.2.3 Test Pits 3
2.3 REGIONAL AND SITE GEOLOGY 4
2.4 SITE SEISMICITY 4
2.5 SURFACE CONDITIONS 5
2.6 SUBSURFACE CONDITIONS 5
2.7 GROUNDWATER CONDITIONS 6
2.8 LABORATORY TESTING 6
2.9 PERCOLATION TESTING 6
2.9.1 Standpipe Percolation Test 6
2.9.2 Double Ring Infiltrometer Testing 6
2.9.3 Percolation Testing Results 7

3.0 CONCLUSIONS 7

3.1 UNDOCUMENTED FILL 7
3.2 SEISMIC HAZARDS 7
3.2.1 Ground Rupture 7
3.2.2 Ground Shaking 8
3.2.3 Liquefaction and Cyclic Softening 8
3.2.4 Densification Due to Earthquake Shaking 9
3.2.5 Lateral Spreading 9
3.2.6 Flooding 9
3.3 2016 CBC SEISMIC DESIGN PARAMETERS 9
3.4 SOIL CORROSION POTENTIAL 10

4.0 CONSTRUCTION MONITORING 11

5.0 EARTHWORK RECOMMENDATIONS 12

5.1 GENERAL SITE CLEARING 12
5.2 UNDOCUMENTED FILL REMOVAL 12
5.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS 13
5.4 ACCEPTABLE FILL 13
5.5 FILL COMPACTION 13
5.5.1 Grading in Structural Areas 13
5.5.2 Underground Utility Backfill 14
5.6 SLOPE GRADIENTS 14
5.7 SURFACE DRAINAGE 15

TABLE OF CONTENTS (Continued)

6.0 FOUNDATION AND SLAB-ON-GRADE RECOMMENDATIONS 15

6.1 FOOTING DIMENSIONS AND ALLOWABLE BEARING CAPACITY 15
6.2 FOUNDATION LATERAL RESISTANCE 16
6.3 SETTLEMENT 16
6.4 INTERIOR CONCRETE SLAB-ON-GRADE FLOORS 16
6.5 TRENCH BACKFILL 17

7.0 RETAINING WALLS 17

7.1 LATERAL SOIL PRESSURES 17
7.2 RETAINING WALL DRAINAGE 18
7.3 BACKFILL 18
7.4 FOUNDATIONS 18

8.0 EXTERIOR FLATWORK RECOMMENDATIONS 18

9.0 PAVEMENT DESIGN 19

9.1 FLEXIBLE PAVEMENTS 19
9.2 RIGID PAVEMENTS 19
9.3 SUBGRADE AND AGGREGATE BASE COMPACTION 20
9.4 CUT-OFF CURBS 20

10.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS 20

SELECTED REFERENCES

FIGURES

APPENDIX A – Exploration Logs

APPENDIX B – Laboratory Test Data

APPENDIX C – Liquefaction Analysis Results

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this geotechnical exploration report is to provide geotechnical recommendations for the design of the proposed logistics facility and associated improvements in Manteca, California.

The scope of our services included:

- Reviewing available literature, geologic maps, and previous available reports pertinent to the site.
- Advancing 2 cone penetrometer tests (CPTs), drilling 6 brings and performing 27 test pits.
- Perform 2 standpipe percolation tests and one double ring infiltrometer percolation test.
- Preforming laboratory analysis.
- Analyzing the geotechnical data.
- Reporting our findings and recommendations.

This report was prepared for the exclusive use of DCT Industrial and its design team consultants. In the event that any changes are made in the character, design or layout of the development, the conclusions and recommendations contained in this report should be reviewed by ENGEO to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO.

1.2 PROJECT LOCATION

The subject site is located on the west side of Spreckels Avenue, south of the intersection of Phoenix Drive and Spreckels Avenue in Manteca, California as shown on Figure 1. The site is accessible from Spreckels Avenue.

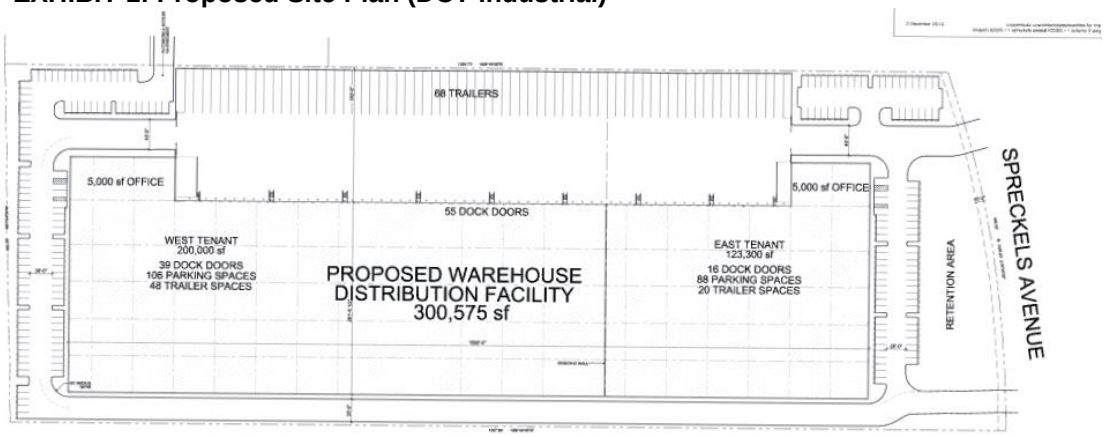
The site is bounded by commercial buildings to the north, industrial buildings to the south, residential structures to the west, and the Manteca Tidewater Bikeway to the east, parallel to Spreckels Avenue, as shown on Figure 2. The approximately 14-acre property currently consists of undeveloped land.

1.3 PROJECT DESCRIPTION

Based on our review of the information provided and discussions with you, we understand the proposed project will include:

- An approximately 300,000-square-foot distribution facility.
- One retention basin.
- Asphalt and Portland Cement Concrete paved parking and driveways.
- Underground utilities.

EXHIBIT 1: Proposed Site Plan (DCT Industrial)



Structural loads are yet to be determined; however, we assume that structural loads and maximum allowable differential settlements will be representative of this type of construction.

2.0 FINDINGS

2.1 SITE BACKGROUND

As shown below, historical images from Google Earth indicate the site was previously occupied by a sugar refinery and associated structures. The northern and southern portions of the site were previously developed with industrial buildings. The remainder of the site appears to contain smaller buildings, stockpiles, a tank, or is undeveloped. Imagery indicates that these structures were removed around 2003 and has since remained undeveloped. The majority of the site appears to have undergone various levels of construction and grading. Below is an aerial image of the site conditions in 1993. The project boundaries are outlined in teal.

EXHIBIT 2: Site conditions in 1993 (Google Earth)

2.2 FIELD EXPLORATION

Our field exploration included drilling 6 borings, advancing 2 CPT soundings and performing 27 exploratory test pits. We performed our field exploration between January 5 and January 6, 2017. The approximate locations of the explorations are shown on the site plan, Figure 2.

2.2.1 Borings

We retained a truck-mounted Soil Test Ranger drill rig and crew to advance the borings using 4-inch-diameter solid flight augers. The borings were advanced to depths ranging from approximately 16½ to 27 feet below existing grade. An ENGEO representative logged the borings in the field and collected soil samples using either a 3 inch O.D. Modified California-type split-spoon sampler fitted with 6-inch-long stainless steel liners or a 2-inch O.D. Standard Penetration Test (SPT) split-spoon sampler. The samplers were advanced with a 140-pound hammer with a 30-inch drop, employing a rope-and-cathead hammer system. The penetration of the samplers into the native materials was field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. Blow count results on the boring logs were recorded as the number of blows required for the last 1 foot of penetration.

We used field logs to develop the boring logs included in Appendix A. The boring logs depict subsurface conditions within the borings at the time the exploration was conducted. Subsurface conditions at other locations may differ from conditions occurring at these boring locations and the passage of time may result in altered subsurface conditions. In addition, stratification lines represent the approximate boundaries between soil types; the transitions may be gradual or gradational.

2.2.2 Cone Penetration Tests

We retained a CPT rig to perform 2 cone penetration tests advanced approximately 50 feet below existing grade. The soundings were performed with a 10-square-centimeter end area 10-ton subtraction digital cone with a pore pressure and seismic transducer. The area of the friction sleeve is 150 square centimeters and the average unequal end area ratio is 0.8. The cone, connected with a series of rods, is pushed into the ground at a constant rate. Cone readings are taken at approximately 5-cm intervals with a penetration rate of 2 cm per second in accordance with ASTM D-3441. Measurements include the tip resistance to penetration of the cone (Q_c), the resistance of the surface sleeve (F_s), and pore pressure (U) (Robertson and Campanella, 1988). CPT logs are presented in Appendix A.

2.2.3 Test Pits

We retained a backhoe to perform 27 exploratory test pits throughout the site. The pits were approximately 3 feet wide and up to 10 feet long. They were excavated to depths ranging from approximately 2½ feet to 7½ feet below the existing ground surface. Logs of the test pits are attached in Appendix A.

Test pit excavations were loosely backfilled with the excavated material. During site grading, the loosely backfilled soils within our exploratory test pits should be removed and re-compacted in

accordance with Section 5.0. The depth of removal of these materials should be determined by ENGEO in the field at the time of grading. The test pits were geocoded at the time of excavation in order to be located at time of construction.

2.3 REGIONAL AND SITE GEOLOGY

We present the following discussion of site geology based on our field reconnaissance and review of the CGS *Geologic Map of the San Francisco-San Jose Quadrangle* (Wagner, Bortugno, and McJunkin 1991).

The site is located in the Great Valley geomorphic province. The Great Valley is an elongate, northwest-trending structural trough bound by the Coast Range on the west and the Sierra Nevada on the east. The Great Valley has been and is presently being filled with sediments primarily derived from the Sierra Nevada.

Our site reconnaissance and previously referenced geologic map indicate that the underlying geologic formation at the site is Dune Sand (Qs) consisting of interbedded silt, sand, and gravel. The regional geologic map is included on Figure 3.

2.4 SITE SEISMICITY

The site is located in an area of moderate to high seismicity. No known active[1] faults cross the property and the site is not located within an Earthquake Fault Special Study Zone; however, large (greater than Moment Magnitude 7) earthquakes have historically occurred in the region and many earthquakes of low magnitude occur every year. Figure 4, Regional Faulting and Seismicity, shows the approximate locations of nearby faults and significant earthquakes recorded within the region. The two nearest earthquake faults zoned as active by the State of California Geological Survey are the Great Valley 7 fault located approximately 15 miles to the southwest and the Greenville fault, located about 26 miles to the southwest.

The Great Valley fault is a blind thrust fault with no known surface expression; the postulated fault location has been based on historical regional seismic activity and isolated subsurface information. Portions of the Great Valley fault are considered seismically active thrust faults; however, since the Great Valley fault segments are not known to extend to the ground surface, the State of California has not defined Earthquake Fault Hazard Zones around the postulated traces. The Great Valley fault is considered capable of causing significant ground shaking at the site, but the recurrence interval is believed longer than for more distant, strike-slip faults. Recent studies by Eaton 1986, Moores 1991 and Wong 1989 suggest that this boundary fault may have been the cause of the Vacaville-Winters earthquake sequence of April 1892.

Further seismic activity can be expected to continue along the western margin of the Central Valley.

[1] An active fault is defined by the California Geologic Survey as one that has had surface displacement within Holocene time (about the last 11,000 years). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.

Other active faults capable of producing significant ground shaking at the site include the Ortigalita fault, 36 miles south; Calaveras fault, 40 miles southwest; the Hayward fault, 43 miles southwest; the Green Valley Connected fault, 44 miles northwest; and the San Andreas fault, 61 miles southwest of the site. Any one of these faults could generate an earthquake capable of causing strong ground shaking at the subject site. Earthquakes of Moment Magnitude 7 and larger have historically occurred in the nearby Bay Area and numerous small magnitude earthquakes occur every year.

2.5 SURFACE CONDITIONS

According to Google Earth, site grades range from elevation 40 feet to 44 feet (Datum WGS84). During our field reconnaissance, we observed the following site conditions:

- Excessive growth of grasses and weeds across the site.
- Varying amounts of concrete, brick and debris across surface of the site with the largest concentration along the northern portion.
- Large debris such as mattresses and bikes along the north and east perimeter.
- A metallic pipe with a diameter of approximately 4 inches extending approximately 4 feet above the ground surface on the eastern portion of the site.

Please refer to the Site Plan, Figure 2, for more information on site features.

2.6 SUBSURFACE CONDITIONS

We encountered varying amounts of undocumented fill within the majority of our test pits and boring explorations. The fill contained concrete debris, bricks, asphalt, and non-native rock, all of varying diameters. Test pits on the southwestern portion of the site uncovered undocumented fill identified as a black, low plastic sandy lean clay at a depth of 3 to 6½ feet below the surface. The depths to native material varied from approximately the surface to 6¾ feet below existing grade. The native soils encountered in our explorations generally consisted of loose to medium dense silty sand and clayey sand to a depth ranging between 2½ to 5 feet. Across the site, a relatively continuous layer of medium dense silty sand extended to a depth ranging from 8 to 10½ feet. Beneath the silty sand stratum was a continuous layer of medium dense poorly graded sand to a depth ranging from 16 to 20 feet. The sand layer was underlain by a lean clay and sandy lean clay to the total depth of the explorations. Data from the CPT explorations found the clay layer to be underlain by a sand and gravelly sand to the total depth of the explorations.

Refer to Figure 2 and exploration logs included in Appendix A for specific subsurface conditions at each location. The logs graphically depict the subsurface conditions encountered at the time of the exploration. The boring logs contain the soil type, color, consistency, and visual classification in general accordance with the Unified Soil Classification System (USCS).

2.7 GROUNDWATER CONDITIONS

We did not observe static groundwater in any of the borings or test pits to the maximum depth explored of 27 feet. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practice, and other factors not evident at the time measurements were made.

2.8 LABORATORY TESTING

We performed laboratory tests on selected soil samples to determine their engineering properties. For this project, we performed moisture content, plasticity index, #200 wash, and resistance value. Corrosion testing was performed by Sunland Analytical. Selected soil properties are recorded on the boring logs in Appendix A. All laboratory data is included in Appendix B.

2.9 PERCOLATION TESTING

2.9.1 Standpipe Percolation Test

We installed two percolation test holes to a depth of 5 feet in the approximate location of the proposed retention basin. Percolation Holes P-1 and P-3 were installed as standpipe percolation tests. We drilled the percolation test holes using a 4-inch-diameter solid flight auger. Preparation of the percolation test holes began by placing a 2-inch-thick layer of open-graded gravel in the bottom of the holes, then placing a 3-inch-diameter plastic pipe in the test holes and ¾-inch-diameter drain rock surrounding the pipe up to the ground surface. We presoaked the holes with municipal drinking water the day prior to performing the percolation test. It is our opinion that the percolation rate of drinking water should be similar to storm water.

ENGEO performed the percolation testing on January 6, 2017. At the start of the test, we filled the holes with water to approximately 12 inches above the gravel placed at the bottom of the holes. The water was then measured until the percolation rate stabilized. At the end of each interval, additional water was added, as needed, to reset the water level to approximately 12 inches above the gravel.

2.9.2 Double Ring Infiltrometer Testing

One 5-foot-deep trench was excavated in the center of the proposed basin. During excavation, the trench's subsurface material was identified and logged as TP-27. Percolation Hole P-2 was installed as a double-ring percolation test in accordance with ASTM D3385. A double-ring infiltrometer consisting of two 20-inch-high open cylinders with diameters of 12 inches and 24 inches were concentrically driven 4 and 6 inches into the ground, respectively. A competent seal between the soil and the cylinders was ensured. Each ring was then filled with water to no more than a depth of 6 inches and the differential depth between the inner and outer cylinders no more than ¼ inch. Two Mariotte tubes of approximately 3,000 ml for the inner cylinder and 10,000 ml for the outer cylinder were used to maintain a constant and even water level in the two tubes.

ENGEO performed the percolation testing for the double-ring test method on January 6, 2017. The apparatus was installed and a field representative monitored the water levels in both the

cylinders and the Mariotte tubes. The test was performed and monitored until the infiltration rate in both the inner and outer cylinders remained constant.

2.9.3 Percolation Testing Results

After performing the standpipe and double-ring percolation tests, the most conservative rate recorded was 60 gallons per square foot per day. This percolation rate is only applicable to the proposed design basin location and depth of 5 feet. If the basin is to be moved or dimensions altered, further testing is suggested. Additional factors of safety should be applied as seen fit by the design civil engineer.

3.0 CONCLUSIONS

From a geotechnical engineering viewpoint, in our opinion, the site is suitable for the proposed development, provided the geotechnical recommendations in this report are properly incorporated into the design plans and specifications. The primary geotechnical issues that could affect development is undocumented fill. We summarize this and our other conclusions below.

3.1 UNDOCUMENTED FILL

Our borings and test pits indicate that the majority of the site is underlain by undocumented fill. The site had an average fill depth of 3 to 5 feet with the deepest fill depth of 6¾ feet. Although explorations were extensive, the depth of fill is variable and may fluctuate outside these averages and limits.

Non-engineered fills can undergo excessive settlement, especially under new fill or building loads. Without proper documentation of existing fill placed on the site, we recommend complete removal and recompaction of the existing fill. We present fill removal recommendations in Section 5.0.

3.2 SEISMIC HAZARDS

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and ground lurching. The following sections present a discussion of these hazards as they apply to the site. Based on topographic and lithologic data, the risk of regional subsidence or uplift, soil liquefaction, dynamic densification, lateral spreading, landslides, tsunamis, flooding or seiches is considered low to negligible at the site.

3.2.1 Ground Rupture

Since there are no known active faults crossing the property and the site is not located within an Earthquake Fault Special Study Zone, it is our opinion that ground rupture is unlikely at the subject property.

3.2.2 Ground Shaking

A potential seismic hazard at the site is strong ground shaking from a nearby moderate to major seismic event. The degree of shaking experienced at a site is dependent on the magnitude of the event, the distance to its epicenter, and the nature of the underlying soils. Based on the probabilistic seismic data provided by the Unites States Geological Survey (USGS), we recently utilized the online 2008 Interactive Deaggregations tool to determine that a horizontal ground surface acceleration of 0.44g is predicted to have a 2 percent probability of being exceeded in a 50-year design life at the site.

To mitigate the ground shaking effects, all structures are to be designed using sound engineering judgment and the latest California Building Code (CBC) requirements as a minimum. The 2016 CBC Seismic Design Parameters are provided below in a subsequent section of this report.

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures are to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1996).

3.2.3 Liquefaction and Cyclic Softening

Soil liquefaction results from loss of strength during cyclic loading, such as imposed by earthquakes. Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained sands. Empirical evidence indicates that loose to medium-dense gravels, silty sands, and low- to moderate-plasticity silts and clays may be susceptible to liquefaction. In addition, sensitive high-plasticity soils may be susceptible to significant strength loss (cyclic softening) as a result of significant cyclic loading. The silts and clays encountered are not sensitive and, therefore, not subject to cyclic softening. We summarize the results of our liquefaction analysis below.

According to Bray and Sancio 2006, fine-grained soils with PI less than or equal to 12 and moisture content and liquid limit ratio of greater than 0.85 can undergo cyclic mobility. Based on our laboratory results, we found site soils to have a plasticity index of 14, and less than a ratio of 0.85.

We evaluated the liquefaction potential of the site soil with CPT data using methods published by Robertson (2009). The Cyclic Stress Ratio (CSR) was estimated for a Peak Ground Acceleration (PGA_M) value of 0.44g, based on probabilistic seismic data provided by USGS as discussed in Section 3.2.2. We also used a moment magnitude (M_w) of 6.7 in our analysis, which corresponds to the maximum magnitude for the Great Valley 7 fault based on the United States USGS national

seismic hazard maps. We considered a design groundwater elevation of approximately 28 feet in our analysis.

The results of our liquefaction analyses indicate relatively thin and discontinuous sand layers approximately 2 feet in thickness below a depth of 34 feet as potentially liquefiable. Consequences of liquefaction could include surface disruption, settlement, and downdrag on deep foundations. Based on the results of our analysis and the relative thickness of non-liquefiable surface soils and potentially liquefiable soil, the risk of surface disruption is low to moderate. We estimate approximately ¾ inch of total liquefaction-induced settlement in a design-level seismic event based on the results of our CPT liquefaction analysis. Appendix C includes the results of our CPT-based liquefaction analysis.

3.2.4 Densification Due to Earthquake Shaking

Densification of loose granular soils above and below the groundwater level can cause settlement due to earthquake-induced vibrations. Due to the density of the granular materials sampled in the boring, the potential for densification of granular layers due to earthquake shaking is considered low at the site.

3.2.5 Lateral Spreading

Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction) that causes the overlying soil mass to move toward a free face or down a gentle slope. Since the potential for liquefaction is considered low and the site is relatively flat, it is our opinion that the potential for lateral spreading is low.

3.2.6 Flooding

Based on site elevation and distance from water sources, flooding is not expected at the subject site; however, the Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final pad elevations and provide appropriate design measures for development of the project, if necessary.

3.3 2016 CBC SEISMIC DESIGN PARAMETERS

Based on the subsurface conditions encountered, we characterized the site as Site Class D in accordance with the 2016 CBC. We provide the 2016 CBC seismic design parameters below, which include design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCE_R) spectral response acceleration parameters.

TABLE 3.3-1: 2016 CBC Seismic Design Parameters (Latitude: 37.79153° Longitude: -121.19926°)

PARAMETER	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	0.97
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.35
Site Coefficient, F_A	1.11
Site Coefficient, F_V	1.71
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.08
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	0.59
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	0.72
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	0.40
Mapped MCE Geometric Mean Peak Ground Acceleration (g)	0.37
Site Coefficient, F_{PGA}	1.15
MCE Geometric Mean Peak Ground Acceleration, PGA_M (g)	0.41
Long period transition-period, T_L	8 sec

3.4 SOIL CORROSION POTENTIAL

As part of this study, we obtained two representative soil samples to determine their pH, resistivity, sulfate, and chloride. Two near-surface samples were combined for the testing. The results are presented in the table below and provided in Appendix B.

TABLE 3.4-1: Corrosivity Test Results

SAMPLE LOCATION	PH	RESISTIVITY (OHMS-CM)	CHLORIDE (MG/KG)	SULFATE (MG/KG)
1-B3 @3.5’ and 1-B5 @ 2.5’	8.04	1,450	55.0	63.2

The 2016 CBC references the 2011 American Concrete Institute Manual, ACI 318-11, Chapter 4, Sections 4.2.1 for structural concrete requirements. ACI Table 4.2.1 provides the following exposure categories and classes, and concrete requirements in contact with soil based upon the exposure risk.

TABLE 3.4-2: ACI Table 4.2.1: Exposure Categories and Classes

CATEGORY	SEVERITY	CLASS	CONDITION	
F Freezing and thawing	Not Applicable	F0	Concrete not exposed to freezing-and-thawing cycles	
	Moderate	F1	Concrete exposed to freezing-and-thawing cycles and occasional exposure to moisture	
	Severe	F2	Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture	
	Very Severe	F3	Concrete exposed to freezing-and-thawing cycles and in continuous contact with moisture and exposed to deicing chemicals	
S Sulfate	Not applicable	S0	SO_4 < 0.10	SO_4 < 150
	Moderate	S1	0.10 ≤ SO_4< 0.20	150 ≤ SO_4 ≤ 1,500 seawater
	Severe	S2	0.20 ≤ SO_4 ≤ 2.00	1,500 ≤ SO_4 ≤ 10,000
	Very severe	S3	SO_4 > 2.00	SO_4 > 10,000
P Requiring low permeability	Not applicable	P0	In contact with water where low permeability is not required.	
	Required	P1	In contact with water where low permeability is required.	
C Corrosion protection of reinforcement	Not applicable	C0	Concrete dry or protected from moisture	
	Moderate	C1	Concrete exposed to moisture but not to external sources of chlorides	
	Severe	C2	Concrete exposed to moisture and an external source of chlorides from deicing chemicals, salt, brackish water, seawater, or spray from these sources	

*Percent sulfate by mass in soil determined by ASTM C1580
**Concentration of dissolved sulfates in water in ppm determined by ASTM D516 or ASTM D4130

In accordance with the criteria presented in the above table, these soils are categorized as Not Applicable, and are within the F0 freeze-thaw class, S0 sulfate exposure class, P0 exposure class and C0 corrosion class. Cement type, water-cement ratio, and concrete strength, are not specified for these ranges.

