

County of Santa Clara
Office of the County Clerk-Recorder
Business Division

County Government Center
70 West Hedding Street, E. Wing, 1st Floor
San Jose, California 95110 (408) 299-5688



Santa Clara County Clerk – Recorder's Office
State of California



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REGINA ALCOMENDRAS, County Clerk – Recorder
by **Vanessa Ortiz, Document Examiner,**

CEQA DOCUMENT DECLARATION

ENVIRONMENTAL FILING FEE RECEIPT

PLEASE COMPLETE THE FOLLOWING:

1. LEAD AGENCY: City of Campbell
2. PROJECT TITLE: Creekside Center, 675 & 705 Creekside Way
3. APPLICANT NAME: Hamilton Campbell, LLC. PHONE: (408) 499-0357
4. APPLICANT ADDRESS: 1690 Dell Avenue, Campbell, CA. 95008
5. PROJECT APPLICANT IS A: ☐ Local Public Agency ☐ School District ☐ Other Special District ☐ State Agency ☒ Private Entity
6. NOTICE TO BE POSTED FOR 22 DAYS.

7. CLASSIFICATION OF ENVIRONMENTAL DOCUMENT

a. PROJECTS THAT ARE SUBJECT TO DFG FEES

- | | | |
|--|-------------|---------|
| ☐ 1. <u>ENVIRONMENTAL IMPACT REPORT</u> (PUBLIC RESOURCES CODE §21152) | \$ 3,029.75 | \$ 0.00 |
| ☐ 2. <u>NEGATIVE DECLARATION</u> (PUBLIC RESOURCES CODE §21080(C)) | \$ 2,181.25 | \$ 0.00 |
| ☐ 3. <u>APPLICATION FEE WATER DIVERSION</u> (STATE WATER RESOURCES CONTROL BOARD ONLY) | \$ 850.00 | \$ 0.00 |
| ☐ 4. <u>PROJECTS SUBJECT TO CERTIFIED REGULATORY PROGRAMS</u> | \$ 1,030.25 | \$ 0.00 |
| ☐ 5. <u>COUNTY ADMINISTRATIVE FEE</u> (REQUIRED FOR a-1 THROUGH a-4 ABOVE)
Fish & Game Code §711.4(e) | \$ 50.00 | \$ 0.00 |

b. PROJECTS THAT ARE EXEMPT FROM DFG FEES

- | | | |
|---|----------|---------|
| ☐ 1. NOTICE OF EXEMPTION (\$50.00 COUNTY ADMINISTRATIVE FEE REQUIRED) | \$ 50.00 | \$ 0.00 |
| ☐ 2. A COMPLETED "CEQA FILING FEE NO EFFECT DETERMINATION FORM" FROM THE DEPARTMENT OF FISH & GAME, DOCUMENTING THE DFG'S DETERMINATION THAT THE PROJECT WILL HAVE NO EFFECT ON FISH, WILDLIFE AND HABITAT, OR AN OFFICIAL, DATED RECEIPT / PROOF OF PAYMENT SHOWING PREVIOUS PAYMENT OF THE DFG FILING FEE FOR THE *SAME PROJECT IS ATTACHED (\$50.00 COUNTY ADMINISTRATIVE FEE REQUIRED) | | |
| DOCUMENT TYPE: ☐ ENVIRONMENTAL IMPACT REPORT ☐ NEGATIVE DECLARATION | \$ 50.00 | \$ 0.00 |

c. NOTICES THAT ARE NOT SUBJECT TO DFG FEES OR COUNTY ADMINISTRATIVE FEES

- | | | |
|---|--------|-----------|
| ☐ NOTICE OF PREPARATION ☒ NOTICE OF INTENT | NO FEE | \$ NO FEE |
|---|--------|-----------|

8. OTHER: _____ FEE (IF APPLICABLE): \$ _____

9. TOTAL RECEIVED..... \$ 0.00

*NOTE: "**SAME PROJECT**" MEANS **NO** CHANGES. IF THE DOCUMENT SUBMITTED IS NOT THE SAME (OTHER THAN DATES), A "NO EFFECT DETERMINATION" LETTER FROM THE DEPARTMENT OF FISH AND GAME FOR THE **SUBSEQUENT** FILING OR THE APPROPRIATE FEES ARE REQUIRED.

THIS FORM MUST BE COMPLETED AND ATTACHED TO THE FRONT OF ALL CEQA DOCUMENTS LISTED ABOVE (**INCLUDING COPIES**) SUBMITTED FOR FILING. WE WILL NEED AN ORIGINAL (WET SIGNATURE) AND THREE COPIES. (**YOUR ORIGINAL WILL BE RETURNED TO YOU AT THE TIME OF FILING.**)

CHECKS FOR ALL FEES SHOULD BE MADE PAYABLE TO: SANTA CLARA COUNTY CLERK-RECORDER

PLEASE NOTE: FEES ARE ANNUALLY ADJUSTED (Fish & Game Code §711.4(b)); PLEASE CHECK WITH THIS OFFICE AND THE DEPARTMENT OF FISH AND GAME FOR THE LATEST FEE INFORMATION.

"... NO PROJECT SHALL BE OPERATIVE, VESTED, OR FINAL, NOR SHALL LOCAL GOVERNMENT PERMITS FOR THE PROJECT BE VALID, UNTIL THE FILING FEES REQUIRED PURSUANT TO THIS SECTION ARE PAID." Fish & Game Code §711.4(c)(3)

(FEES EFFECTIVE 01-01-2014)



**NOTICE OF INTENT
INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION
CITY OF CAMPBELL, CALIFORNIA**

Notice is hereby given of the intent of the Campbell City Council to adopt a Mitigated Negative Declaration for the Creekside Center project, an application for a Modification of a Planned Development Permit (PLN2013-238) and a Planned Development Permit (PLN2013-237) to allow construction of a five-story 172,000 square-foot office building, a one-story 11,500 square-foot office building, and a seven-story parking structure, pursuant to Public Resources Code Section 21092(b)(1), for property located at **675 and 705 Creekside Way, Campbell, CA.**

The project site of 4.99 acres consists of two parcels located at the Highway 17 northbound off ramp to Creekside Way and Hamilton Avenue. The site is currently developed with a parking lot on the central and southern portions of the property and is vacant on the west side of the site that abuts Highway 17. Abutting land uses include Highway 17 right-of-way to the west, a hotel to the north, an office complex to the east, and a PG&E substation to the south.

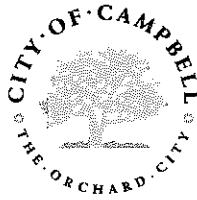
The Initial Study prepared by the City was undertaken for the purpose of determining whether the project may have a significant effect on the environment. On the basis of the Initial Study, Community Development Department staff has determined that the project will not have a significant effect on the environment due to the incorporation of certain mitigation measures, and therefore, has prepared a draft Mitigated Negative Declaration for consideration by the Campbell Planning Commission and Campbell City Council.

All interested parties are invited