Considering a 'Not Applicable' sulfate exposure, there is no requirement for cement type or water-cement ratio; however, a minimum concrete compressive strength of 2,500 psi is specified by the building code.

If desired to investigate this further, we recommend a corrosion consultant be retained to determine if specific corrosion recommendations are necessary for the project.

4.0 CONSTRUCTION MONITORING

Our experience and that of our profession clearly indicate that the risk of costly design, construction, and maintenance problems can be significantly lowered by retaining the design geotechnical engineering firm to:

1. Review the final grading and foundation plans and specifications prior to construction to determine whether our recommendations have been implemented, and to provide additional or modified recommendations, if necessary. This also allows us to check if any changes have occurred in the nature, design or location of the proposed improvements and provides the opportunity to prepare a written response with updated recommendations.

2. Perform construction monitoring to check the validity of the assumptions we made to prepare this report. All earthwork operations should be performed under the observation of our representative to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of the fills has been performed in accordance with our recommendations and the project specifications. Sufficient notification to us prior to earthwork is essential.

If we are not retained to perform the services described above, then we are not responsible for any party's interpretation of our report (and subsequent addenda, letters, and verbal discussions).

5.0 EARTHWORK RECOMMENDATIONS

The relative compaction and optimum moisture content of soil and aggregate base referred to in this report are based on the most recent ASTM D1557 test method. Compacted soil is not acceptable if it is unstable. It should exhibit only minimal flexing or pumping, as determined by an ENGEO representative.

As used in this report, the term "moisture condition" refers to adjusting the moisture content of the soil by either drying if too wet or adding water if too dry.

We define "structural areas" in a subsequent section of this report as any area sensitive to settlement of compacted soil. These areas include, but are not limited to building pads, sidewalks, pavement areas, and retaining walls.

5.1 GENERAL SITE CLEARING

Areas to be developed should be cleared of all surface and subsurface deleterious materials, including existing building foundations, slabs, buried utility and irrigation lines, pavements, debris, and designated trees, shrubs, and associated roots. Clean and backfill excavations extending below the planned finished site grades with suitable material compacted to the recommendations presented in the subsequent Earthwork Recommendations sections of this report. ENGEO should be retained to observe and test all backfilling.

Following clearing, mow and remove as much of the near surface vegetation that is feasible.

5.2 UNDOCUMENTED FILL REMOVAL

As previously discussed, a majority of the site is underlain by undocumented fill. All undocumented fill will need to be removed to expose competent native soil. Figure 2 shows the approximate location and depth of nonengineered fill that was encountered in our test pits. The actual lateral extent and depth of fill is expected to vary. ENGEO will need to be present during the subexcavation of the non-engineered fill to confirm that it is all removed. The non-engineered

fill may be placed back as an engineered fill provided it meets the recommendations in Section 5.4 below.

5.3 OVER-OPTIMUM SOIL MOISTURE CONDITIONS

The contractor should anticipate encountering excessively over-optimum (wet) soil moisture conditions during winter or spring grading, or during or following periods of rain. Wet soil can make proper compaction difficult or impossible. Wet soil conditions can be mitigated by:

1. Frequent spreading and mixing during warm dry weather.
2. Mixing with drier materials.
3. Mixing with a lime or cement product; or
4. Stabilizing with aggregate, geotextile stabilization fabric, or both.

Options 3 and 4 should be evaluated and approved by ENGEO prior to implementation.

5.4 ACCEPTABLE FILL

Onsite soil material is suitable as fill material provided it is processed to remove concentrations of organic material, debris, and particles greater than 6 inches in maximum dimension.

Portions of the site identified potentially expansive near-surface soils. During excavation, if an expansive clay material is encountered, the soil should be removed or mixed with other non-expansive soil onsite. Soil with a plasticity index greater than 12 inches should not be placed within the upper 24 inches of the building pad.

Imported fill materials should meet the above requirements and have a plasticity index less than 12. Allow ENGEO to sample and test proposed imported fill materials at least one week prior to delivery to the site.

5.5 FILL COMPACTION

5.5.1 Grading in Structural Areas

Once all non-engineered fill is removed, compact the exposed subgrade and surface of areas without non-engineered fill as follows.

1. Scarify to a depth of at least 12 inches.

2. Moisture condition lifts to at least 1 percentage point above the optimum moisture content for soil with a plasticity index less than 12 and at least 3 percentage points above the optimum moisture content for soil with a plasticity index greater than 12.

3. Compact the subgrade to at least 90 percent relative compaction. Compact the upper 6 inches of finish pavement subgrade to at least 95 percent relative compaction prior to aggregate base placement.

After the subgrade soil has been compacted, place and compact acceptable fill as follows:

1. Spread fill in loose lifts that do not exceed 8 inches.

2. Moisture condition lifts to at least 1 percentage point above the optimum moisture content for soil with a plasticity index less than 12 and at least 3 percentage points above the optimum moisture content for soil with a plasticity index greater than 12.

3. Compact fill to a minimum of 90 percent relative compaction; Compact the upper 12 inches of fill in pavement areas and building pads to 95 percent relative compaction prior to aggregate base placement.

Additional testing may need to be performed once non-engineered fill has been removed to identify proper moisture and compaction specifications.

Compact the pavement Caltrans Class 2 Aggregate Base section to at least 95 percent relative compaction (ASTM D1557). Moisture condition aggregate base to or slightly above the optimum moisture content prior to compaction.

5.5.2 Underground Utility Backfill

Recommendations for fill compaction of underground utility backfill within structural areas are provided in this section. Jetting of backfill is not an acceptable means of compaction.

The contractor is responsible for conducting all trenching and shoring in accordance with CALOSHA requirements. Project consultants involved in utility design should specify pipe bedding materials.

Place and compact trench backfill as follows:

1. Trench backfill should have a maximum particle size of 6 inches.

2. Moisture condition lifts to at least 1 percentage point above the optimum moisture content for soil with a plasticity index less than 12 and at least 3 percentage points above the optimum moisture content for soil with a plasticity index greater than 12. Moisture condition backfill outside the trench.

3. Place fill in loose lifts not exceeding 12 inches.

4. Compact fill to a minimum of 90 percent relative compaction (ASTM D1557).

5.6 SLOPE GRADIENTS

Construct final slope gradients less than 10 feet high to 2:1 (horizontal:vertical) or flatter. Slopes taller than 10 feet high should be constructed as a 3:1. The contractor is responsible to construct temporary construction slopes in accordance with CALOSHA requirements.

5.7 SURFACE DRAINAGE

The project civil engineer is responsible for designing surface drainage improvements. With regard to geotechnical engineering issues, we recommend that finish grades be sloped away from buildings and pavements to the maximum extent practical to reduce the potentially damaging effects of expansive soil. As a minimum, we recommend the following:

1. Discharge roof downspouts into closed conduits and direct away from foundations to appropriate drainage devices.

2. Consider the use of surface drainage collection systems to reduce overland surface drainage across the site.

3. Do not allow water to pond near foundations, pavements, or exterior flatwork.

6.0 FOUNDATION AND SLAB-ON-GRADE RECOMMENDATIONS

We developed structural improvement recommendations using our field exploration and laboratory test results and engineering analysis. The proposed building can be supported on continuous or isolated spread footings bearing in competent native soil or compacted fill, in conjunction with slab-on-grade floors.

6.1 FOOTING DIMENSIONS AND ALLOWABLE BEARING CAPACITY

Provide minimum footing dimensions as follows in the Table 6.1-1 below.

TABLE 6.1-1: Minimum Footing Dimensions

FOOTING TYPE	*MINIMUM DEPTH (INCHES)	MINIMUM WIDTH (INCHES)
Continuous	24 (Perimeter Footings) 18 (Interior Footings)	12
Isolated	24 (Perimeter Footings) 18 (Interior Footings)	24

*below lowest adjacent pad grade

Minimum footing depths shown above are taken from lowest adjacent pad grade. The cold joint between the exterior footing and slab-on-grade should be located at least 4 inches above adjacent exterior grade. Design foundations recommended above for a maximum allowable bearing pressure of 2,500 pounds per square foot (psf) for dead-plus-live loads. Increase this bearing capacity by one-third for the short-term effects of wind or seismic loading.

The maximum allowable bearing pressure is a net value; the weight of the footing may be neglected for design purposes. All footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1:1 (horizontal:vertical) plane projected upward from the bottom edge of the trench to the footing.

6.2 FOUNDATION LATERAL RESISTANCE

Lateral loads may be resisted by friction along the base and by passive pressure along the sides of footings bearing in competent native soil or compacted fill. The passive pressure is based on an equivalent fluid pressure in pounds per cubic foot (pcf). We recommend the following allowable values for design:

- Passive Lateral Pressure: 300 pcf
- Coefficient of Friction: 0.30

Increase the above values by one-third for the short-term effects of wind or seismic loading. Passive lateral pressure should not be used for footings on or above slopes.

6.3 SETTLEMENT

While we were not provided any structural loads for evaluating potential foundation settlements, we anticipate that total and differential foundation settlements will be less than approximately ½ and ¼ inch, respectively, over 50 feet, provided the above report recommendations are followed. Once the foundation layout and structural loads are known, we should be retained to review the information and update or revise the above total and differential settlement estimates.

As noted in Section 3.2.3, total earthquake-induced settlements of up to ¾ inch can be expected under the maximum considered earthquake (MCE) as a result of liquefaction. However, due to the relatively thick cap of non-liquefiable soils at the surface of the site, we anticipate differential settlements to be negligible under the MCE. The foundation should be designed to accommodate the cumulative static and seismically induced settlement without collapse of the structure.

6.4 INTERIOR CONCRETE SLAB-ON-GRADE FLOORS

We anticipate that the operation of the distribution facility will include forklift and rack loads on the interior concrete floor slab. When the types and sizes of forklifts and rack loads are known, we recommend that we be retained to review and update these recommendations, as needed.

Interior concrete floors that will support forklift or rack loads should be underlain by 6 inches of granular base having an R-value of at least 50, a plasticity index less than 12, and no more than 10 percent passing the No. 200 sieve. The base should be compacted to at least 95 percent relative compaction (ASTM D1557) to provide firm, uniform support for the slab-on-grade. Prior to construction of the slab, the surface should be proof-rolled with heavy equipment to check that the base material is uniformly compacted and does not deflect under equipment loads. Prior to placing the base material, the building subgrade should be prepared in accordance with the Earthwork Recommendations.

When buildings are constructed with concrete slab-on-grade, water vapor from beneath the slab will migrate through the slab and into the building. This water vapor can be reduced but not stopped. Vapor transmission can negatively affect floor coverings and lead to increased moisture within a building. When water vapor migrating through the slab would be undesirable, such as in any designated office areas where floor coverings may be applied, for example, we recommend installation of a durable vapor retarder beneath the concrete floor. The vapor retarder should be

sealed at all seams and pipe penetrations and connected to all footings. Vapor retarders should conform to Class A vapor retarders in accordance with ASTM E 1745-97 “Standard Specification for Plastic Water Vapor Retarders used in Contact with Soil or Granular Fill under Concrete Slabs”.

6.5 TRENCH BACKFILL

Backfill and compact all trenches below building slabs-on-grade and to 5 feet laterally beyond any edge in accordance with the Underground Utility Backfill recommendations in a previous section of this report.

7.0 RETAINING WALLS

7.1 LATERAL SOIL PRESSURES

Unrestrained drained walls, such as site retaining walls, up to 10 feet in height should be designed for active lateral earth pressures. For drained and restrained retaining walls, such as loading dock walls, at-rest lateral earth pressures should be considered. Table 7.1-1 provides lateral earth pressures for retaining wall design with level backfill conditions.

TABLE 7.1-1: Lateral Earth Pressures for Drained Retaining Walls with Level Backfill

ACTIVE PRESSURE (PCF)	AT-REST PRESSURE (PCF)
40	60

In accordance with 2016 California Building Code requirements, foundation walls and retaining walls supporting more than 6 feet of backfill height are to be designed for dynamic seismic lateral earth pressures corresponding to design earthquake ground motions. We recommend a dynamic seismic lateral earth pressure corresponding to 20H, where H is the height of the retaining wall and the seismic earth pressure has a triangular distribution. When considering seismic earth pressures for retaining walls, the recommended seismic earth pressure increment should be added to the active earth pressures provided above.

Appropriate surcharge loads from buildings, hardscape, and vehicles should be incorporated when the surcharge loading is situated above a 1:1 (horizontal:vertical) line of projection extending up the rear base edge of the bottom of the footing. A uniform horizontal surcharge load of 50 percent of the vertical surcharge load should be assumed to act over the height of the wall.

If adequate drainage is not provided, we recommend that an additional equivalent fluid pressure of 40 pcf be added to the values recommended above for both restrained and unrestrained walls. Damp-proofing of the walls should be included in areas where wall moisture would be problematic.

Passive pressures acting on foundations and keyways may be assumed as 400 pounds per cubic foot (pcf) provided that the area in front of the retaining wall is level for a distance of at least 10 feet or three times the depth of foundation and keyway, whichever is greater. The friction factor for sliding resistance may be assumed as 0.30. The upper 1 foot of soil should be excluded from passive pressure computations unless it is confined by pavement or a concrete slab.

7.2 RETAINING WALL DRAINAGE

Construct either graded rock drains or geosynthetic drainage composites behind the retaining walls to reduce hydrostatic lateral forces. For rock drain construction, we recommend two types of rock drain alternatives:

1. A minimum 12-inch-thick layer of Class 2 Permeable Filter Material (Caltrans Specification 68-1.025) placed directly behind the wall, or

2. A minimum 12-inch-thick layer of washed, crushed rock with 100 percent passing the ¾-inch sieve and less than 5 percent passing the No. 4 sieve. Envelop rock in a minimum 6-ounce, nonwoven geotextile filter fabric.

For both types of rock drains:

1. Place the rock drain directly behind the walls of the structure.

2. Extend rock drains from the wall base to within 12 inches of the top of the wall.

3. Place a minimum of 4-inch-diameter perforated pipe at the base of the wall, inside the rock drain and fabric, with perforations placed down.

4. Place pipe at a gradient at least 1 percent to direct water away from the wall by gravity to a drainage facility.

ENGEO should review and approve geosynthetic composite drainage systems prior to use.

7.3 BACKFILL

Backfill behind retaining walls should be placed and compacted in accordance with the Earthwork Recommendations contained in this report. Use light compaction equipment within 5 feet of the wall face. If heavy compaction equipment is used, the walls should be temporarily braced to avoid excessive wall movement.

7.4 FOUNDATIONS

Retaining walls may be supported on continuous footings designed for an allowable bearing pressure of 2,500 psf embedded to a minimum depth of 24 inches. Subgrade treatment of retaining wall foundations that are not within the building pad footprints should follow the recommendations in Existing Fill Removal and Expansive Soil Mitigation sections of this report.

8.0 EXTERIOR FLATWORK RECOMMENDATIONS

Exterior flatwork includes items such as concrete sidewalks, steps, and outdoor courtyards exposed to foot traffic only. Provide a minimum section of 4 inches of concrete over 4 inches of aggregate base. In addition:

1. Compact the aggregate base to at least 90 percent relative compaction (ASTM D1557).

2. Construct control and construction joints in accordance with current Portland Cement Association Guidelines.

9.0 PAVEMENT DESIGN

9.1 FLEXIBLE PAVEMENTS

We obtained one representative bulk sample of the native soil and performed one R-value tests to provide data for pavement design. The results of the tests are included in Appendix B and indicate an R-value of 34, based on the site variability we judge an R-value of 20 to be to be appropriate for design. Additional R-Value testing should be performed on the actual pavement subgrade material to verify the following recommendations are applicable.

Using estimated traffic indices for various pavement loading requirements, we developed the following recommended pavement sections using Topic 630 of the Caltrans Highway Design Manual (including the asphalt factor of safety), presented in the Table 9.1-1 below.

TABLE 9.1-1: Recommended Asphalt Concrete Pavement Sections

TRAFFIC INDEX	ASPHALT CONCRETE (INCHES)	CLASS 2 AB (INCHES)
5	3	8
6	3½	10
7	4	12
8	5	14
9	5½	16
10	6½	18
11	7	20
12	8	22
13	9	24

The civil engineer should determine the appropriate traffic indices based on the estimated traffic loads and frequencies.

9.2 RIGID PAVEMENTS

We developed the rigid Portland Cement Concrete Pavement (PCCP) pavement section in accordance with ACI 330R-08 “Guide for the Design and Construction of Concrete Parking Lots”.

At the time we performed this analysis, no traffic data was available and no serviceability information was provided. Therefore, the design is based on ACI 330-08 Traffic Category D for the distribution of traffic with varying average daily truck traffic volumes (ADTT), a 550 psi modulus of rupture for the concrete, a serviceability index of 2.5, a reliability index of 95 percent, and a 20-year design life. These assumptions correspond to a rigid pavement section designed to have

five percent of the slabs cracked at the end of the design life; if the design team and yourself would like these assumptions revised, we can provide supplemental pavement sections.

We provide jointed plane concrete pavement (JPCP) recommendations below for R-value 20 due to the variability of the site. We calculated the following pavement section in accordance with the Portland Cement Association assuming edge support is provided by a tied concrete shoulder or curb and gutter. We confirmed our pavement section design using the commercially available software program *StreetPave12*. Additional R-Value testing should be performed on the actual pavement subgrade material to verify the following recommendations are applicable.

TABLE 9.2-1: Recommended Concrete Pavement Sections

ADTT	MINIMUM JPCP (INCHES)	MAXIMUM JOINT SPACING (FEET)
300	7½	15
1,400	8½	15
2,300	8½	15

Note: Calculations are based on the presence of a concrete shoulder or curbs

9.3 SUBGRADE AND AGGREGATE BASE COMPACTION

Compact finish subgrade and aggregate base in accordance with the Fill Compaction section of this report. Aggregate Base should meet the requirements for ¾-inch maximum Class 2 AB in accordance with Section 26-1.02a of the latest Caltrans Standard Specifications.

9.4 CUT-OFF CURBS

Saturated pavement subgrade or aggregate base can cause premature failure or increased maintenance of asphalt concrete pavements. This condition often occurs where landscape areas directly abut and drain toward pavements. If desired to install pavement cutoff barriers, they should be considered where pavement areas lie downslope of any landscape areas that are to be sprinklered or irrigated, and should extend to a depth of at least 4 inches below the base rock layer. Cutoff barriers may consist of deepened concrete curbs or deep-root moisture barriers.

10.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents geotechnical recommendations for design of the improvements discussed in Project Description section of this report for 407 Spreckels Avenue. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations, if any. It is the responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including but not limited to developers, owners, buyers, architects, engineers, and designers. The conclusions and recommendations contained in this report are solely professional opinions and are valid for a period of no more than 2 years from the date of report issuance.

We strived to perform our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty is expressed or implied. There are risks of earth movement and property damages inherent in

building on or with earth materials. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report with limited subsurface exploration data. We assumed that our subsurface exploration data is representative of the actual subsurface conditions across the site. Considering possible underground variability of soil, rock, stockpiled material, and groundwater, additional costs may be required to complete the project. We recommend that the owner establish a contingency fund to cover such costs. If unexpected conditions are encountered, notify ENGEO immediately to review these conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include excavation sloping or shoring, soil volume change factors, flood potential, or a geohazard exploration. In addition, our geotechnical exploration did not include work to determine the existence of possible hazardous materials. If any hazardous materials are encountered during construction, notify the proper regulatory officials immediately.

This document must not be subject to unauthorized reuse, that is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time.

Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's documents. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-site construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

We determined the lines designating the interface between layers on the exploration logs using visual observations. The transition between the materials may be abrupt or gradual. The exploration logs contain information concerning samples recovered, indications of the presence of various materials such as clay, sand, silt, rock, existing fill, etc., and observations of groundwater encountered. The field logs also contain our interpretation of the subsurface conditions between sample locations. Therefore, the logs contain both factual and interpretative information. Our recommendations are based on the contents of the final logs, which represent our interpretation of the field logs.

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FIGURES

FIGURE 1: Vicinity Map
FIGURE 2: Site Plan
FIGURE 3: Regional Geologic Map (Wagner)
FIGURE 4: Regional Faulting and Seismicity Map

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

ENGEO Expect Excellence

VICINITY MAP

407 SPRECKELS AVENUE

MANTECA, CALIFORNIA

PROJECT NO.: 13618.000.000

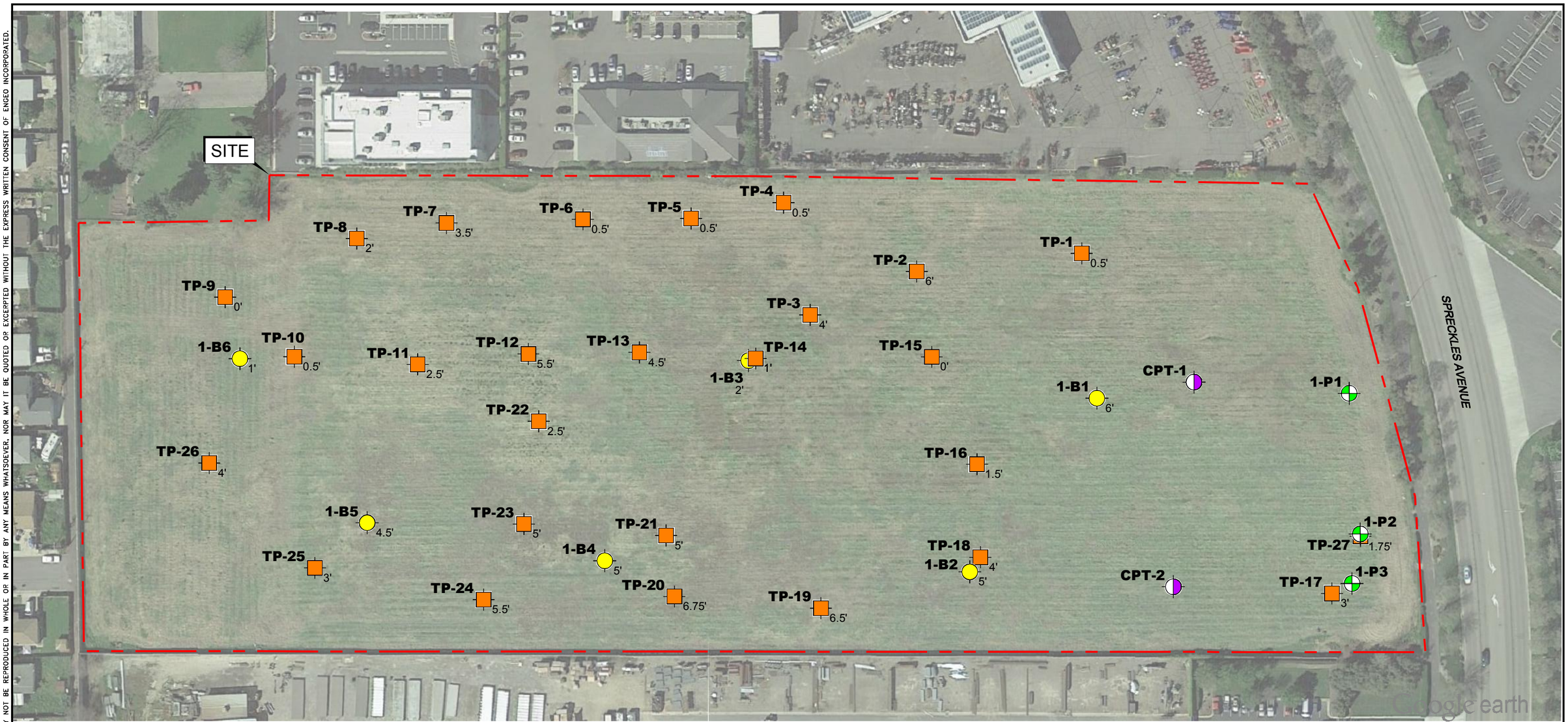
SCALE: AS SHOWN

DRAWN BY: SRP | CHECKED BY: SDH

FIGURE NO. 1

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13618\000\GEX\13618000000-1-VicinityMap-0117.dwg Plot Date: 1-17-17 spatters

ORIGINAL FIGURE PRINTED IN COLOR



N

0 FEET 100

0 METERS 50

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- 1-B6 1' — BORING SHOWING NON-ENGINEERED FILL DEPTH (ENGEO, JANUARY 2017)
- TP-27 1.75' — TEST PIT SHOWING NON-ENGINEERED FILL DEPTH (ENGEO, JANUARY 2017)
- CPT-2 — CONE PENETRATION TEST (ENGEO, JANUARY 2017)
- 1-P3 — PERCOLATION TEST (ENGEO, JANUARY 2017)

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

ENGEO Expect Excellence

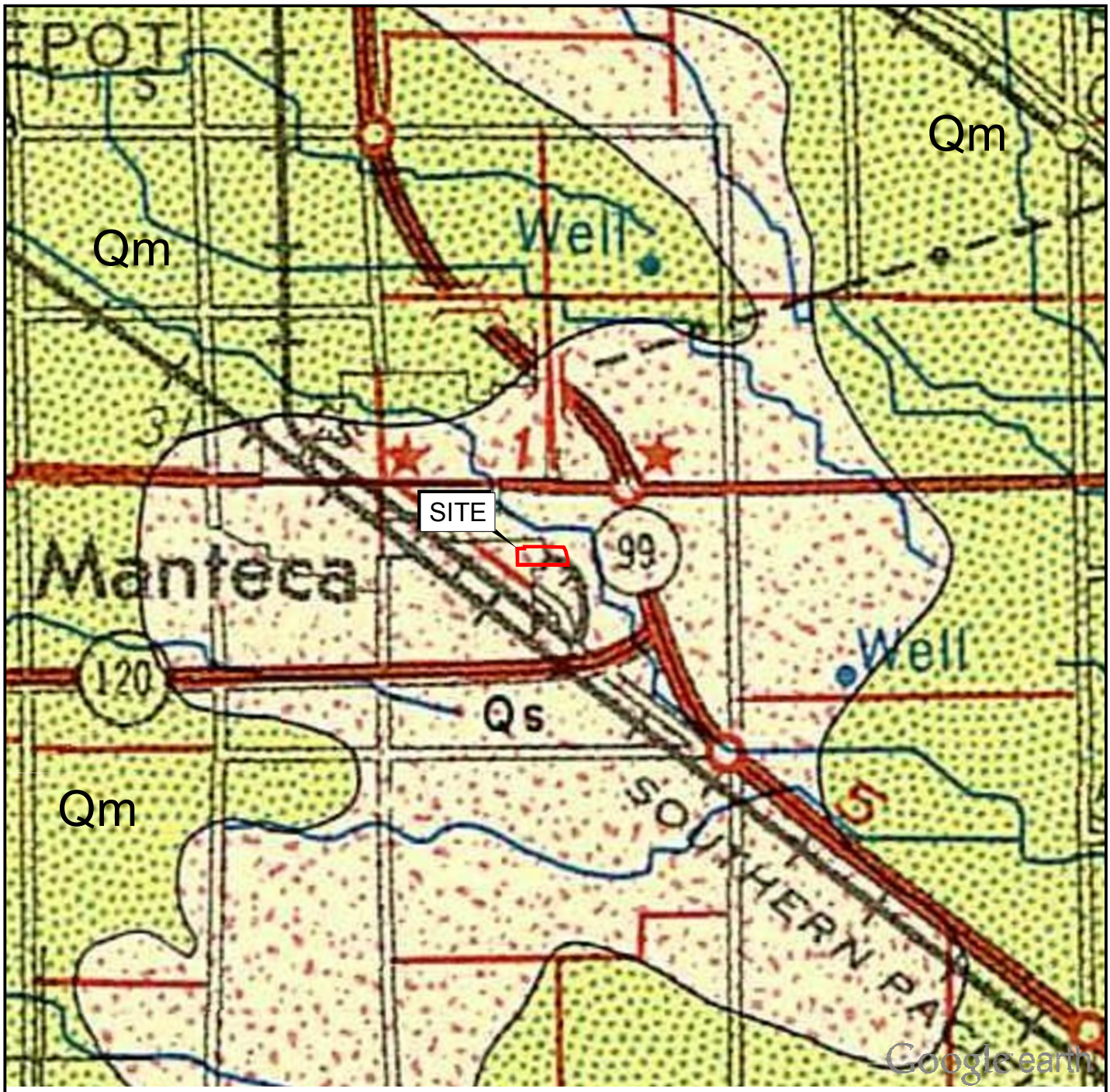
SITE PLAN
407 SPRECKELS AVENUE
MANTECA, CALIFORNIA

PROJECT NO.: 13618.000.000
SCALE: AS SHOWN
DRAWN BY: SRP
CHECKED BY: SDH

FIGURE NO. 2

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13618\000\GEX\13618000000-2-SitePlan-0117.dwg Plot Date:1-19-17 llee

ORIGINAL FIGURE PRINTED IN COLOR



N

0 FEET 4000

0 METERS 2000

EXPLANATION

Qs	DUNE SAND
Qm	MODESTO FORMATION
——— – – –	GEOLOGIC CONTACT-DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED

BASE MAP SOURCE: WAGNER, 1991

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REGIONAL GEOLOGIC MAP

407 SPRECKELS AVENUE

MANTECA, CALIFORNIA

PROJECT NO.: 13618.000.000

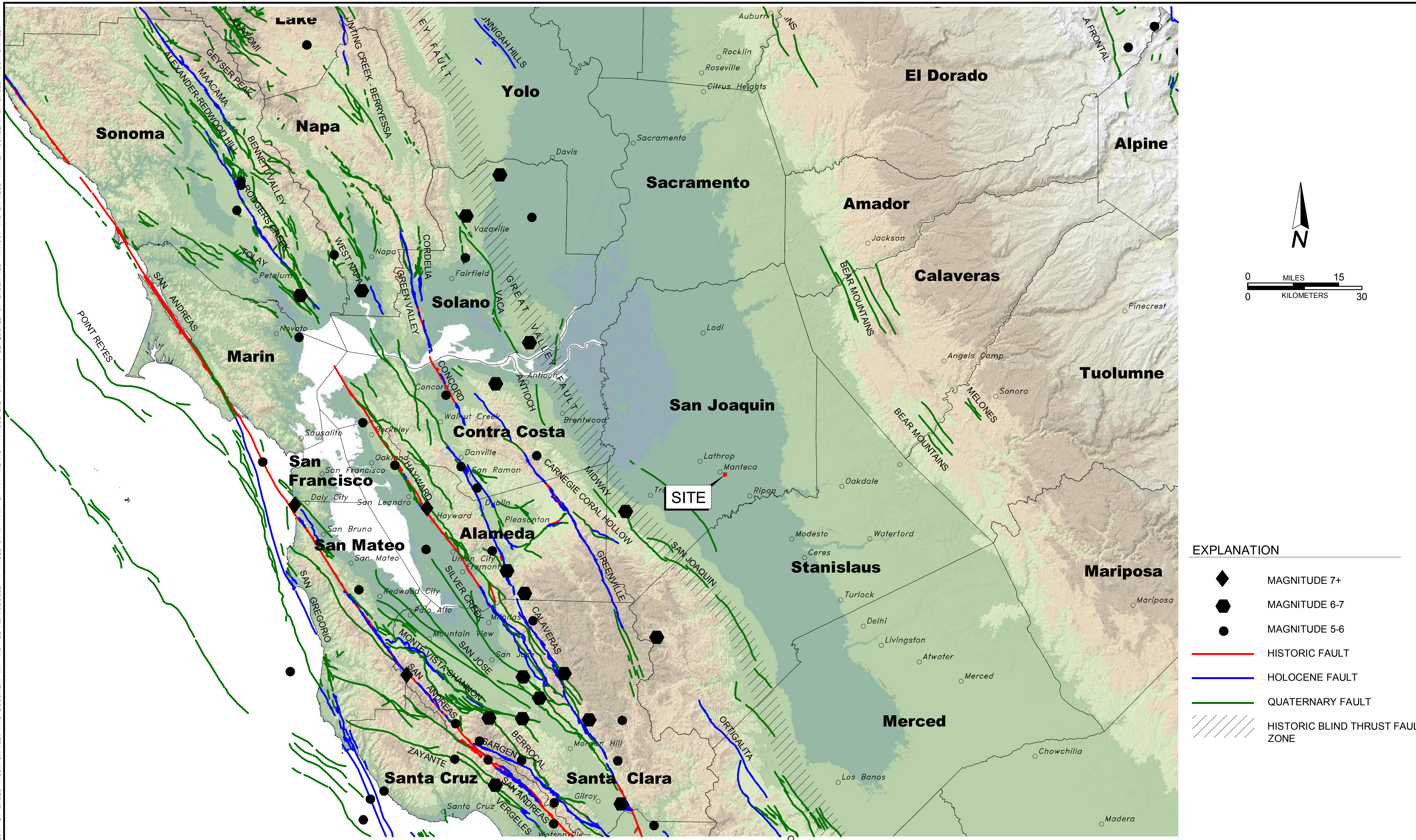
SCALE: AS SHOWN

DRAWN BY: SRP CHECKED BY: SDH

FIGURE NO. 3

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13618\000\GEX\13618000000-3-GeologicMap-0117.dwg Plot Date:1-17-17 spatters

ORIGINAL FIGURE PRINTED IN COLOR



BASE MAP SOURCE:
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATASET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, NOVEMBER, 2010
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800–2000)

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REGIONAL FAULTING AND SEISMICITY
407 SPRECKELS AVENUE
MANTECA, CALIFORNIA

PROJECT NO.: 13618.000.000	FIGURE NO. 4
SCALE: AS SHOWN	
DRAWN BY: SRP	CHECKED BY: SDH

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13618\000\GEX\13618000000-4-FaultMap-0117.dwg Plot Date:1-17-17 spatters

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

KEY TO BORING LOGS
EXPLORATION LOGS
TEST PITS
CONE PENETRATION TESTS

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity CH - Fat clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE				CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4 "	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MOISTURE CONDITION

Dry	Dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible freewater

LINE TYPES

- _____ Solid - Layer Break
- _ _ _ _ _ _ Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- Groundwater level during drilling
- Stabilized groundwater level

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

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LOG OF BORING 1-B1

ENGEO INCORPORATED

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 18 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 43 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND WITH GRAVEL (SM), very dark grayish brown, loose, moist, low plasticity, fine-grained sand, 35-45% fines, contains organics, miscellaneous rock fragments[undocumented fill]												
			SILTY SAND WITH GRAVEL (SM), dark brown, medium dense, moist, 15-25% gravel, fine-grained sand, 20-30 % fines[undocumented fill]			20					9				
	40		SILTY SAND WITH GRAVEL (SM), dark yellowish brown, loose to very loose, moist, 15-25% fine- to coarse-grained gravel, fine-grained sand, 25-35% fines [undocumented fill]			6									
5			contains miscellaneous non-native rock approximately 1.5" diameter			9					6				
			SILTY SAND (SM), yellowish brown, medium dense, moist, non plastic, fine-grained sand, 10-15% silt fines [Native]												
	35														
10						27					9				
			POORLY GRADED SAND (SP), yellowish brown, medium dense to loose, moist, fine- to medium-grained sand, <5% fines												
	30		(grades to fine- to coarse-grained sand)												
15						20					21				
			SANDY LEAN CLAY (CL), light brownish gray, stiff, moist, medium plasticity, 10-20% fine-grained sand			16									
	25		Bottom of boring at approximately 18 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

LOG OF BORING 1-B2

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 42 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), very dark grayish brown, loose, moist, low to medium plasticity, fine-grained sand, 35-45% fines, organics, contains miscellaneous non-native rock and concrete up to 8" diameter [undocumented fill]												
	40		SILTY SAND (SM), dark brown, loose, moist, low plasticity, fine-grained sand, 30-40% fines, contains rock fragments approximately 1/2" diameter [undocumented fill]			14									
5			SILTY SAND (SM), dark yellowish brown, loose, moist, fine-grained sand, 20-30% fines [native]			11									
	35		(grades to fine- to medium-grained sand)												
			POORLY GRADED SAND WITH SILT (SP-SM), dark yellowish brown, medium dense, fine-grained sand, 5-10% fines			38									
10			POORLY GRADED SAND (SP), yellowish brown, medium dense, fine- to medium-grained sand												
	30		grades fine- to coarse-grained sand			24									
15															
			LEAN CLAY WITH SAND (CL), light brownish gray, very stiff, medium plasticity, <20% fine-grained sand			16								2.5*	PP
			Bottom of boring at approximately 16 1/2 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

LOG OF BORING 1-B3

ENGEO INCORPORATED

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 27 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 41 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	40		SILTY SAND (SM), very dark grayish brown, loose, moist, low plasticity, fine-grained sand, 30-40% fines, contains organics, contains non-native rock fragments and concrete [undocumented fill]												
			SILTY SAND (SM), dark yellowish brown, loose to medium dense, moist, fine-grained sand, 15-25% fines [native]			18					5				
						18									
5	35		POORLY GRADED SAND (SP), yellowish brown, loose to medium dense, moist, fine- to medium-grained sand, <5% fines			8				5					
10	30					19					3				
15	25		LEAN CLAY (CL), light brownish gray, stiff, moist, medium plasticity, <5% fine-grained sand			18					4				
20	20		(grades to soft)			8					37				
			LEAN CLAY (CL), light brownish gray, medium plasticity, <15% fine-grained sand												
25	15					28					34	87			
			LEAN CLAY WITH SAND low to medium plasticity, <30 fine-grained sand			27									
			Bottom of boring at approximately 27 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

LOG OF BORING 1-B4

ENGEO INCORPORATED

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 43 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), very dark grayish brown, loose, moist, low plasticity, fine-grained sand, 35-45% fines, organics, contains non-native rock fragments approximately 1/2" diameter [undocumented fill]												
	40		SILTY SAND (SM), light grayish brown, medium dense, moist, low plasticity, fine-grained sand, 20-30% fines, contains non-native rock fragments and concrete [undocumented fill]			40									
5			SILTY SAND (SM), dark yellowish brown, medium dense, moist, fine-grained sand [native]												
	35		SILT (ML), gray mottled with yellowish brown, hard, moist, non plastic, fine-grained sand			65				79				>4.5*	PP
			SILTY SAND (SM), yellowish brown, medium dense, moist, fine- to medium-grained sand, <15% fines			27				23					
10			POORLY GRADED SAND (SP), yellowish brown, medium dense, moist, fine- to medium-grained sand, <5% fines			20									
15	30														
			(grades to medium-grained sand, very pale brown)			40									
	25														
20			LEAN CLAY (CL), light brownish gray, very stiff, moist, medium plasticity, <5% fine-grained sand			27								3.0*	PP
			Bottom of boring at approximately 21 1/2 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

LOG OF BORING 1-B5

ENGEO INCORPORATED

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 44 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), very dark grayish brown, loose, moist, low to medium plasticity, fine-grained sand, contains organics and non-native rock fragments approximately 1/2 inch diameter [undocumented fill]												
			CLAYEY SAND (SC), brown, medium stiff to soft, moist, low plasticity, 30-40% fines, contians concrete and brick fragments [undocumented fill]			21					10				
						9									
	40														
5			SILTY SAND (SM), brown, medium dense, moist, [native]			11				34	8				
			(grades to less fines)												
	35														
10			POORLY GRADED SAND WITH SILT (SP-SM), yellowish brown, medium dense, moist, fine- to coarse-grained sand			14				9	3				
			(grades to fine- to medium-grained sand)												
	30														
15			(grades to fine- to coarse-grained sand)			29					3				
			Bottom of boring at approximately 16 1/2 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

LOG OF BORING 1-B6

ENGEO INCORPORATED

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.000

DATE DRILLED: 1/5/2017
HOLE DEPTH: Approx. 21½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (WGS84): Approx. 43 ft.

LOGGED / REVIEWED BY: C. Stouffer / ZC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			CLAYEY SAND (SC), very dark grayish brown, loose, moist, low to medium plasticity, 20-30% fine-grained sand, contains organics, non-native rock fragments approximately 1/2" diameter, and concrete [undocumented fill]			65	27	13	14	44					
	40		CLAYEY SAND (SC), dark brown mottled with dark yellowish brown, medium dense, moist, low to medium plasticity, fine-grained sand			11									
			SILTY SAND (SM), dark yellowish brown, loose, moist, low plasticity, fine-grained sand, 20-30% fines												
5						17									
	35		POORLY GRADED SAND WITH SILT (SP), dark yellowish brown, medium dense, moist, fine-grained sand, <12% fines												
10			POORLY GRADED SAND (SP), pale brown, medium dense, moist, fine- to coarse-grained sand, <5% fines			16									
	30														
15						22									
	25														
20			LEAN CLAY (CL), light brownish gray, stiff, moist, medium plasticity, <15% fine-grained sand			18									
			Bottom of boring at approximately 21 1/2 feet. Groundwater not observed during drilling.												

SHEAR AND UNCONF STRENGTH W/ ELEV BORINGS_GINT_13618.GPJ ENGEO INC.GDT 1/24/17

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-1	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, rock fragments, and concrete debris with maximum diameter of 2" [UNDOCUMENTED FILL]
	½ – 3	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand [NATIVE]
TP-2	0 – 3	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics and large chunks of concrete footing observed to a depth of 3 feet [UNDOCUMENTED FILL]
	3-6	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 8" [UNDOCUMENTED FILL]
	6 – 6 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-3	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, brick, concrete, and rock fragments with maximum diameter of 4" [UNDOCUMENTED FILL]
	½ - 1 ½	SILTY SAND (SM) – dark brown, medium dense, moist, fine-grained sand, contains concrete and brick with maximum diameter of 8" [UNDOCUMENTED FILL]
	1 ½ - 4	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 2" [UNDOCUMENTED FILL]
	4 – 4 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]
TP-4	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, rock fragments, concrete debris with maximum diameter of 2" [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-5	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, low to medium plasticity, fine-grained sand, contains organics, rock fragments, concrete debris with maximum diameter of 2” [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand [NATIVE]
TP-6	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, low to medium plasticity, fine-grained sand, contains organics, rock fragments, concrete debris with maximum diameter 4” and metal pipe with diameter of 4” [UNDOCUMENTED FILL]
	½ - 2	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand [NATIVE]
	2 - 3	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-7	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, rock fragments and concrete debris with maximum diameter of 6" [UNDOCUMENTED FILL]
	½ - 2 ½	SILTY SAND (SM) – brown, to medium dense to dense, moist, fine-grained sand, contains rock with maximum diameter of 4" and concrete debris with maximum diameter of 3" [UNDOCUMENTED FILL]
	2 ½ - 3 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand, contains large concrete footing [UNDOCUMENTED FILL]
	3 ½ - 5 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]
TP-8	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, rock fragments, and concrete debris with maximum diameter of 2" [UNDOCUMENTED FILL]
	½ - 2	SILTY SAND (SM) – dark brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	2 – 4	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-9	0 – ½	CLAYEY SAND (SC) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [NATIVE]
	½ - 2 ½	CLAYEY SAND (SC) – dark brown, loose to medium dense, moist, fine-grained sand
TP-10	0 – ½	CLAYEY SAND (SC) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, and rock fragments with maximum diameter of 2” [UNDOCUMENTED FILL]
	½ - 1 ½	CLAYEY SAND (SC) – dark brown, loose to medium dense, moist, fine-grained sand [NATIVE]
	1 ½ - 3	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-11	0 – 1 ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	1 ½ - 2 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand, concrete debris and brick fragments with maximum diameter 3" [UNDOCUMENTED FILL]
	2 ½ - 3 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]
TP-12	0 – 1 ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	1 ½ - 5.5	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand, contains large concrete with maximum diameter of 8" to 5.5 feet and metal pipe of 4" diameter at 3.5' [UNDOCUMENTED FILL]
	5 ½ - 6 ½	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-13	0 – 1	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics and rock fragments with maximum diameter of 2" [UNDOCUMENTED FILL]
	1 – 4 ½	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand, contains concrete footing encountered at 1 ½ feet and debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	4 ½ - 6	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]
TP-14	0 – 1	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics and rock fragments with maximum diameter of 2" [UNDOCUMENTED FILL]
	1 - 3	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-15	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [NATIVE]
	½ - 2	SILTY SAND (SM) – dark yellowish brown, loose to medium dense, moist, fine-grained sand
	2 – 3	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand
TP-16	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics and rock fragments with maximum diameter 2” [UNDOCUMENTED FILL]
	½ - 1 ½	SILTY SAND (SM) –brown, loose to medium dense, moist, fine-grained sand, contains organics, rock fragments with maximum diameter 2”, and asphalt and cement debris with maximum diameters of 4” [UNDOCUMENTED FILL]
	1 ½ - 3	SILTY SAND (SM) – dark yellowish brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-17	0 – 2	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	2 – 3	SILTY SAND (SM) – dark brown, medium dense, moist, fine-grained sand, contains concrete and brick debris with maximum diameter of 2” [UNDOCUMENTED FILL]
	3 – 6 ¾	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]
TP-18	0 – ½	CLAYEY SAND (SC) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 1 ½	CLAYEY SAND (SC) – dark brown, loose to medium dense, moist, fine-grained sand, contains large concrete debris with maximum diameter of 10” to depth of 1 ½ feet [UNDOCUMENTED FILL]
	1 ½ - 4	SILTY SAND (SM) – dark brown, dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 6” to depth of 1 ½ feet and asphalt with maximum diameter of 6” to depth of 4 feet [UNDOCUMENTED FILL]
	4 - 5	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-19	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics, rock fragments, and concrete debris with a maximum diameter of 2" [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains rock fragments, concrete chunks and asphalt with maximum diameter of 4" [UNDOCUMENTED FILL]
	3 – 6 ½	SANDY LEAN CLAY (CL) – black, medium stiff, low plasticity [UNDOCUMENTED FILL]
	6 ½ - 7 ½	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]
TP-20	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 4	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete footing at depth of 1 foot, asphalt and concrete debris with maximum diameter of 6" and tree root with diameter of 4" [UNDOCUMENTED FILL]
	4 – 6 ¾	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 3" [UNDOCUMENTED FILL]
	6 ¾ - 7 ½	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-21	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	3 – 5	SILTY SAND (SM) – black, medium stiff, low plasticity [UNDOCUMENTED FILL]
	5 - 7	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]
TP-22	0 – 1	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	1 – 2 ½	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	2 ½ - 4	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-23	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4” [UNDOCUMENTED FILL]
	3 – 4	SANDY LEAN CLAY (CL) – black, medium stiff, low plasticity, contains concrete and asphalt debris with maximum diameter of 3” [UNDOCUMENTED FILL]
	4 – 5	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 3” [UNDOCUMENTED FILL]
	5 – 6	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

Test Pit Number	Depth (Feet)	Description
TP-24	0 – ½	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 3 ½	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	3 ½ - 5 ½	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 4" [UNDOCUMENTED FILL]
	5 ½ - 7	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]
TP-25	0 – 1 ½	CLAYEY SAND (SC) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	1 ½ - 3	CLAYEY SAND (SC) – dark yellow brown, medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 6" [UNDOCUMENTED FILL]
	3 – 5	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

ENGEO Expect Excellence	TEST PIT LOG
407 Spreckels, Ave GEX Manteca, CA 13618.000.000	Logged By: Christopher Stouffer Logged Date: 1/6/2016

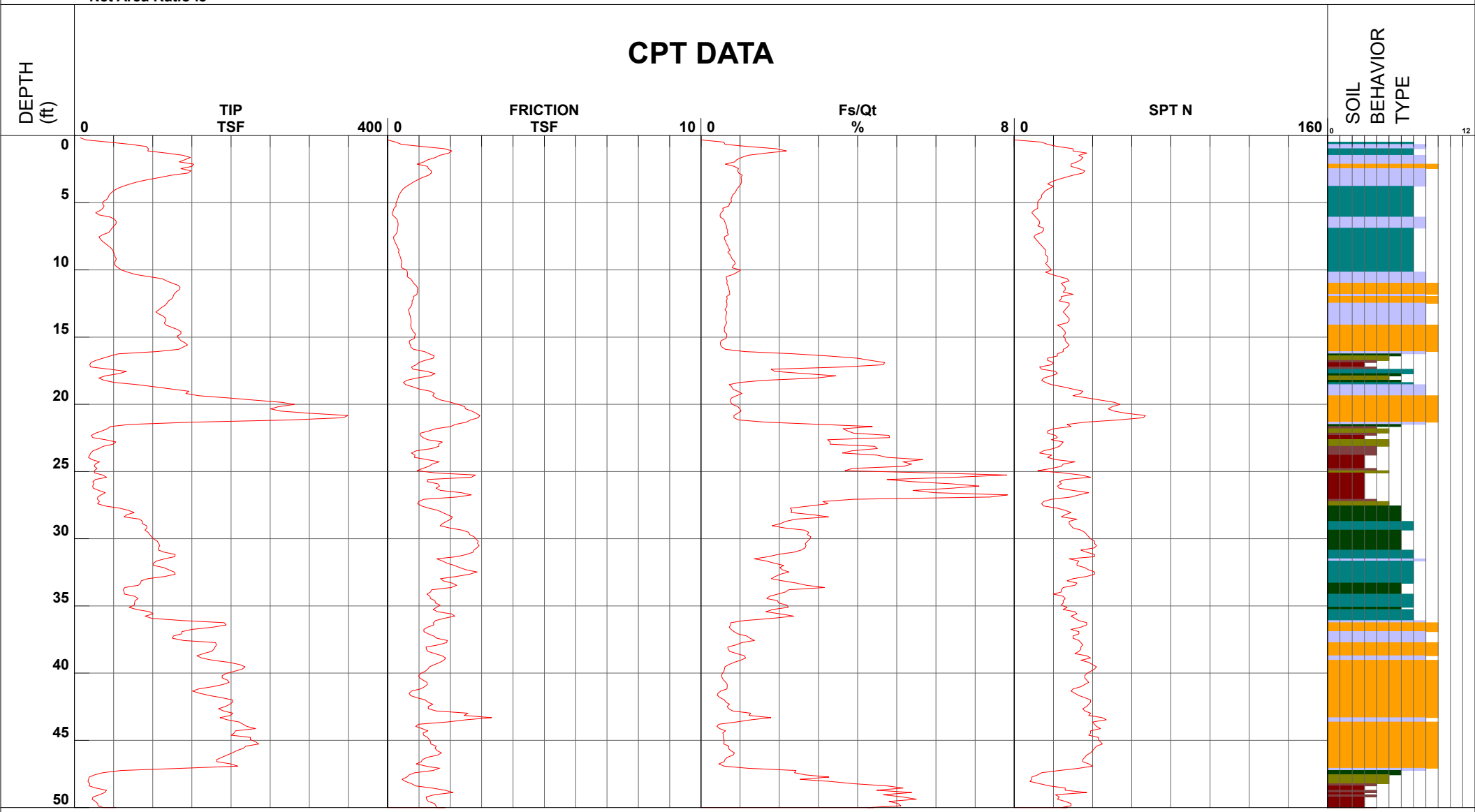
Test Pit Number	Depth (Feet)	Description
TP – 26	0 – ½	CLAYEY SAND (SC) – very dark grayish brown, loose, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	½ - 3	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains concrete debris with maximum diameter of 3" [UNDOCUMENTED FILL]
	3 – 4	SANDY LEAN CLAY (CL) – black, medium stiff, low plasticity [UNDOCUMENTED FILL]
	4 - 6	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]
TP-27	0 – 1	SILTY SAND (SM) – very dark grayish brown, loose to medium dense, moist, fine-grained sand, contains organics [UNDOCUMENTED FILL]
	1 – 1 ¾	SILTY SAND (SM) – dark yellow brown, loose to medium dense, moist, fine-grained sand, contains asphalt and rock fragment debris [UNDOCUMENTED FILL]
	1 ¾ - 5	SILTY SAND (SM) – dark yellow brown, medium dense, moist, fine-grained sand [NATIVE]

Engeo Inc

Project	Spreckels	Operator	KK-RB	Filename	SDF(583).cpt
Job Number	TBD	Cone Number	DDG1333	GPS	
Hole Number	CPT-02	Date and Time	1/6/2017 8:05:22 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

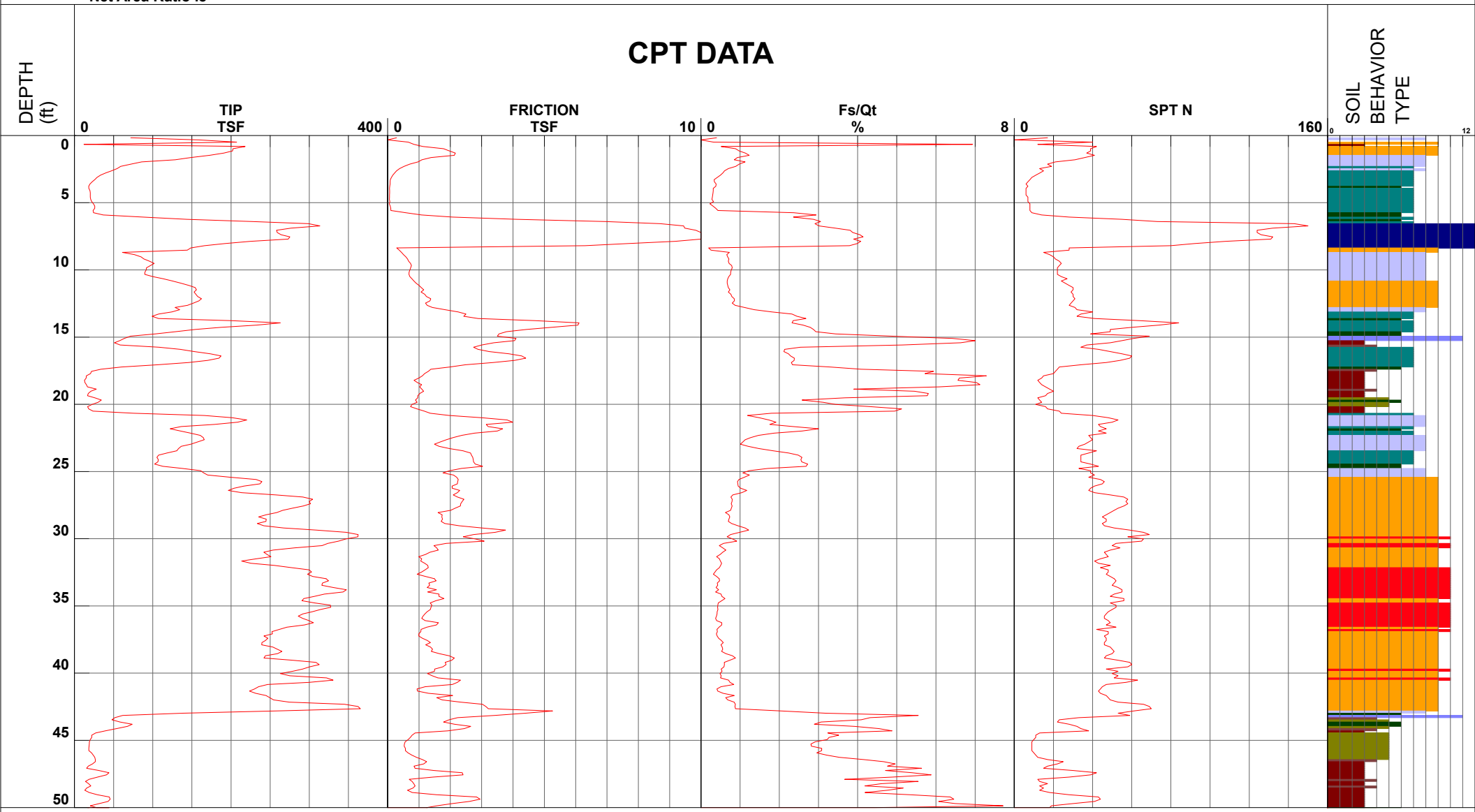
S*Soil behavior type and SPT based on data from UBC-1983

Engeo Inc

Project	Spreckels	Operator	KK-RB	Filename	SDF(582).cpt
Job Number	TBD	Cone Number	DDG1333	GPS	
Hole Number	CPT-01	Date and Time	1/6/2017 7:18:06 PM	Maximum Depth	50.52 ft
EST GW Depth During Test		0.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

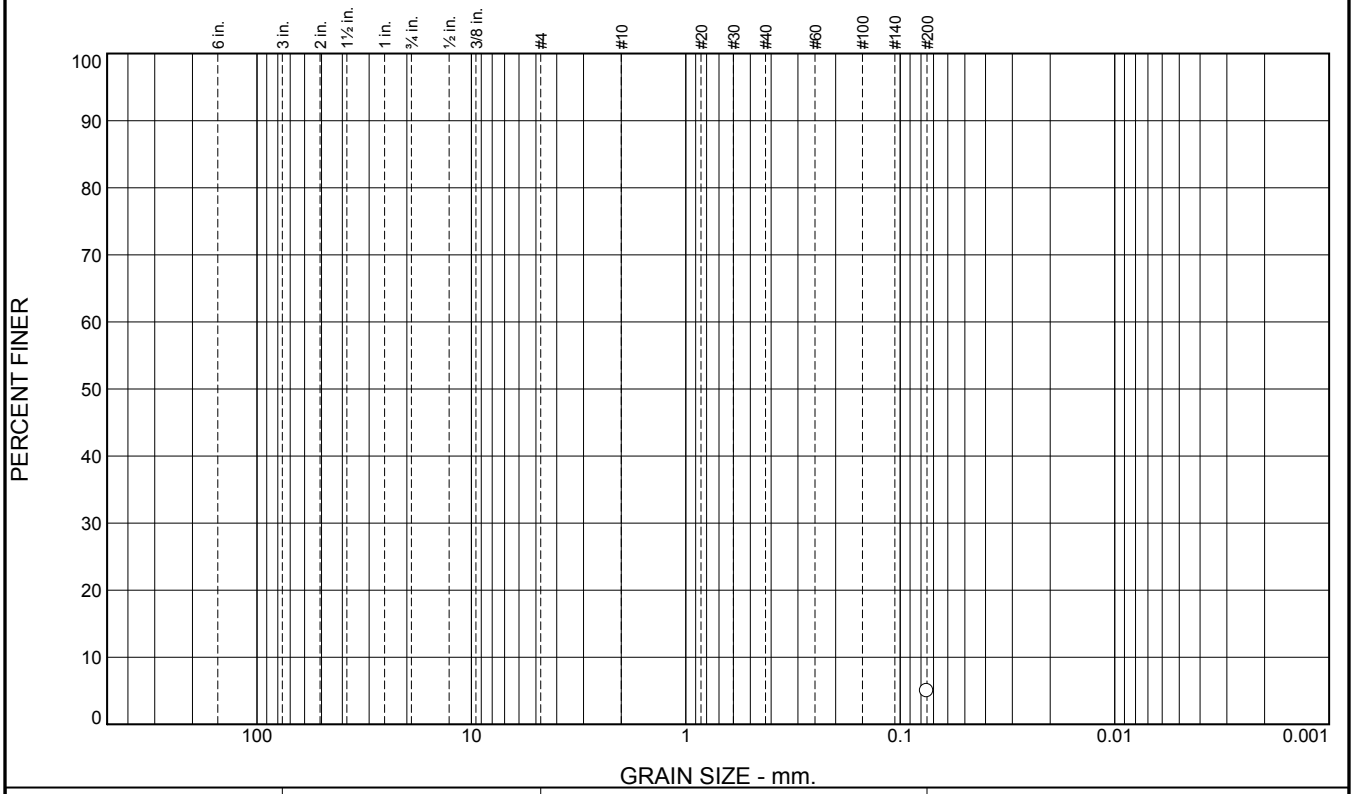
S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B

LABORATORY TEST DATA

Particle Size Distribution Report
Liquid and Plastic Limits Test Report
R-Value Test Report
Sunland Analytical Test Report

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						5.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.0		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Source of Sample: GEX **Depth:** 6
Sample Number: 1-B3 @ 6

Date: 1-12-17

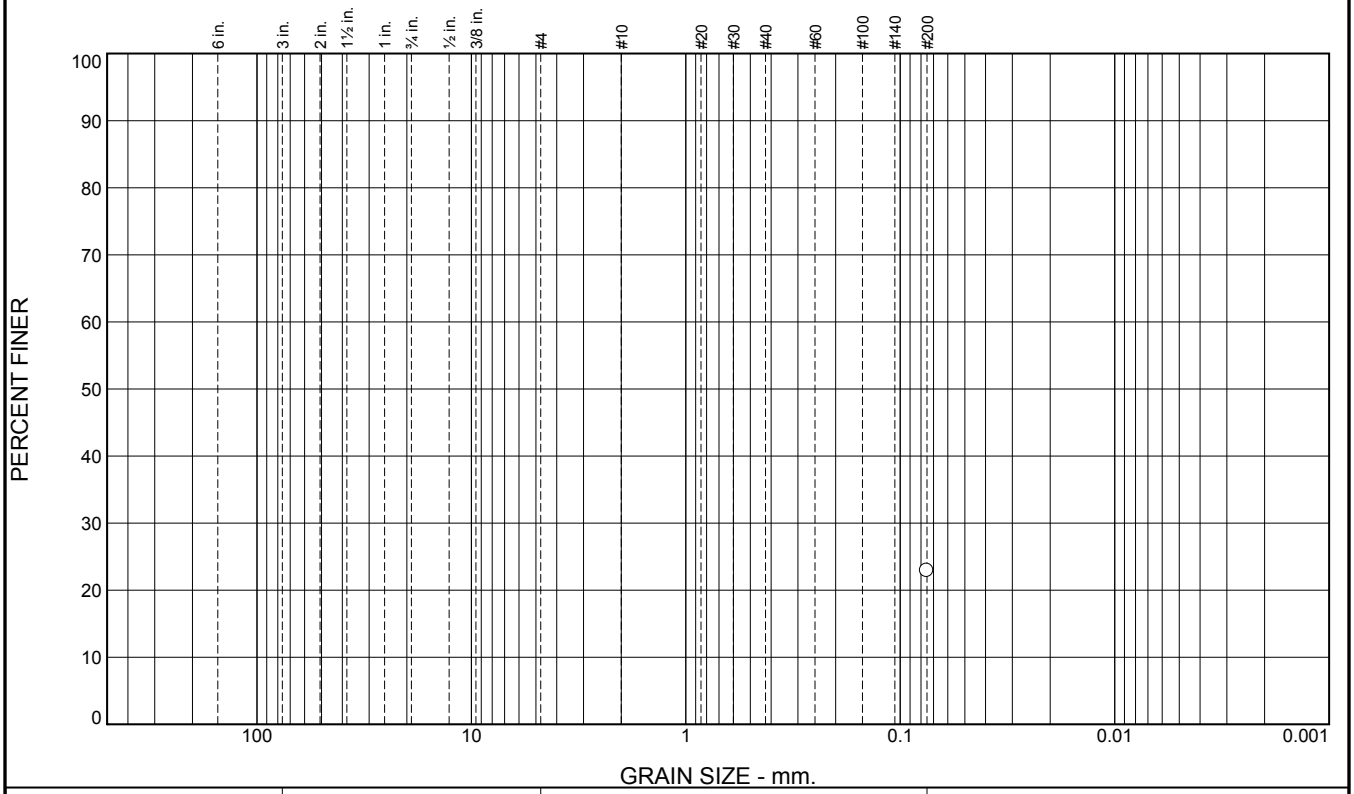
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	22.9		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Source of Sample: GEX **Depth:** 8.5
Sample Number: 1-B4 @ 8.5

Date: 1-12-17

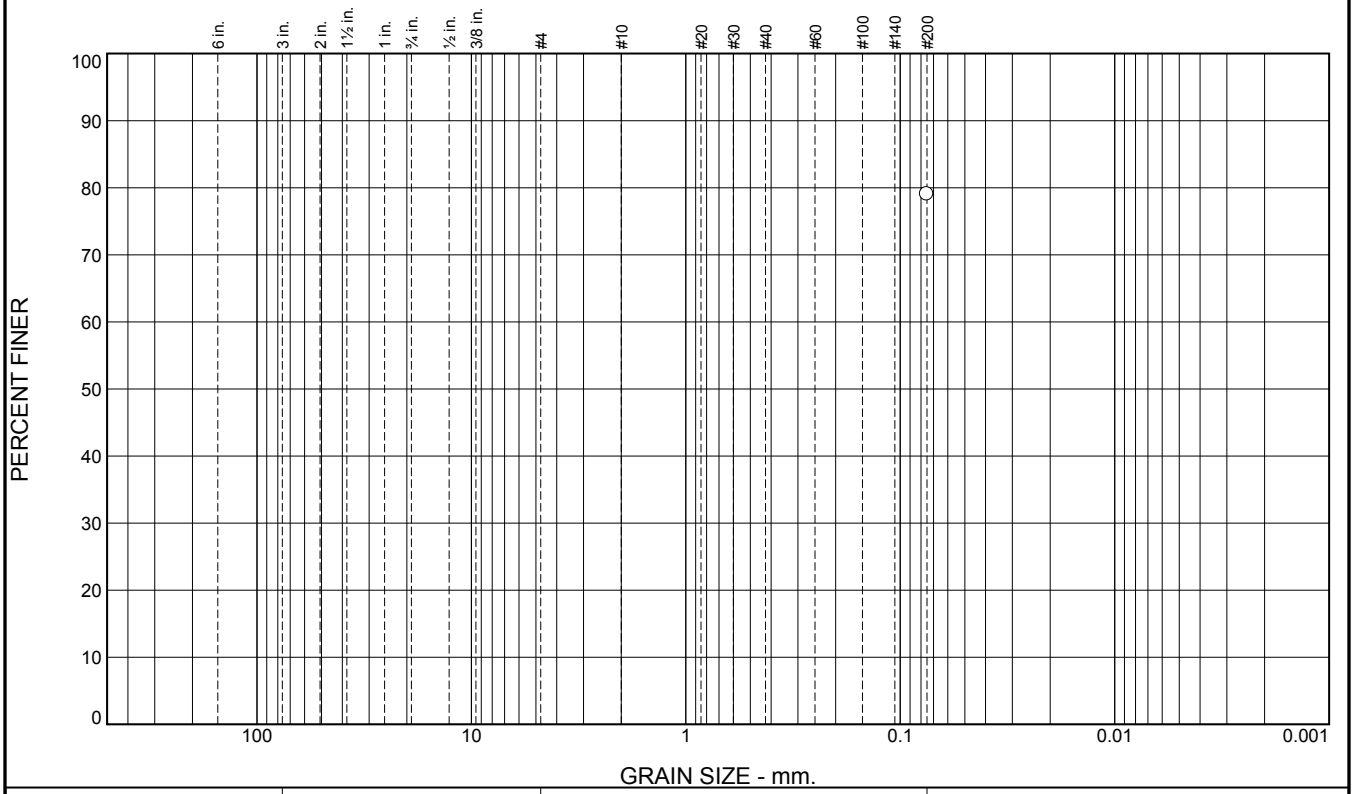
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						79.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	79.0		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Source of Sample: GEX **Depth:** 8
Sample Number: 1-B4 @ 8

Date: 1-12-17

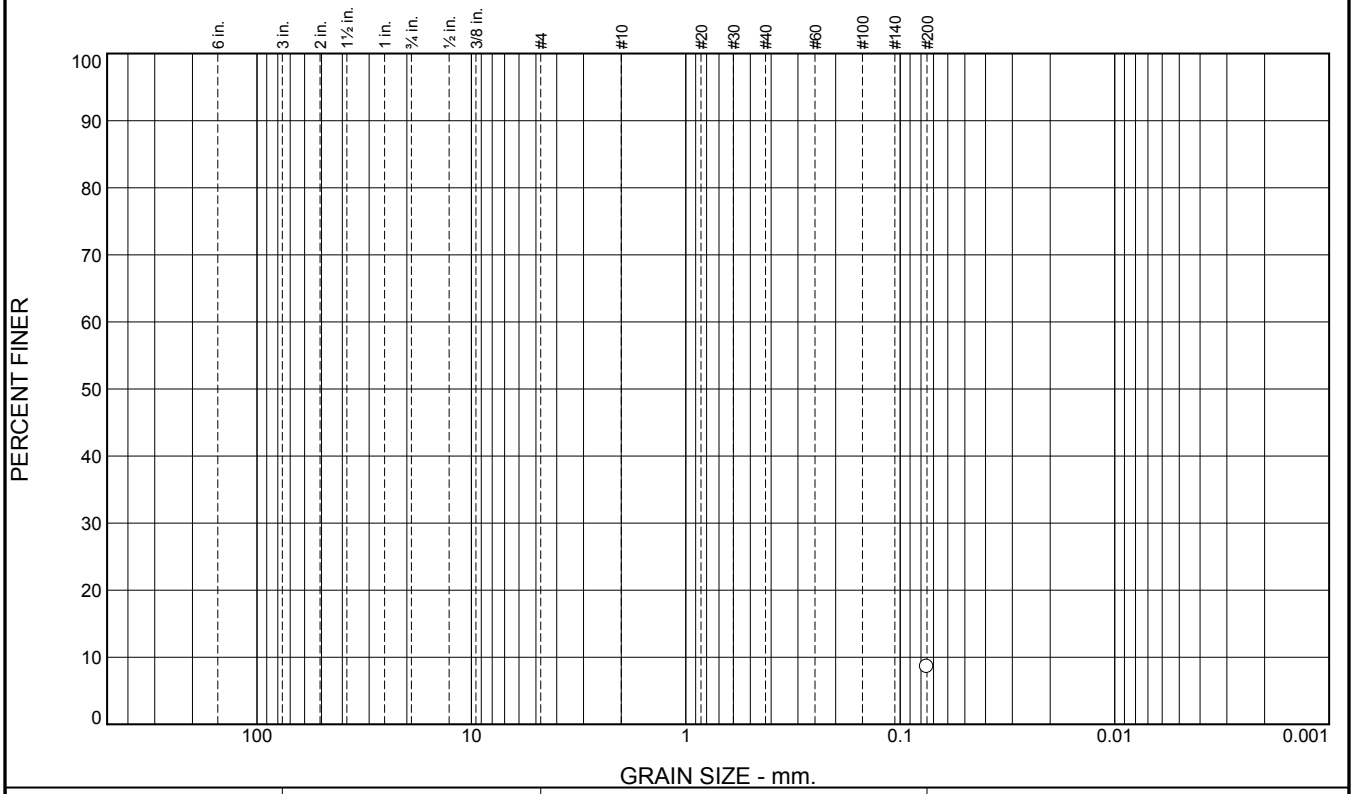
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	8.6		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Source of Sample: GEX **Depth:** 10
Sample Number: 1-B5 @ 10 **Date:** 1-12-17

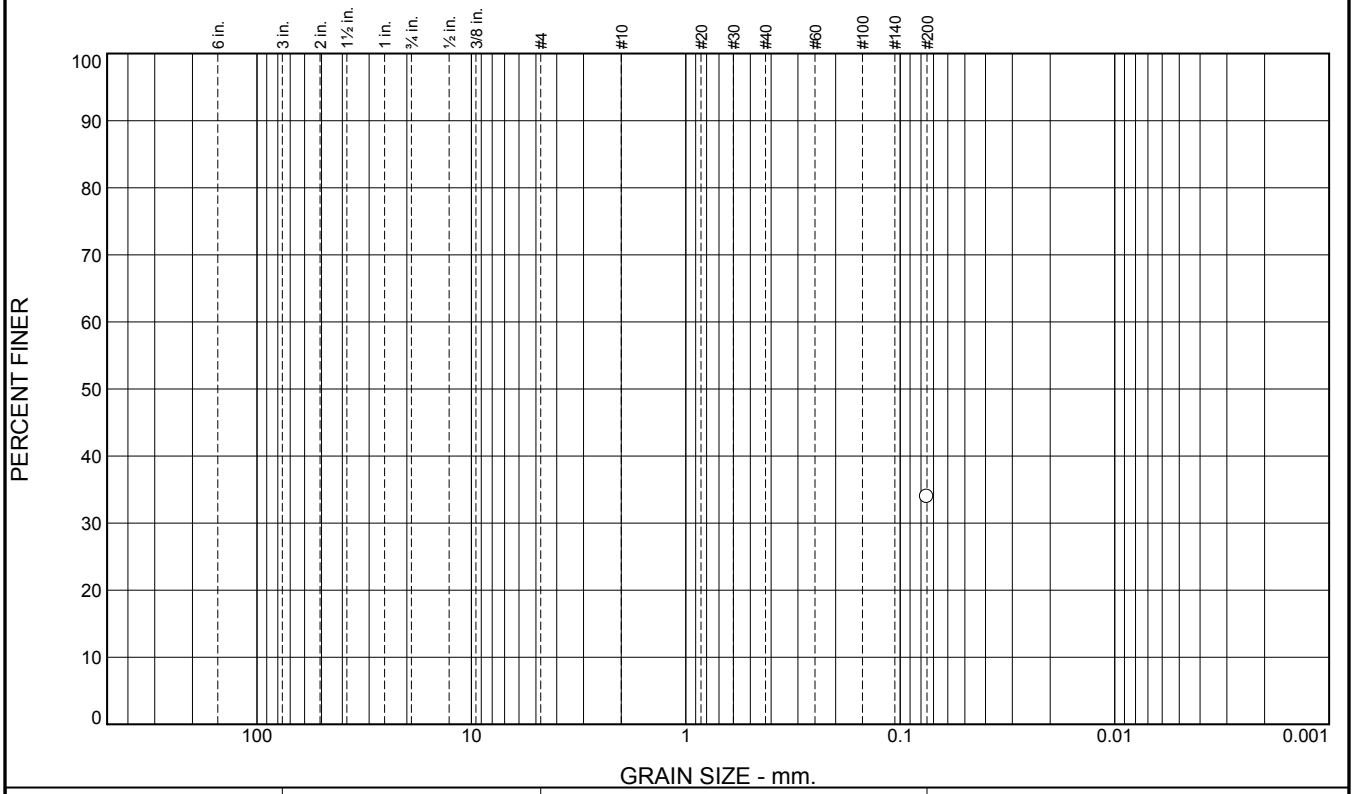
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	33.9		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140

Source of Sample: GEX **Depth:** 5
Sample Number: 1-B5 @ 5

Date: 1-12-17

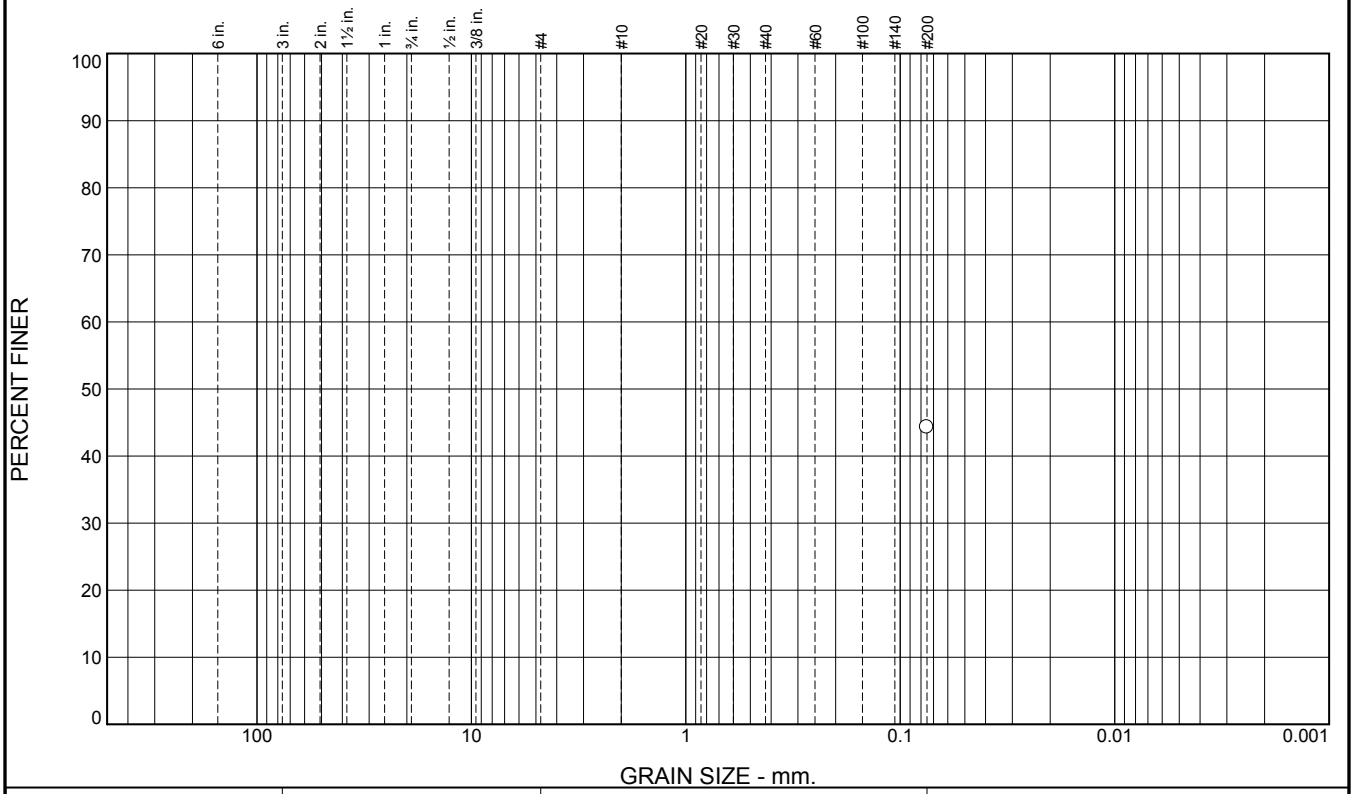
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						44.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	44.3		

* (no specification provided)

Soil Description

See Exploration Log

Atterberg Limits

PL= 13 LL= 27 PI= 14

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

ASTM D1140
ASTM D4318, wet method

Source of Sample: GEX **Depth:** 2
Sample Number: 1-B6 @ 2

Date: 1-12-17

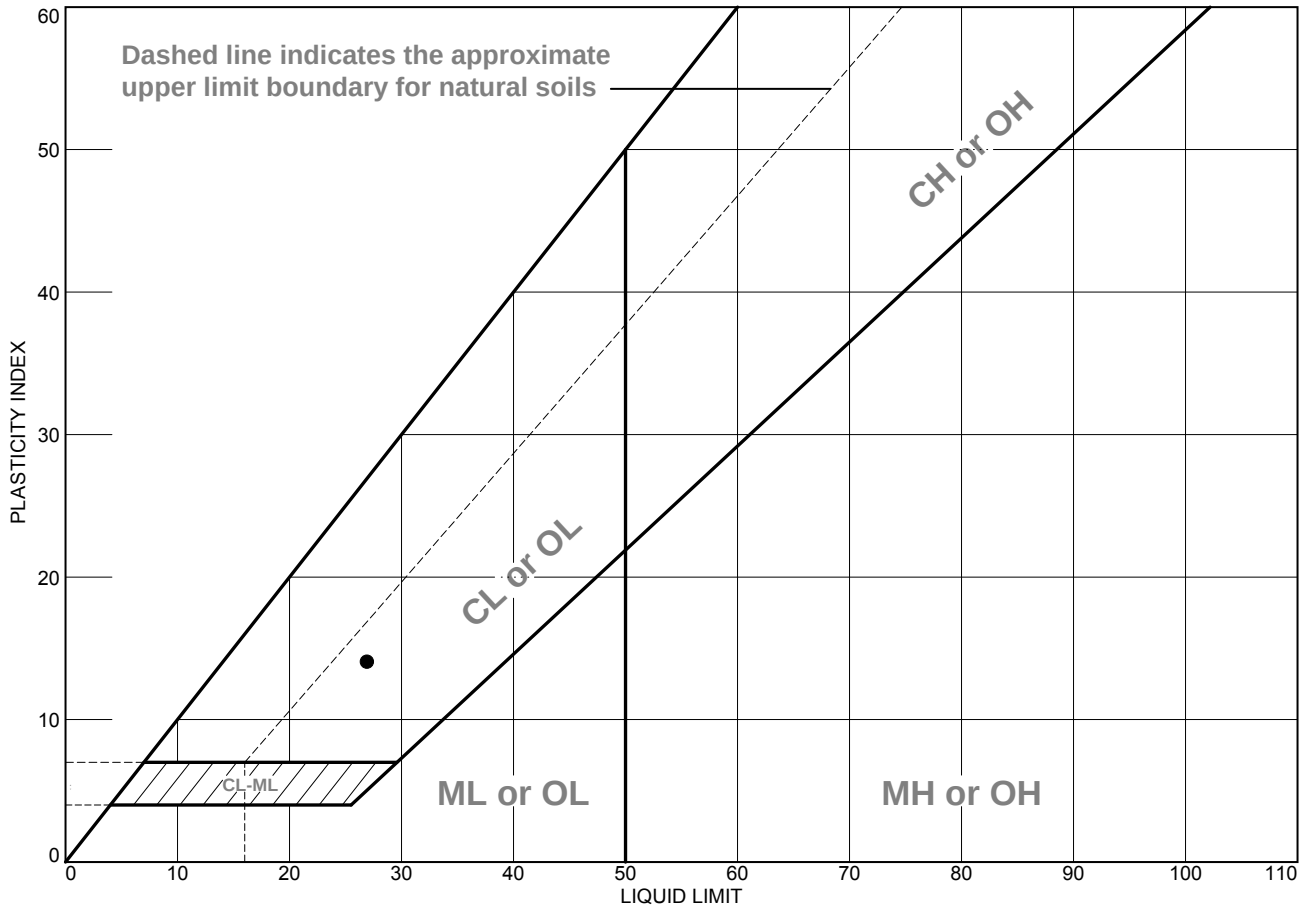
ENGEO INCORPORATED

Client: DCT Industrial
Project: 407 Spreckles Ave.

Project No: 13618.000.000 **Figure**

Tested By: I. McCauley **Checked By:** K. Lecce

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	See Exploration Log	27	13	14		44.3	

Project No. 13618.000.000 **Client:** DCT Industrial

Project: 407 Spreckles Ave.

●**Source of Sample:** GEX **Depth:** 2 **Sample Number:** 1-B6 @ 2

Remarks:

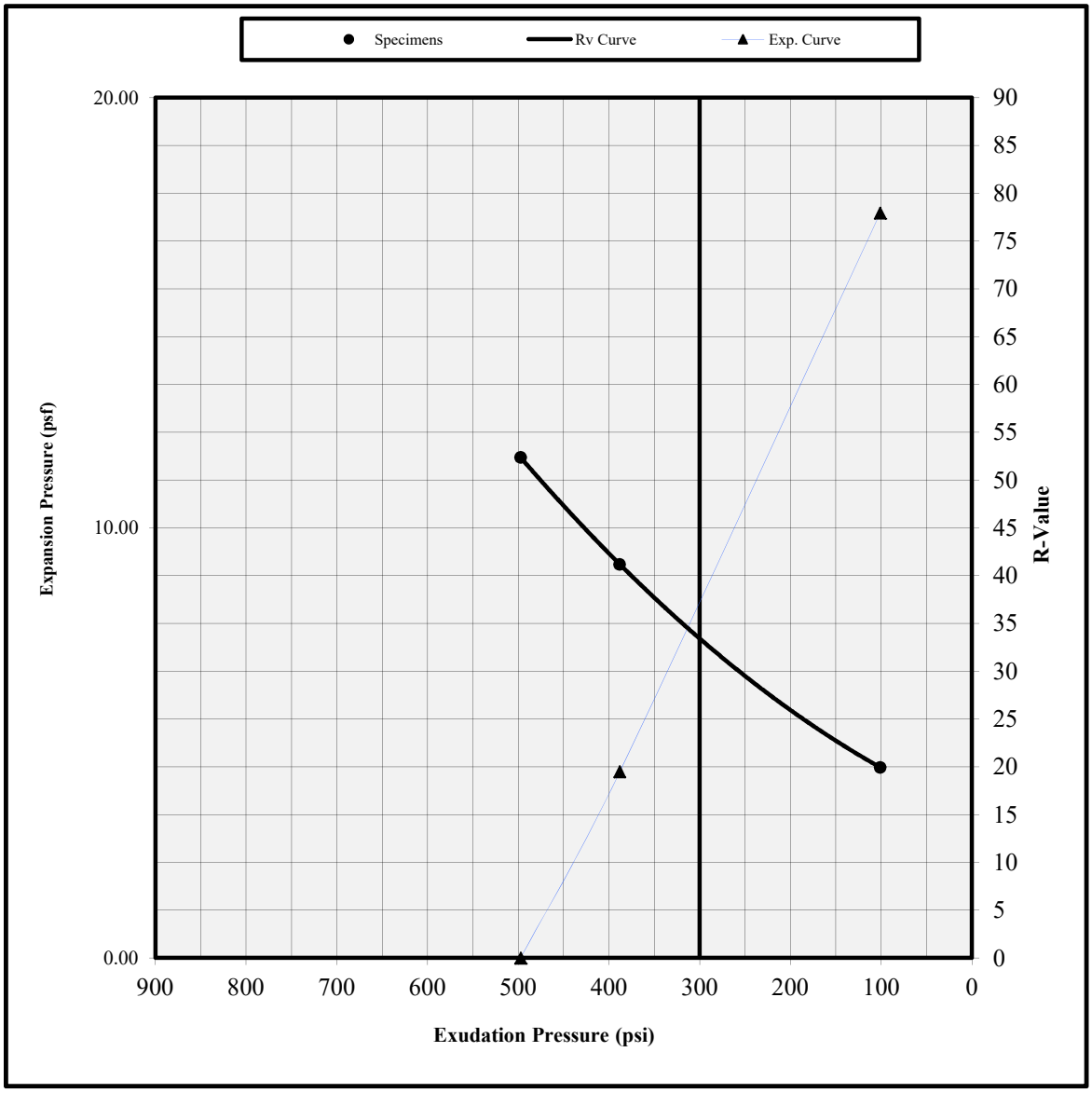
●ASTM D4318, wet method
ASTM D1140

ENGEO INCORPORATED

Figure

Tested By: I. McCauley **Checked By:** K. Lecce

R VALUE TEST REPORT
CTM-301



Sample ID/Location: Spreckles Ave. 0-5
Description: Dark grayish brown silty SAND
Test remarks:

Specimen	Specimen 1	Specimen 2	Specimen 3
Exudation Pressure (p.s.i.)	497	388	101
Expansion dial (0.0001")	0	1	4
Expansion Pressure (p.s.f.)	0	4	17
Resistance Value, "R"	52	41	20
% Moisture at Test	10.3	11.0	11.8
Dry Density at Test, p.c.f.	121.8	119.6	117.7
"R" Value at Exudation Pressure of 300 psi.		34	
Expansion Pressure (psf) at Exudation Pressure of 300 psi.		8	

PROJECT NAME: 407 Spreckels Ave
PROJECT NUMBER: 13618.000.000
CLIENT: DCT Industrial
PHASE NUMBER: 001

DATE: 01/12/16

ENGEO Expect Excellence

Tested by: W. Miller

Reviewed by: D. Seibold

Lab Address : 3420 Fostoria Way, Suite E, San Ramon, CA 94583

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 01/18/2017
Date Submitted 01/12/2017

To: Chris Stouffer
Engeo Inc.
580 Golden Valley Pkwy
Lathrop CA 95330

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 1-B3@3.5F+1-B5@2.5F Site ID : 1/12/17.
Thank you for your business.

* For future reference to this analysis please use SUN # 73489-153310.

EVALUATION FOR SOIL CORROSION

Soil pH	8.04		
Minimum Resistivity	1.45 ohm-cm (x1000)		
Chloride	55.0 ppm	0.00550	%
Sulfate	63.2ppm	0.00632	%

METHODS
pH and Min.Resistivity CA DOT Test #643 Mod.(Sm.Cell)
Sulfate CA DOT Test #417, Chloride CA DOT Test #422

APPENDIX C

LIQUEFACTION ANALYSIS RESULTS

ENGEO Inc.
17278 Golden Valley Pkwy
Lathrop, CA
www.engeo.com

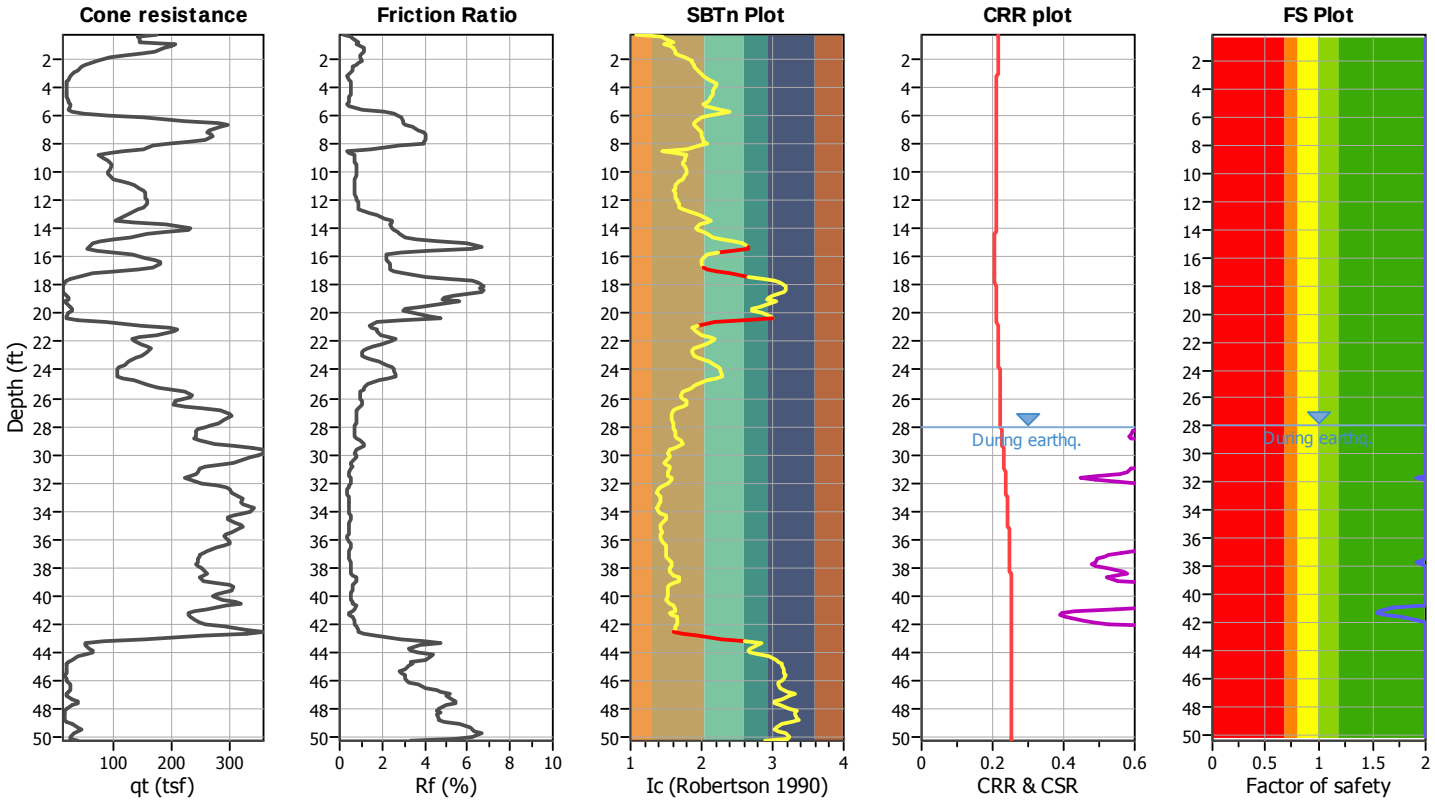
LIQUEFACTION ANALYSIS REPORT

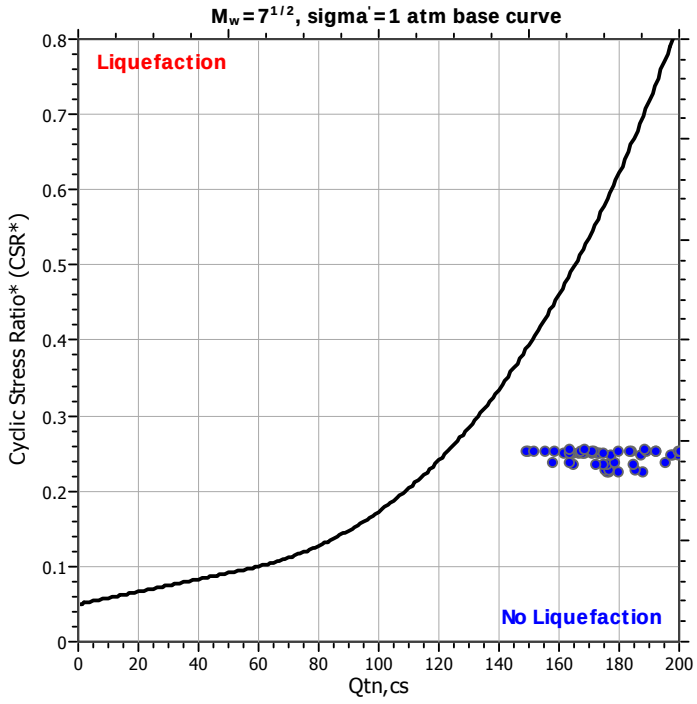
Project title : 407 Spreckels Ave **Location : Manteca, CA**

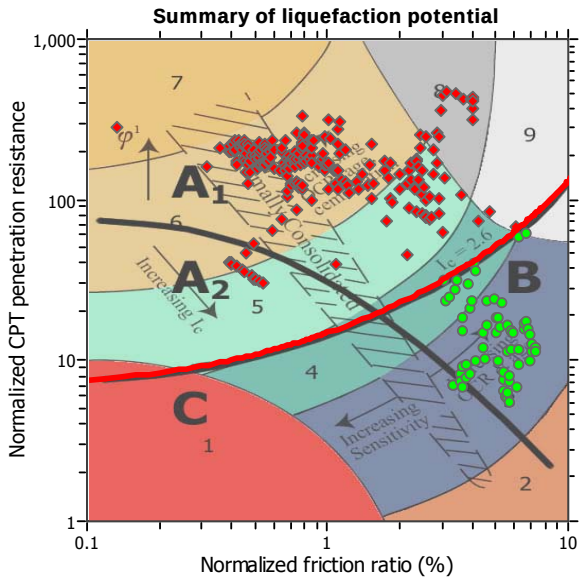
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	28.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	28.00 ft	Fill height:	N/A		
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	No
Earthquake magnitude M_w:	6.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	Limit depth:	N/A
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes	MSF method:	Method based

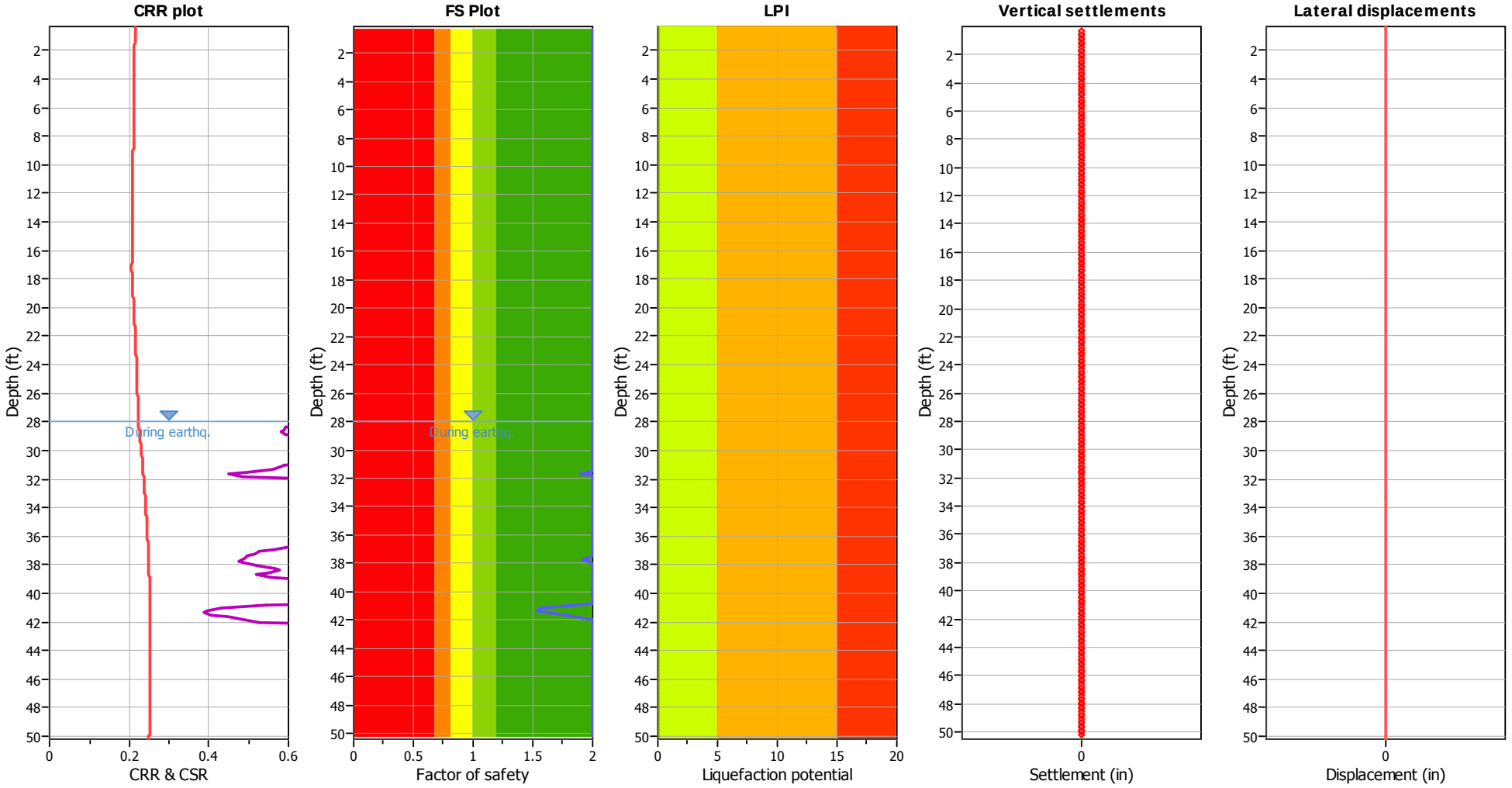






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	28.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	28.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

ENGEO Inc.
17278 Golden Valley Pkwy
Lathrop, CA
www.engeo.com

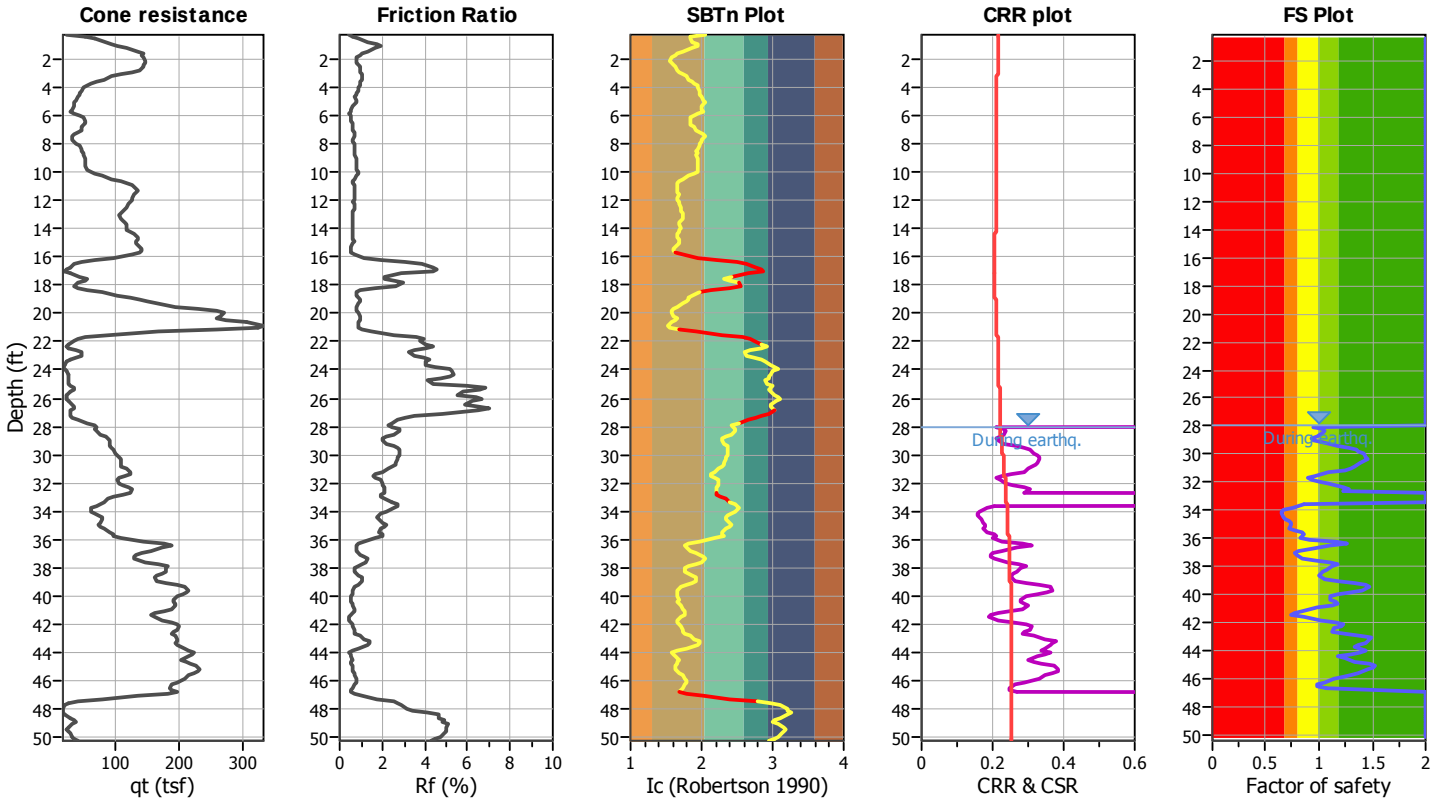
LIQUEFACTION ANALYSIS REPORT

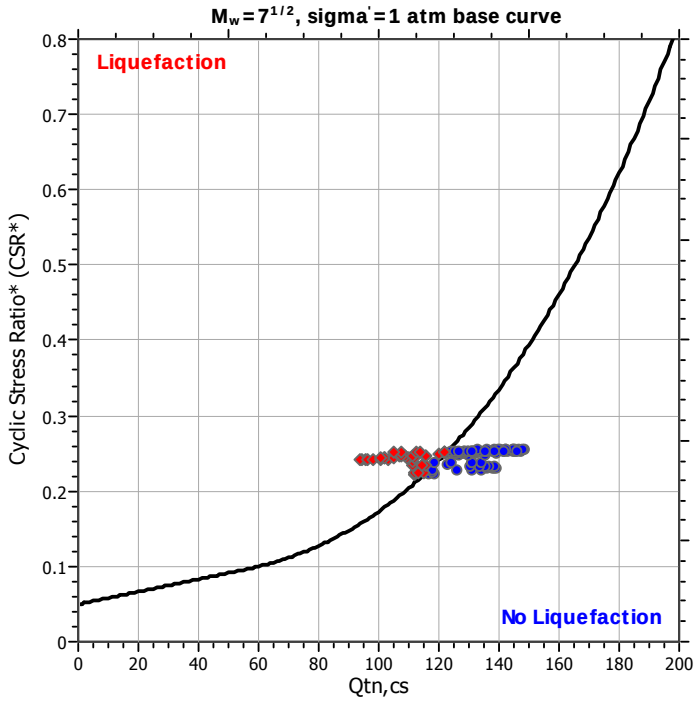
Project title : 407 Spreckels Ave **Location : Manteca, CA**

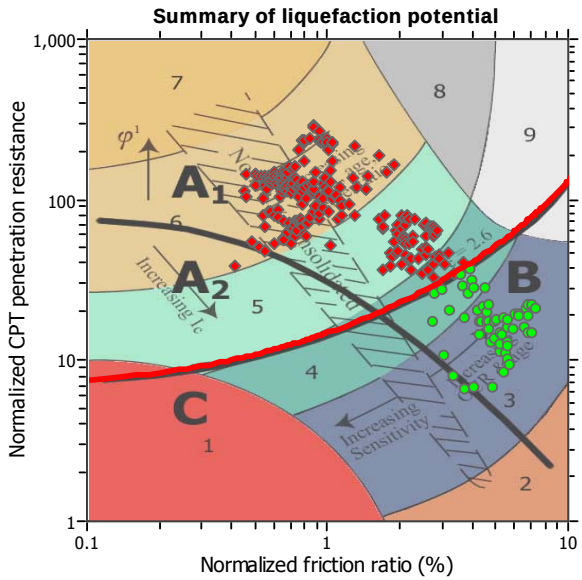
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	28.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	28.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.70	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.44	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

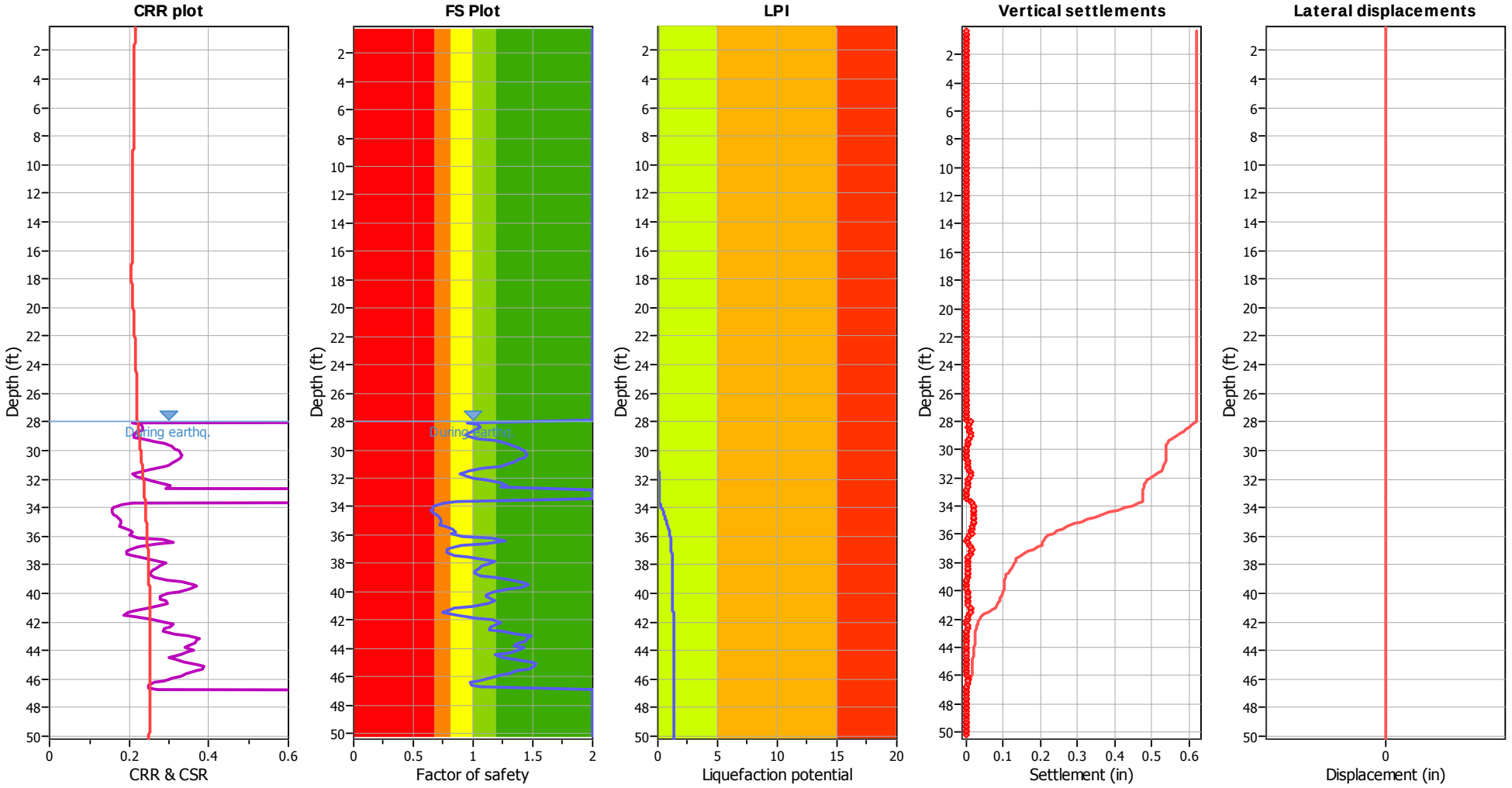






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	28.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	6.70	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.44	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	28.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

SAN RAMON

SAN FRANCISCO

SAN JOSE

OAKLAND

LATHROP

ROCKLIN

SANTA CLARITA

IRVINE

CHRISTCHURCH

WELLINGTON

AUCKLAND

ENGEO

Expect Excellence

March 8, 2024

Project No.
13618.000.001

Ms. Nicole Torstvet
Prologis
3353 Gateway Blvd
Fremont, CA 94538

Subject: 407 Spreckels Avenue
Manteca, California

GEOTECHNICAL REPORT UPDATE

Dear Ms. Torstvet:

As requested, we prepared this geotechnical report update for the proposed industrial facility located at 407 Spreckels Avenue in Manteca, California. Our scope of services included reviewing our geotechnical exploration report (Reference 1), performing supplemental borings, percolation testing, laboratory testing, and providing updated geotechnical recommendations for the proposed development. For our use, we were provided with the Conceptual Site Plan dated December 14, 2023.

PROJECT LOCATION AND DESCRIPTION

The project is located at 407 Spreckels Avenue in Manteca, California, as shown in our Vicinity Map, Figure 1. According to the provided site plan and our discussions with you, the proposed improvements have changed slightly from the improvements proposed in Reference 1 and will include an approximately 278,000-square-foot industrial building, an underground water storage/infiltration chamber, parking areas, drive aisles, underground utilities, and associated improvements.

The proposed site layout is shown in our Site Plan, Figure 2. Structural loads and grading are yet to be determined; however, we assume that structural loads will be representative for this type of construction and that grading will consist of subexcavating the existing non-engineered fill and placing it back as an engineered fill across the site to achieve design grades.

PREVIOUS FIELD EXPLORATION

ENGEO previously completed a geotechnical exploration for the subject site (Reference 1), which included borings, test pits, cone penetration tests, and shallow percolation testing (on the eastern edge of the site). The main geotechnical concern stated in the report was the presence of undocumented fill across the majority of the site due to the previous sugar refinery located on site.

SUPPLEMENTAL FIELD EXPLORATION

Our supplemental field exploration included drilling two borings and performing four percolation tests. We performed our field exploration between February 23 and February 28, 2024. The approximate locations of the explorations are shown in the site plan, Figure 2. The locations of our explorations are approximate and were estimated by utilizing smartphones equipped with GPS; they should be considered accurate only to the degree implied by method used.

We retained a truck-mounted Soil Test Ranger drill rig and crew to advance the borings using 4-inch-diameter solid-flight augers. The borings were advanced to a maximum depth of 31½ feet below existing grade. An ENGEO representative logged the borings in the field and collected soil samples using either a 3-inch outside diameter (O.D.) Modified California-type split-spoon sampler fitted with 6-inch-long stainless-steel liners or a 2-inch O.D. standard penetration test (SPT) split-spoon sampler. The samplers were advanced with a 140-pound hammer with a 30-inch drop, employing a rope-and-cathead hammer system. The penetration of the samplers into the native materials was field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. Blow count results on the boring logs were recorded as the number of blows required for the last 1 foot of penetration.

We used field logs to develop the boring logs attached to this letter. The boring logs depict subsurface conditions within the borings at the time the exploration was conducted. Subsurface conditions at other locations may differ from conditions occurring at these boring locations and the passage of time may result in altered subsurface conditions. In addition, stratification lines represent the approximate boundaries between soil types; the transitions may be gradual or gradational.

SURFACE CONDITIONS

According to Google Earth, site grades still range from approximately Elevation 40 to 44 feet (WGS84). We observed the following site features during our field exploration.

- An access road along the perimeter of the site
- Excessive growth of grasses and weeds across the site
- Wood debris in the northeastern corner of the site
- Miscellaneous dumped debris along the northern site boundary
- A metal pipe with a diameter of approximately 4 inches extending approximately 4 feet above ground surface in the eastern portion of the site

Please refer to the Site Plan, Figure 2, for more information on surface conditions.

SUBSURFACE CONDITIONS

The subsurface conditions encountered were similar to those previously encountered and described in Reference 1. Undocumented fill was encountered to a depth of approximately 2½ feet in Boring 2-B1 and approximately 6 feet in Boring 2-B2. The near-surface soil encountered in our borings was non-expansive.

GROUNDWATER CONDITIONS

Groundwater was encountered at a depth of approximately 27 feet below ground surface in Boring 2-B1 and 26½ feet below ground surface in Boring 2-B2. Fluctuations in the level of groundwater may occur due to variations in rainfall, irrigation practice, and other factors not evident at the time measurements were made.

LABORATORY TESTING

We performed laboratory tests on selected soil samples to determine their engineering properties. For this project, we performed sieve analysis and plasticity index testing. Selected soil properties are recorded on the boring logs and all laboratory data is attached to this letter.

CONCLUSIONS AND UPDATED RECOMMENDATIONS

Based on our review of our geotechnical exploration report, the primary geotechnical concerns relating to existing undocumented fill remain valid. It is our opinion that the conclusions and recommendations in the referenced report remain applicable for the project, with the addition of the following supplemental recommendations.

Percolation Testing

We installed and performed four percolation tests at the locations shown in Figure 2. The percolation test holes extended to a maximum depth of approximately 14 feet below the existing ground surface. The test holes were drilled using a drill rig equipped with 4-inch-diameter solid-flight augers.

Preparation of the percolation test holes began by placing approximately 2 inches of fine gravel in the bottom of the holes. A 3-inch-diameter perforated PVC pipe was then placed in the test holes and surrounded by fine gravel. The holes were pre-soaked overnight prior to testing, with measurement of the percolation rate occurring in the following days.

To perform the percolation test, we measured the time until relatively stable percolation rates were achieved. Municipal drinking water was used for the percolation testing. It is our opinion that the percolation rate of drinking water should be similar to stormwater. The results of the percolation tests are discussed below.

Percolation Testing Results

The following infiltration rates are based on a falling head percolation test where measurements are recorded for the time it took the water level to drop from a depth of approximately 12 inches from the bottom of the hole to a depth of approximately 6 inches from the bottom of the hole. Infiltration in the lateral and vertical direction is inherent in the rates provided below.

Based on our measured field test results, we converted the uncorrected field percolation rates to infiltration rates using Porchet's Method (Inverse Borehole Method), as summarized in the table below.

TABLE 1: Percolation Testing Results

PERCOLATION TEST HOLE	TEST DEPTH	RAW FIELD PERCOLATION RATE (inches/hour)	CONVERTED PORCHET DESIGN INFILTRATION RATE (inches/hour)	SOIL TYPE
2-P1	14	600	50	Poorly Graded Sand (SP)
2-P2	9½	50	5	Silty Sand (SM)
2-P3	13	70	6	Silty Sand (SM)
2-P4	10	20	2	Silty Sand (SM)

Based on the results of our percolation tests we recommend a design infiltration rate of 5 inches per hour for the western side of the site, and 2 inches per hour for the southern end of the site.

The rates presented in the table above conform to Type A soil in accordance with Table 3-1 of the Multi-Agency Post Construction Stormwater Standards Manual (June, 2015) shown below.

TABLE 2: Table 3-1. Typical Soil Types and Infiltration Rates

Type	Description	Typical Infiltration Rate (in/hr) (1)
A	Sands, gravels	>1.0
B	Sandy loams with moderately fine to moderately coarse textures	0.5-1.0
C	Silty-loams or soils with moderately fine to fine texture	0.17-0.27
D	Clays	0.02-0.10

(1) Infiltrate rates presented are adapted from multiple sources (National Resource Conservation Service, American Society of Civil Engineers, etc.).

Conventional Spread Footing Design Criteria

Based on our updated explorations, the foundation and slab-on-grade recommendations contained in Reference 1 are still valid for the proposed development.

2022 CBC Seismic Design Parameters

The 2022 CBC utilizes seismic design criteria established in the ASCE/SEI Standard "Minimum Design Loads and Associated Criteria for Buildings and Other Structures" (ASCE 7-16). Based on the subsurface conditions encountered, we characterized the site as Site Class D.

ASCE 7-16 requires a site-specific ground-motion hazard analysis for Site Class D sites with a mapped S_1 value greater than or equal to 0.2; however, Section 11.4.8 of ASCE 7-16 and Supplement No. 3 provide an exception to this requirement. A site-specific ground-motion hazard analysis is not required where the value of the parameter S_{M1} determined by Equation 11.4-2, and shown in Table 3, is increased by 50 percent for developing the mapped risk-targeted maximum considered earthquake (MCER) spectral response, calculating S_{D1}, and evaluating C_s in accordance with Chapter 12 of ASCE 7-16.

TABLE 3: 2022 CBC Seismic Design Parameters Latitude: 37.79153 Longitude: -121.19926

PARAMETER	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	0.77
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.29
Site Coefficient, F_a	1.19
Site Coefficient, F_v	2.02*
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	0.92
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	0.59*
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	0.61
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	0.39*
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.32
Site Coefficient, F_{PGA}	1.28
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.41
Long Period Transition-Period, T_L (sec)	8

*The parameters above should only be used for calculation of T_s, determination of Seismic Design Category, and, when taking the exceptions under Items 1 and 2 of ASCE 7-16 Section 11.4.8. (Supplement Number 3 https://ascelibrary.org/doi/epdf/10.1061/9780784414248.sup3).

We recommend that we collaborate with the structural engineer of record to further evaluate the effects of taking the exception on the structural design and identify the need for performing a site-specific ground-motion hazard analysis. We can prepare a proposal for a site-specific ground-motion hazard analysis, if requested.

CLOSING

It is our opinion that the recommendations contained in Reference 1 are still applicable for the proposed development, with the addition of the supplemental recommendations provided in this letter.

If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Connor Dunn

Steve Harris, GE

cd/sdh/ar

Attachments: Selected References
Figures 1 and 2
Boring Logs
Laboratory Test Data

SELECTED REFERENCES

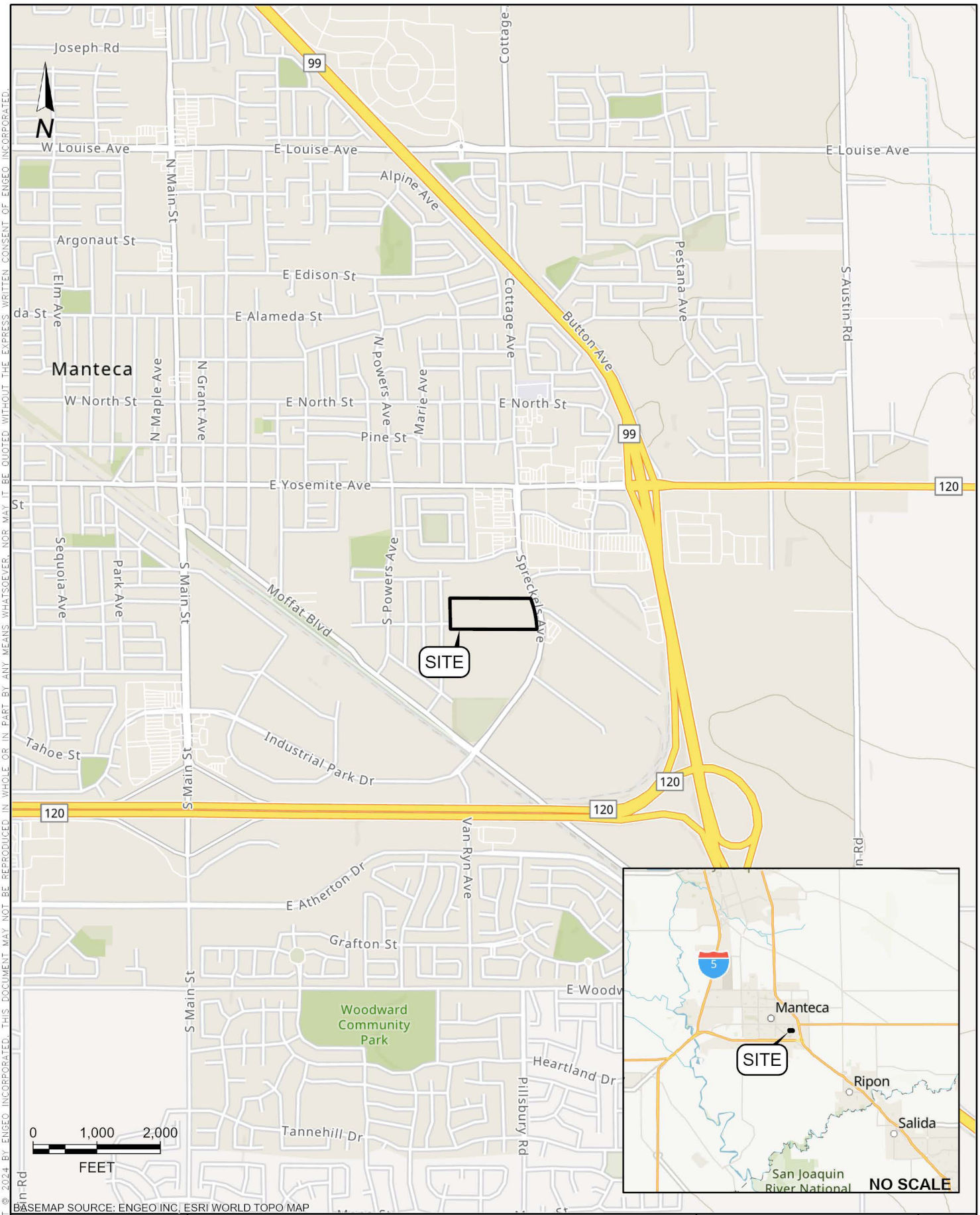
1. ENGEO. 2017. Geotechnical Exploration, 407 Spreckels Avenue, Manteca, California. January 24, 2017. Project No. 13618.000.000.

2. Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16).

3. Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-16) Supplement Number 3.

FIGURES

Figure 1 – Vicinity Map
Figure 2 – Site Plan



BASEMAP SOURCE: ENGEO INC, ESRI WORLD TOPO MAP

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VICINITY MAP

407 SPRECKLES AVENUE

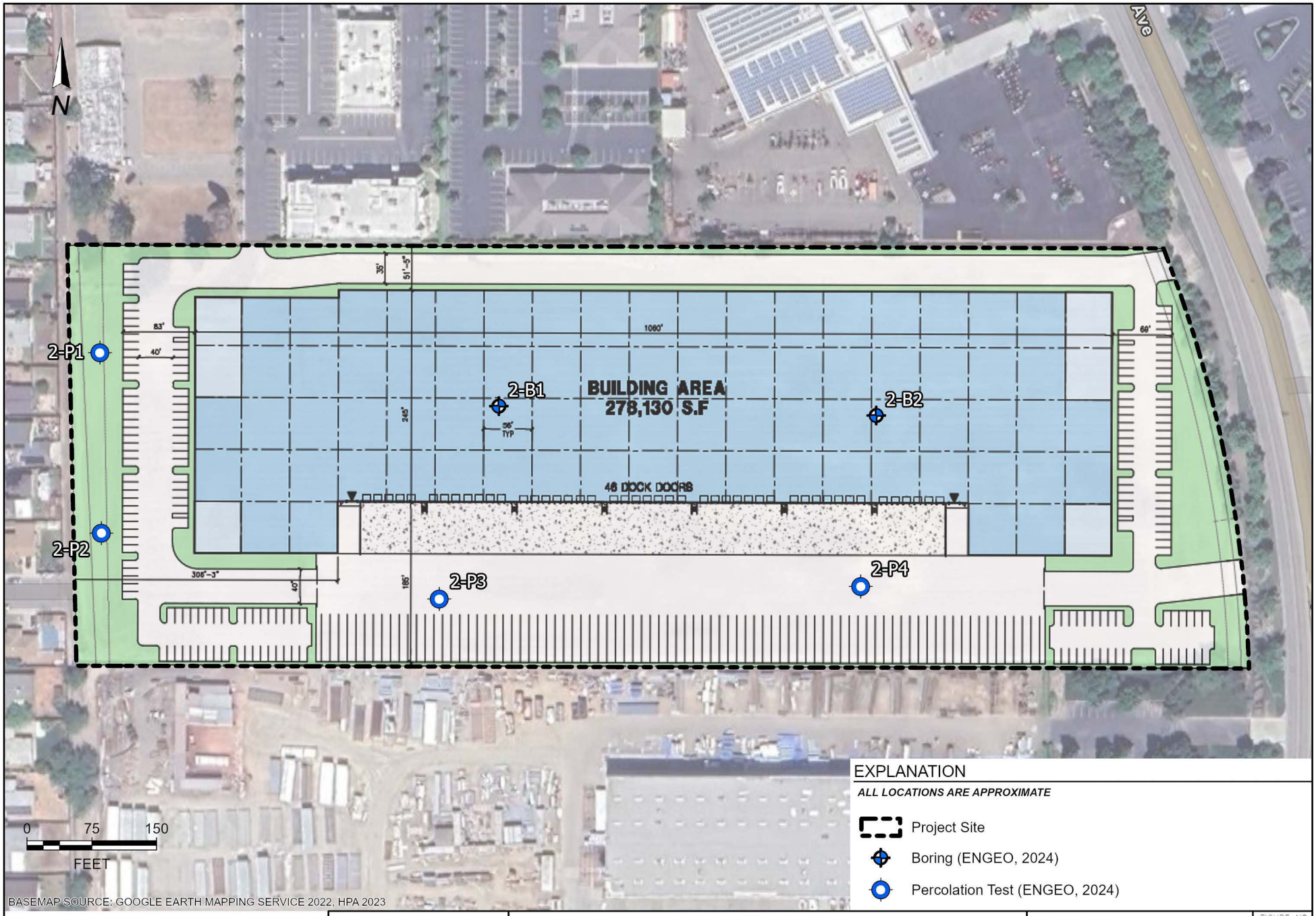
MANTECA, CALIFORNIA

PROJECT NO. :	13618.000.001
SCALE:	AS SHOWN
DRAWN BY: CMG	CHECKED BY: SDH

FIGURE NO. 1

PATH: G:\DRAFTING\PROJECTS_12000 TO 13999\13618\13618000001\GEOTECH\GEX\13618000001_407_SPRECKLES_AVENUE_GEX.APRX
LAYOUT: 01. VICINITY 8.5 X 11 PORTRAIT USER: CGUERIN

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

- Project Site
- Boring (ENGEO, 2024)
- Percolation Test (ENGEO, 2024)

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SITE PLAN

407 SPRECKLES AVENUE

MANTECA, CALIFORNIA

PROJECT NO. :	13618.000.001
SCALE:	AS SHOWN
DRAWN BY: CMG	CHECKED BY: SDH

FIGURE NO. 2

PATH: G:\DRAFTING\PROJECTS_12000 TO 13999\13618\13618000001\GEOTECH\GEX\13618000001_407_SPRECKLES_AVENUE_GEX.APRX
LAYOUT: 02. SITE PLAN 8.5 X11 LANDSCAPE USER: CGUERIN

ORIGINAL FIGURE PRINTED IN COLOR

ENGEO
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KEY TO BORING LOGS
BORING LOGS

13618.000.001
March 8, 2024

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LOG OF BORING 2-B1

LATITUDE: 37.792110° LONGITUDE: -121.199989°

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.001

DATE DRILLED: 2/23/2024
HOLE DEPTH: Approx. 31½ ft.
HOLE DIAMETER: 4½ in.
SURF ELEV (WGS84): Approx. 41 ft.

LOGGED / REVIEWED BY: L. Becker / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	40		SILTY SAND (SM), dark brown, medium dense, moist, low plasticity, fine- to coarse-grained sand, approximately 30-35% fines [UNDOCUMENTED FILL]												
			SILTY SAND (SM), dark yellowish brown, medium dense, moist, low plasticity, fine- to coarse-grained sand, approximately 25-30% fines [NATIVE]			47									
						19				27					
5	35		Non-plastic			26	NV	NP	NP	33					
			Increase in fines content, low plasticity			54									
10	30		POORLY GRADED SAND (SP), light gray, medium dense, moist, fine- to coarse-grained sand, less than 5% fines, mica present												
			SILTY SAND (SM), yellowish brown, dense, moist, fine- to coarse-grained sand, approximately 15-20% fines												
15	25		Grades to light gray, decreasing fines content			38				19					
			CLAYEY SAND (SC), yellowish brown, medium dense to dense, moist, fine- to coarse-grained sand, approximately 20-25% fines												
20															

LOG - GEOTECHNICAL_SU+QU W/ ELEV_BORINGS_GINT_13618.GPJ ENGEO INC.GDT 3/7/24

ENGEO
Expect Excellence

LOG OF BORING 2-B1

LATITUDE: 37.792110° LONGITUDE: -121.199989°

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.001

DATE DRILLED: 2/23/2024
HOLE DEPTH: Approx. 31½ ft.
HOLE DIAMETER: 4½ in.
SURF ELEV (WGS84): Approx. 41 ft.

LOGGED / REVIEWED BY: L. Becker / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
	20		CLAYEY SAND (SC), dark yellowish brown, medium dense, moist, fine- to coarse-grained sand, approximately 35-45% fines			30									
25	15		LEAN CLAY (CL), yellowish brown, very stiff, moist, low to medium plasticity, approximately 10-15% fine- to medium-grained sand, mica present, iron oxide present			46				86				2.25*	PP
			SILT (ML), dark greenish gray, very stiff, moist to wet, low plasticity, slow to rapid dilatancy, approximately 5-10% fine-grained sand, oxidized rootlets present		▽										
			SANDY SILT (ML), grayish brown, stiff, wet, low plasticity, slow to rapid dilatancy, approximately 35-45% fine-grained sand												
30	10		SILTY SAND (SM), grayish brown, very dense, wet, fine- to medium-grained sand, approximately 35-45% fines			95									
			Bottom of boring at approximately 31½ feet below ground surface. Groundwater observed at approximately 27 feet below ground surface during drilling.												

LOG - GEOTECHNICAL_SU+QU W/ ELEV_BORINGS_GINT_13618.GPJ ENGEO INC.GDT 3/7/24

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LOG OF BORING 2-B2

LATITUDE: 37.792103° LONGITUDE: -121.198438°

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.001

DATE DRILLED: 2/23/2024
HOLE DEPTH: Approx. 30¾ ft.
HOLE DIAMETER: 4½ in.
SURF ELEV (WGS84): Approx. 44 ft.

LOGGED / REVIEWED BY: L. Becker / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
0	40		SILTY SAND (SM), dark brown, loose, moist, less than 5% fine to coarse non-native gravel, approximately 30-35% fines, fine- to coarse-grained sand [UNDOCUMENTED FILL]												
			SILTY SAND (SM), dark yellowish brown, loose, moist, approximately 30-35% fines, fine- to coarse-grained sand [UNDOCUMENTED FILL]			12									
5						8									
						24				26					
	35		SILTY SAND (SM), brown, medium dense, approximately 20-30% fines, fine- to medium-grained sand [NATIVE]												
10			POORLY GRADED SAND WITH SILT (SP-SM), brown, medium dense, moist, approximately 5-10% fines, fine- to coarse-grained sand, mica present			55									
	30		SILTY SAND (SM), approximately 12-15% fines, fine-to coarse-grained sand, mica present												
15			SILTY SAND (SM), light gray, dense, moist, fine- to coarse-grained sand, less than 15-20% fines, mica present			31									
	25														
20															

LOG - GEOTECHNICAL_SU+QU W/ ELEV_BORINGS_GINT_13618.GPJ ENGEO INC.GDT 3/7/24

ENGEO
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LOG OF BORING 2-B2

LATITUDE: 37.792103° LONGITUDE: -121.198438°

Geotechnical Exploration
407 Spreckels Ave
Manteca, CA
13618.000.001

DATE DRILLED: 2/23/2024
HOLE DEPTH: Approx. 30¾ ft.
HOLE DIAMETER: 4½ in.
SURF ELEV (WGS84): Approx. 44 ft.

LOGGED / REVIEWED BY: L. Becker / ZAC
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

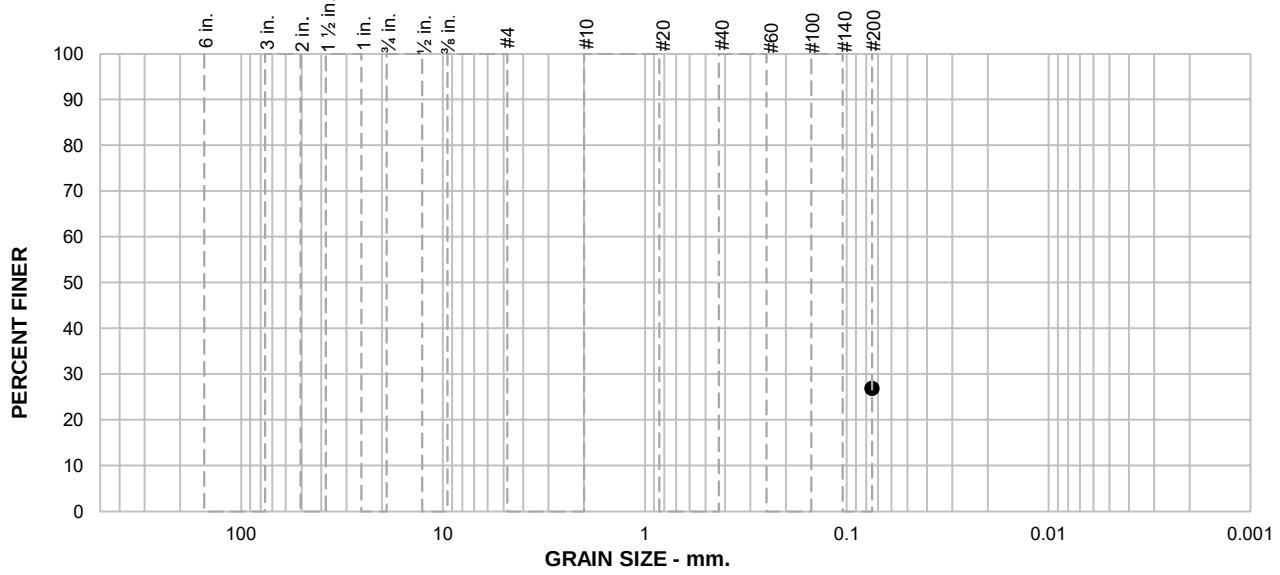
Depth in Feet	Elevation in Feet	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Shear Strength (psf) *field approximation	Unconfined Strength (tsf) *field approximation	Strength Test Type
			SILTY SAND (SM), brown, medium dense, moist, approximately 20-30% fines, fine- to medium-grained sand			27									
			SILT (ML), brown to pale brown, stiff, moist, approximately 10-15% fine-grained sand, mica present, iron oxide present												
20			SANDY SILT (ML), grayish brown, very stiff, moist, approximately 30-35% fine- to medium-grained sand, low plasticity, iron oxide present												
25			SILTY SAND (SM), grayish brown, very dense, very moist to wet, fine- to coarse-grained sand, approximately 15-20% fines, low plasticity		▼	50/5.5"									
15			POORLY GRADED SAND WITH SILT (SP-SM), grayish brown, very dense, wet, approximately 5-10% fines, fine- to coarse-grained sand												
30						50/3"									
			Bottom of boring at approximately 31 feet below ground surface. Groundwater observed at approximately 26½ feet below ground surface during drilling.												

LABORATORY TEST DATA

13618.000.001
March 8, 2024

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 2-B01@3.5

DEPTH (ft): 3.5

LOCATION: 2-B01

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						26.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26.9		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 343.8 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
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CLIENT: Prologis

PROJECT NAME: 407 Spreckels Ave Percolation Testing

PROJECT NO: 13618.000.001 PH001

PROJECT LOCATION: Manteca, CA

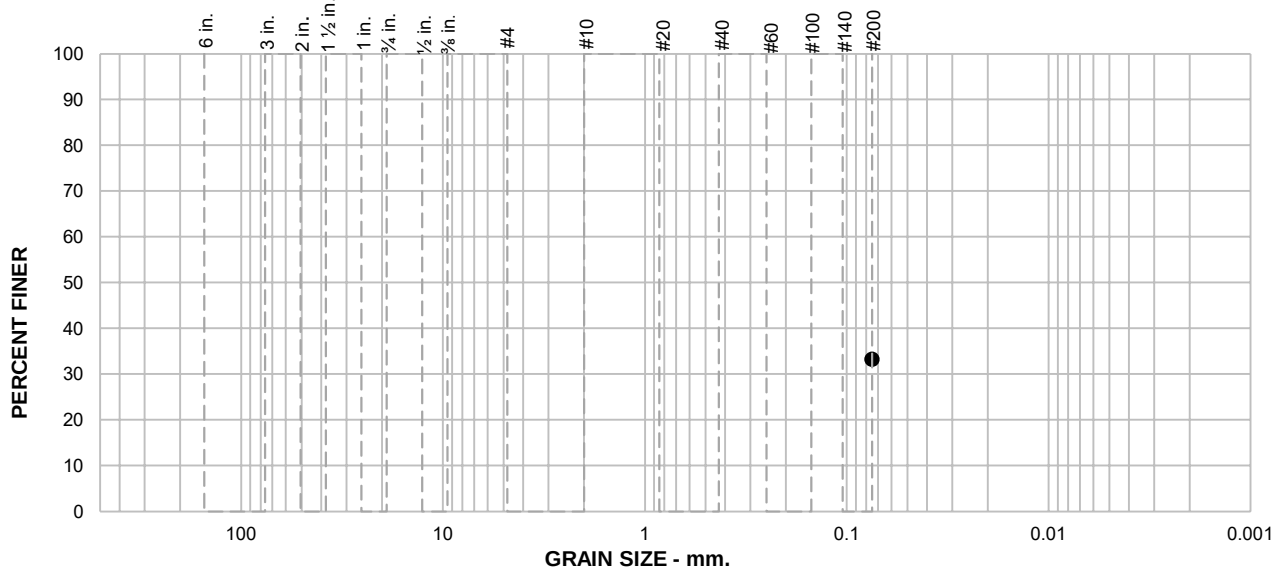
REPORT DATE: 3/5/2024

TESTED BY: K. Lecce

REVIEWED BY: V. Nunez

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 2-B01@7

DEPTH (ft): 7

LOCATION: 2-B01

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						33.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	33.2		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = NP LL = NV PI = NP

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

PI: ASTM D4318, Wet Method

Soak time = 180 min
Dry sample weight = 341.2 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Prologis

PROJECT NAME: 407 Spreckels Ave Percolation Testing

PROJECT NO: 13618.000.001 PH001

PROJECT LOCATION: Manteca, CA

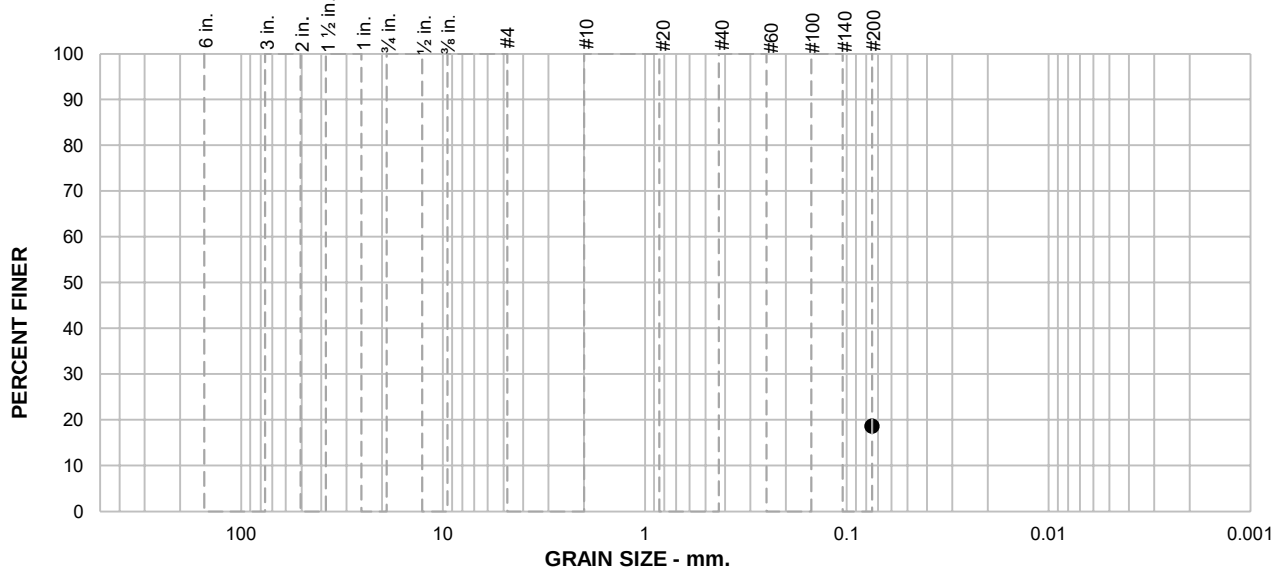
REPORT DATE: 3/5/2024

TESTED BY: K. Lecce

REVIEWED BY: V. Nunez

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 2-B01@15.5

DEPTH (ft): 15.5

LOCATION: 2-B01

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						18.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	18.6		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 268.2 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Prologis

PROJECT NAME: 407 Spreckels Ave Percolation Testing

PROJECT NO: 13618.000.001 PH001

PROJECT LOCATION: Manteca, CA

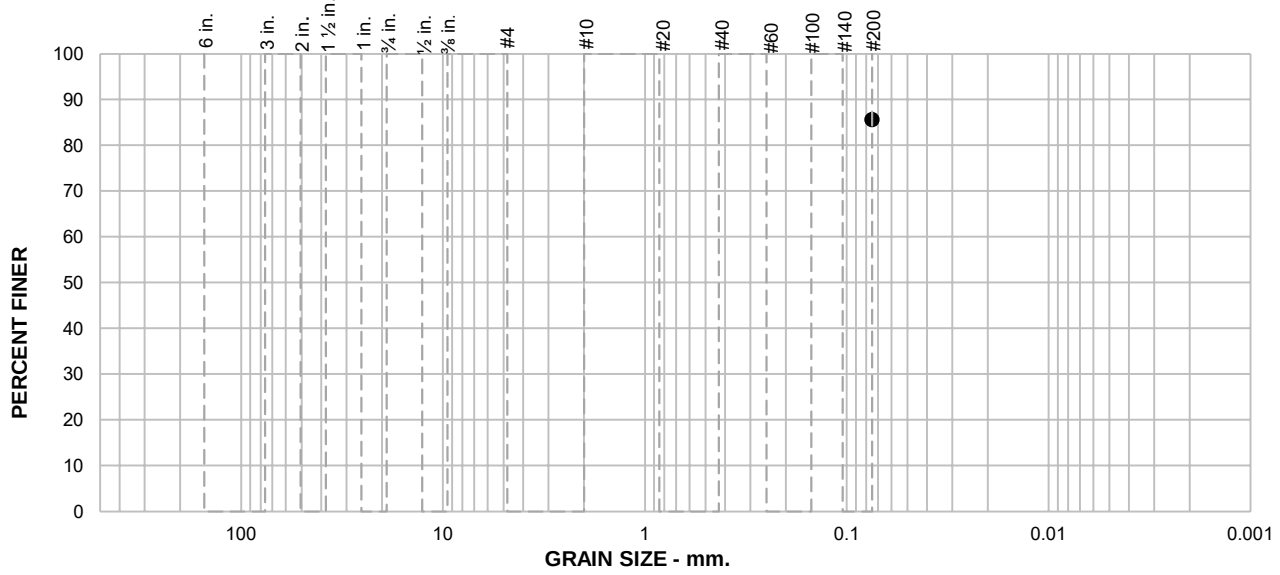
REPORT DATE: 3/5/2024

TESTED BY: K. Lecce

REVIEWED BY: V. Nunez

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 2-B01@25

DEPTH (ft): 25

LOCATION: 2-B01

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						85.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	85.6		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = LL = PI =

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

Soak time = 180 min
Dry sample weight = 282.8 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Prologis

PROJECT NAME: 407 Spreckels Ave Percolation Testing

PROJECT NO: 13618.000.001 PH001

PROJECT LOCATION: Manteca, CA

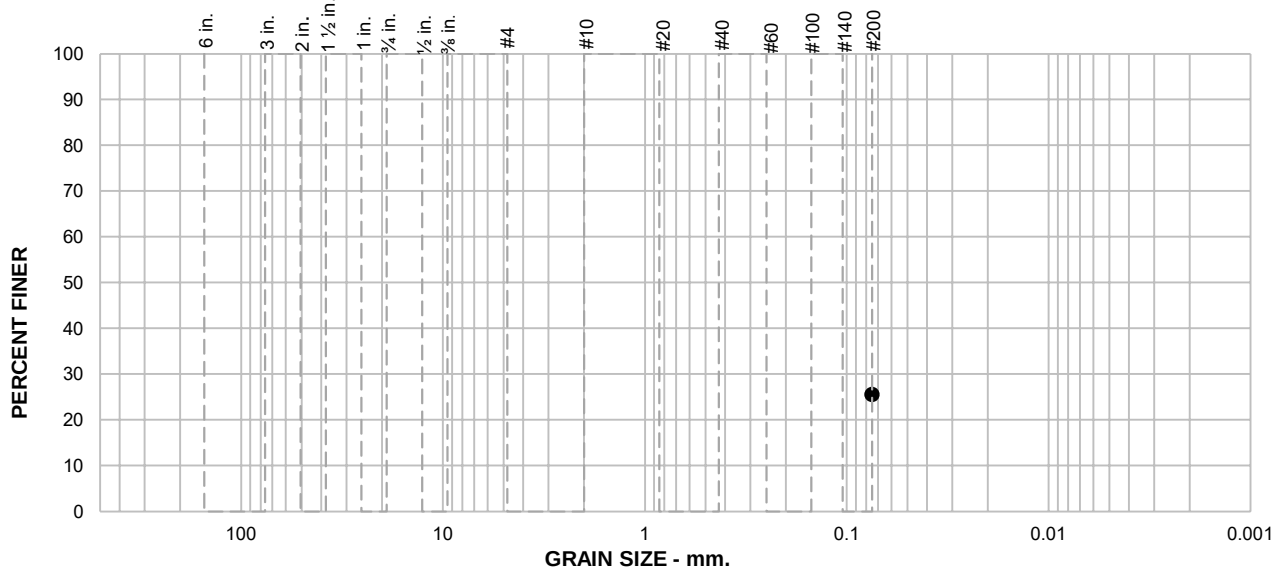
REPORT DATE: 3/5/2024

TESTED BY: K. Lecce

REVIEWED BY: V. Nunez

PARTICLE SIZE DISTRIBUTION REPORT

ASTM D1140, Method B



SAMPLE ID: 2-B02@6

DEPTH (ft): 6

LOCATION: 2-B02

% +75mm	% GRAVEL		% SAND			% FINES	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
						25.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	25.6		

SOIL DESCRIPTION

See exploration logs

ATTERBERG LIMITS

PL = NP LL = NV PI = NP

COEFFICIENTS

D_{90} = D_{85} = D_{60} =
D_{50} = D_{30} = D_{15} =
D_{10} = C_u = C_c =

CLASSIFICATION

USCS =

REMARKS

PI: ASTM D4318, Wet Method

Soak time = 180 min
Dry sample weight = 310.6 g
Largest particle size < No. 4 Sieve

* (no specification provided)

ENGEO
Expect Excellence

CLIENT: Prologis

PROJECT NAME: 407 Spreckels Ave Percolation Testing

PROJECT NO: 13618.000.001 PH001

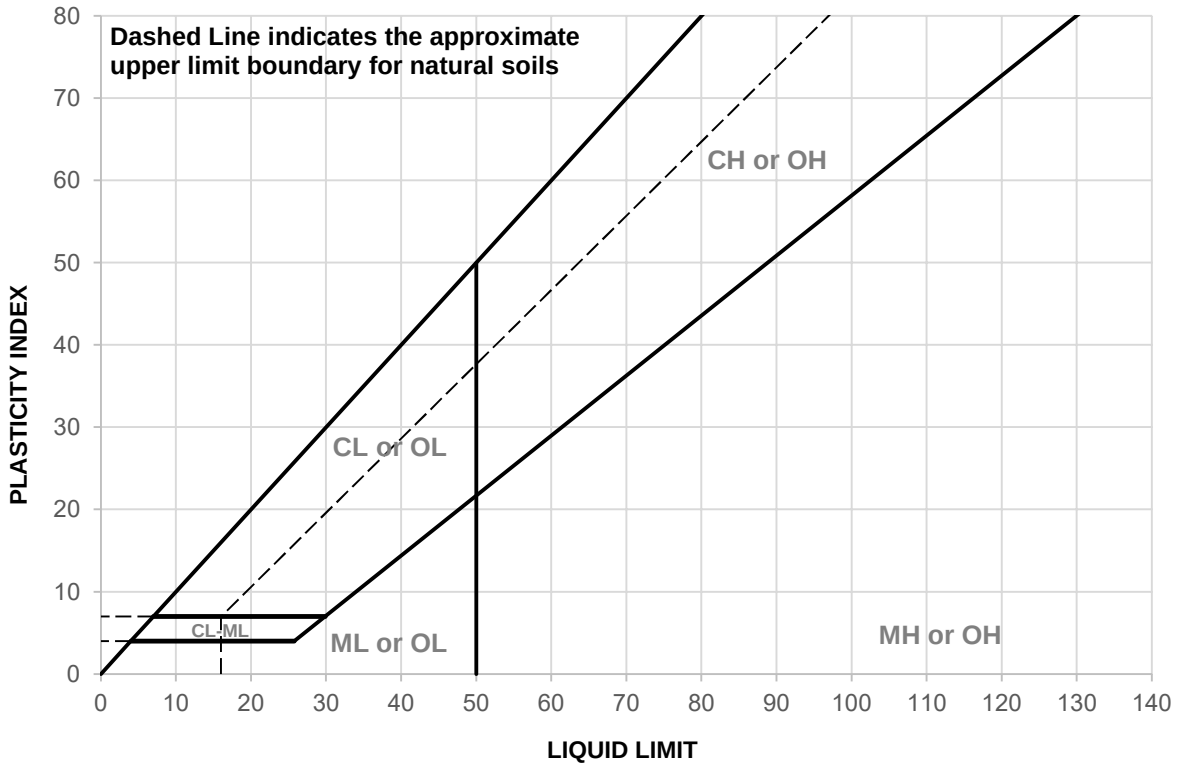
PROJECT LOCATION: Manteca, CA

REPORT DATE: 3/5/2024

TESTED BY: K. Lecce

REVIEWED BY: V. Nunez

LIQUID AND PLASTIC LIMITS TEST REPORT
ASTM D4318



	SAMPLE ID	DEPTH (ft)	MATERIAL DESCRIPTION	LL	PL	PI
▲	2-B01@7	7	See exploration logs	NV	NP	NP
◆	2-B02@6	6	See exploration logs	NV	NP	NP

	SAMPLE ID	TEST METHOD	REMARKS
▲	2-B01@7	PI: ASTM D4318, Wet Method	
◆	2-B02@6	PI: ASTM D4318, Wet Method	

ENGEO
Expect Excellence

CLIENT: Prologis
PROJECT NAME: 407 Spreckels Ave Percolation Testing
PROJECT NO: 13618.000.001 PH001
PROJECT LOCATION: Manteca, CA
REPORT DATE: 3/5/2024
TESTED BY: V. Nunez
REVIEWED BY: K. Lecce

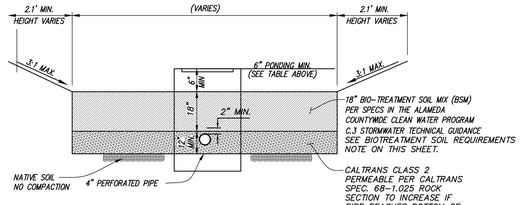
STORMWATER QUALITY SUMMARY TABLE

Area No.	Area (SF)	Area (AC)	Landscape (SF)	Landscape (AC)	Imperv. (SF)	Imperv. (AC)	Stormwater Design Volume* (CF)	Bioretention Area Required* (SF)	Bioretention Area Provided (SF)	Treatment Type
1	606,068	13.91	42,751	0.98	563,317	12.93	28,788	N/A	N/A	Infiltration Basin
2	39,903	0.92	17,876	0.41	22,027	0.51	898	665	2,510	Bio-Retention Planter
TOTAL	645,971	14.83	60,627	1.39	585,344	13.44	29,686	665	2,510	-

* Required bioretention area was calculated by determining the Stormwater Design Volume (SDV) using the 'Post-Construction Standards Manual dated 06-30-2015.

NOTES

1. THE STORM DRAIN FACILITIES SHALL COMPLY WITH THE 2015 MUNICIPAL REGIONAL PERMIT (MRP) OF THE SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) AND THE ALAMEDA COUNTYWIDE CLEAN WATER PROGRAM C.3 GUIDELINES.
2. THE DEVELOPMENT PROJECT SHALL PROVIDE LOW IMPACT DEVELOPMENT (LID) SOURCE CONTROL MEASURES AS PER MRP PROVISION C.3.c FOR REGULATED PROJECTS (C.3.b) AND HYDROMODIFICATION MANAGEMENT AS PER MRP PROVISION C.3.g.
3. A NOTICE OF INTENT (NOI) AND STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE PREPARED AND SUBMITTED TO RWQCB FOR REVIEW AND APPROVAL.
4. THE PROJECT PLANS SHALL IDENTIFY BEST MANAGEMENT PRACTICES (BMPs) APPROPRIATE TO THE USES CONDUCTED ON-SITE TO LIMIT THE ENTRY OF POLLUTANTS INTO STORM WATER RUNOFF TO THE MAXIMUM EXTENT PRACTICABLE.
5. DESIGNS SHALL COMPLY WITH THE LATEST ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT'S HYDROLOGY AND HYDRAULICS CRITERIA SUMMARY.
6. THE ON-SITE STORM DRAIN AND STORM WATER TREATMENT SYSTEMS SHALL BE OWNED-AND-MAINTAINED BY THE PROPERTY OWNER.
7. ALL STORM DRAIN INLETS MUST BE LABELED "NO DUMPING – DRAINS TO BAY" USING THE CITY APPROVED SPECIFICATIONS.
8. THE PROJECT SHALL NOT BLOCK RUNOFF FROM, OR AUGMENT RUNOFF TO, ADJACENT PROPERTIES.



NOTES:
1. BIO-RETENTION PLANTERS SHALL CONFORM TO THE GUIDELINES SET FORTH IN THE ALAMEDA COUNTYWIDE CLEAN WATER PROGRAM C.3 STORMWATER TECHNICAL GUIDANCE, DATED MAY 2, 2016. VERSION 5.1.

SECTION - IN GROUND BIO RETENTION 1

NOT TO SCALE

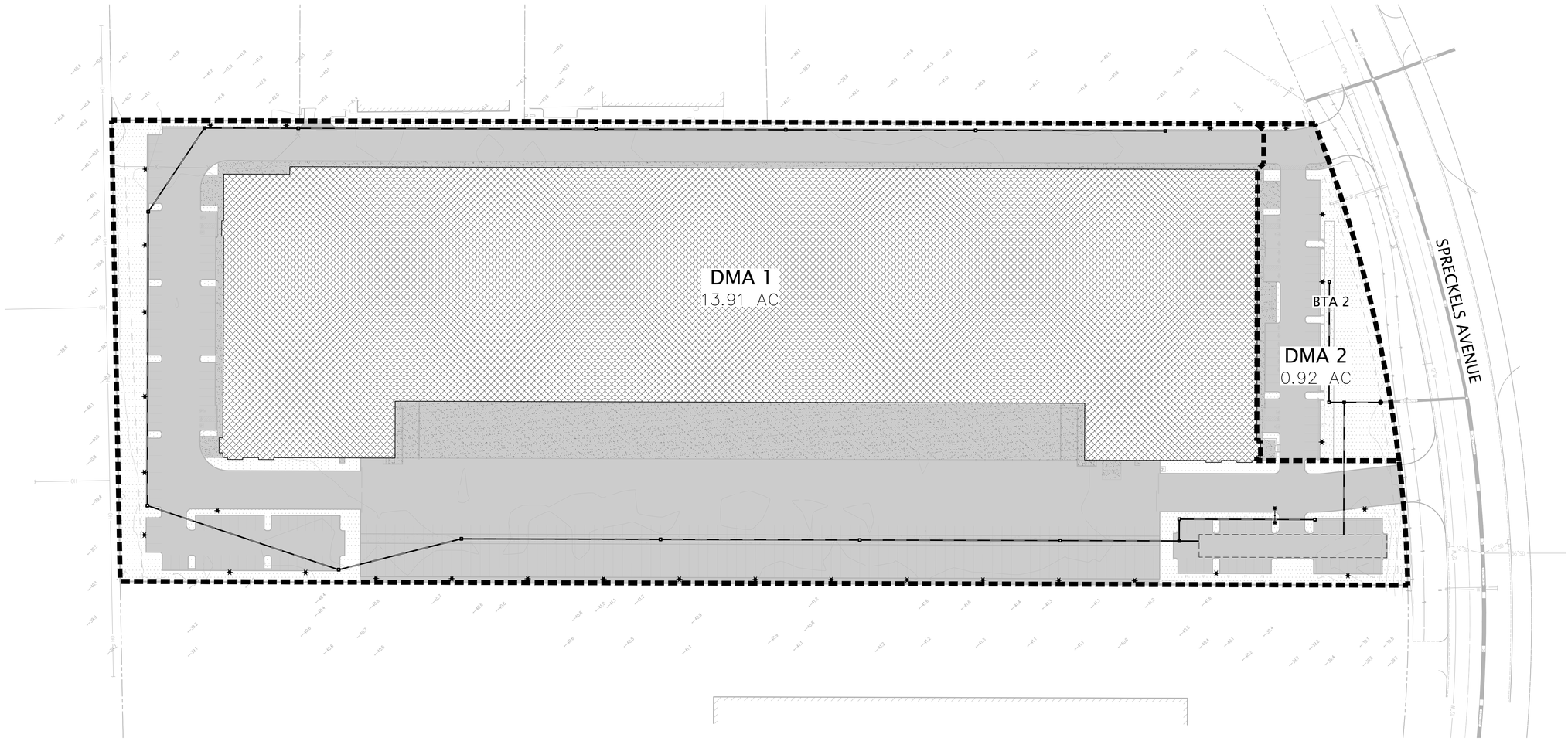
NORTH

0 25 50 100 150

Scale 1" = 50'

LEGEND

- TRIBUTARY AREA LIMITS
- LANDSCAPE AREA
- IMPERVIOUS ROOFTOP DRAINING TO BIO-SWALE
- IMPERVIOUS PAVEMENT DRAINING TO BIO-SWALE
- BIO-RETENTION TREATMENT AREA
- UNDERGROUND STORM DRAIN STORAGE SYSTEM
- # / #.## DRAINAGE MANAGEMENT AREA # / DRAINAGE MANAGEMENT AREA (ACRES)



PROGRESS SET

REVISION BY NO.

REVISION BY NO.

REGISTERED PROFESSIONAL ENGINEER
MICHAEL T. BASSETTO
No. 71814
PRELIMINARY
CIVIL
STATE OF CALIFORNIA

KIER+WRIGHT
2850 Collier Canyon Road
Livermore, CA 94551
Phone: (925) 245-8788
www.kierwright.com

STORM WATER QUALITY CONTROL PLAN

OF

407 SPRECKLES AVENUE

FOR

PROLOGIS

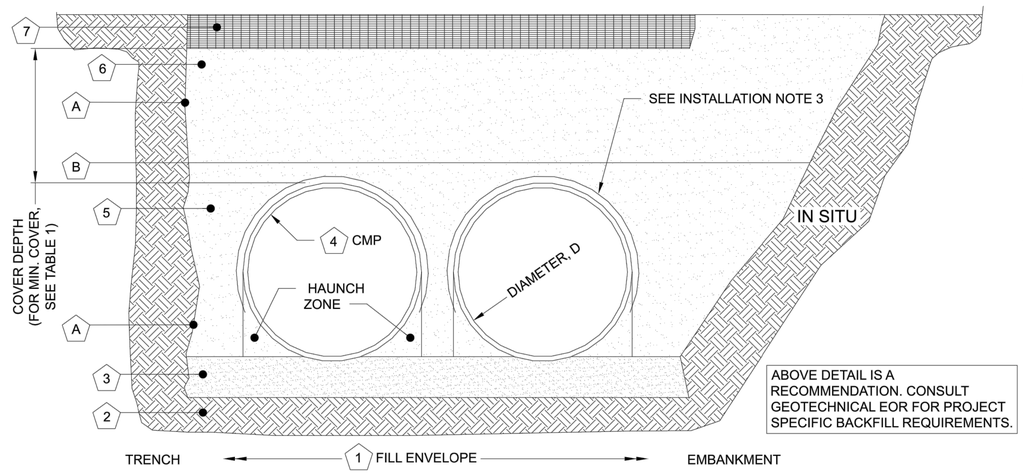
MANTECA, CALIFORNIA

DATE	APRIL, 2024
SCALE	AS SHOWN
DESIGNER	AJC
DRAWN BY	AJA
JOB NO.	A24057
SHEET	C6.0
OF	8 SHEETS

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.



ABOVE DETAIL IS A RECOMMENDATION. CONSULT GEOTECHNICAL EOR FOR PROJECT SPECIFIC BACKFILL REQUIREMENTS.

MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. AN HDPE MEMBRANE LINER WILL BE PLACED ON THE CROWN OF EACH PIPE TO PROVIDE AN IMPERMEABLE BARRIER AGAINST ENVIRONMENTAL CHANGES THAT MAY ADVERSELY AFFECT THE SYSTEM OVER TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL TECHNICAL DETAILS.

TABLE 2: PERFORATED STANDARD

CMP RETENTION STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** - PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57**	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE OPEN GRADED GRANULAR BEDDING CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5	BACKFILL	FREE-DRAINING, ANGULAR, WASHED-STONE PER **AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** OR APPROVED EQUAL *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WHERE CONVENTIONAL COMPACTION TESTING IS NOT PRACTICAL, THE MATERIAL SHALL BE MECHANICALLY COMPACTED UNTIL NO FURTHER YIELDING OF MATERIAL IS OBSERVED UNDER THE COMPACTOR. AREAS WITH HIGH WATER TABLE FLUCTUATIONS THAT INTERACT WITH THE PIPE ZONE, CONSIDER INSTALLING A GEOTEXTILE SEPARATION LAYER TO PREVENT SOIL MIGRATION.	**IN
6	COVER MATERIAL	UP TO MIN. COVER - **AASHTO M 145: A-1, A-2, A-3** ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROADBASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.

* APPROVED REGIONAL EQUIVALENTS FOR SECTION 5 INCLUDE CA-7, MIDOT 6AA, 6A, OR 5G, PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.

MANUFACTURER RECOMMENDED BACKFILL

NOT TO SCALE

C:\EXPORTS\TEMPLATES\NEW\CMP_V8.DWG 10/18/2019 10:02 AM

DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH **DYODS** DRAWING

DYO49058 Prologis - 407 Spreckles Ave
CMP Retention
Manteca, CA
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
33994	49058	4/2/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

PROGRESS SET

REVISION NO. BY

REVISION NO. BY

REGISTERED PROFESSIONAL ENGINEER
HYOKEL T. BASSETTE
No. 71814
PRELIMINARY
CIVIL
STATE OF CALIFORNIA

KIER+WRIGHT
2850 Collier Canyon Road
Livermore, CA 94551
Phone: (925) 245-8788
www.kierwright.com

CONTECH – CMP DETENTION SYSTEM
OF
407 SPRECKLES AVENUE
FOR
PROLOGIS
MANTECA, CALIFORNIA

DATE	APRIL, 2024
SCALE	AS SHOWN
DESIGNER	AJC
DRAWN BY	AJA
JOB NO.	A24057
SHEET	C8.0
OF	8 SHEETS

Z:\2024\A24057\DWG\CENTILEMENTS\A24057-PC.dwg 4-12-24 03:00:22 PM rcressler

ATTACHMENT 10

Example Maintenance Access Agreement

(Long Form)

Recorded at the request of:

City/County of_____

After recording, return to:

City/County of_____

City/County Clerk

_____

_____

STORMWATER TREATMENT CONTROL MEASURE
MAINTENANCE ACCESS AGREEMENT

OWNER: _____

PROPERTY ADDRESS:_____

APN:_____

THIS AGREEMENT is made and entered into in_____, California, this___day of_____, by and between_____, hereinafter referred to as "Owner" and the CITY/COUNTY OF_____ _____, a municipal corporation, located in the County of _____, State of California hereinafter referred to as "CITY/COUNTY";

WHEREAS, the Owner owns real property ("Property") in the City/County of _____ _____, County of _____, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

WHEREAS, at the time of initial approval of development project known as_____ _____within the Property described herein, the City/County required the project to employ on-site control measures to minimize pollutants in urban runoff;

WHEREAS, the Owner has chosen to install (a/n) _____ _____, hereinafter referred to as "Stormwater Treatment Control Measure(s)", as the on-site control measure to minimize pollutants in urban runoff;

WHEREAS, said Stormwater Treatment Control Measure(s) has/have been installed in accordance with plans and specifications accepted by the City/County;

WHEREAS, said Stormwater Treatment Control Measure(s), with installation on private property and draining only private property, is a private facility with all maintenance or

replacement, therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, vegetation management, filter material replacement, and sediment removal, is required to assure peak performance of the Stormwater Treatment Control Measure(s) and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

WHEREAS, the Owner is required to implement the Operations and Maintenance Plan, more specifically described in Exhibit "C", which is attached hereto and incorporated herein by this reference;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1) Owner hereby provides the City/County or City's/County's designee complete access, of any duration, to the Stormwater Treatment Control Measure(s) and its immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City's/County's Director of Public Works no advance notice, for the purpose of inspection, sampling, testing of the Stormwater Treatment Control Measure(s), and in case of emergency, to undertake all necessary repairs or other preventative measures at Owner's expense as provided in paragraph 3 below. City/County shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2) Owner shall use its best efforts diligently to operate and maintain the Stormwater Treatment Control Measure(s) in a manner assuring peak performance at all times in accordance with the Operation and Maintenance Plan, which is incorporated into this Agreement as Exhibit C. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of material(s) from the Stormwater Treatment Control Measure(s) and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City/County, the Owner shall provide the City/County with documentation identifying the material(s) removed, the quantity, and disposal destination.

3) In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City/County, the City/County is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or Owner's successors or assigns, including administrative costs, attorneys' fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full.

4) The City/County may require the Owner to post security in form and for a time period satisfactory to the City/County of guarantee of the performance of the obligations stated herein. Should the Owner fail to perform the obligations under the Agreement, the City/County may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement. As an additional remedy, the Director may withdraw any previous stormwater related approval with respect to the Property on which a Stormwater Treatment Control Measure has been installed until such time as Owner repays to City/County its reasonable costs incurred in accordance with paragraph 3 above.

5) This Agreement shall be recorded in the Office of the Recorder of _____ _____County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City/County, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6) In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City/County in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7) It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

8) The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the City/County at the same time such notice is provided to the successor.

9) Time is of the essence in the performance of this Agreement.

10) Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IF TO CITY/COUNTY:

_____

_____

_____

IF TO OWNER:

_____

_____

_____

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

APPROVED AS TO FORM:

_____

City/County Attorney

OWNER:

_____

Owner

Name: _____

Title: _____

CITY/COUNTY OF_____:

_____

Name:_____

Title:_____

OWNER:

_____

Name:_____

Title:_____

ATTEST:

_____

City/County Clerk Date

Notaries on Following Page

EXHIBIT A

(Legal Description)

EXHIBIT B

(Map/illustration)

EXHIBIT C

(Operations and Maintenance Plan)

(Short Form)

Recorded at the request of and mail to:

_____

_____

_____

Covenant and Agreement Regarding

Stormwater Treatment Control Measure Maintenance and Access

The undersigned hereby certify that we are the owners of hereinafter legally described real property located in the City/County of _____, County of _____ _____, State of California.

Legal Description: _____

_____

as recorded in Book _____, Page_____, Records of _____ County, which property is located and known as **(Address):** _____.

And in consideration of the City/County of _____ allowing_____

_____

on said property, we do hereby covenant and agree to and with said City/County to maintain according to the Operations and Maintenance Plan (Attachment 1), all structural stormwater treatment control measures including the following:

_____

_____.

This Covenant and Agreement shall run all of the above described land and shall be binding upon ourselves, and future owners, encumbrances, their successors, heirs, or assignees and shall continue in effect until released by the authority of the City/County upon submittal of request, applicable fees, and evidence that this Covenant and Agreement is no longer required by law.

NOTARIES ON FOLLOWING PAGE

OWNER'S CERTIFICATION
OPERATION AND MAINTENANCE PLAN
for
(PROJECT NAME)

This Operations and Maintenance Plan (Plan) was prepared for _____(Project Owner / Developer)_____ by ___(Name of Preparing Firm/Individual)_____. This Plan is intended to comply with all requirements specified in the City/County of _____Stormwater Management and Discharge Control Ordinance _____.

The undersigned understands that stormwater treatment control measures are enforceable requirements under the Municipal Code. The undersigned, while owning the property on which such stormwater treatment control measures are to be implemented, is responsible for the implementation of the provisions of this Plan and for the operation and maintenance of all structural stormwater treatment control measures and agrees to ensure that the conditions on the project site conform to the requirements specified in the Municipal Code.

Once the undersigned transfers its interest in the project property, its successors-in-interest shall bear the aforementioned responsibility to maintain

Name of Owner: _____

Address of Owner: _____

Phone number of Owner: _____

Signature: _____

Print Name: _____

Title _____

Date _____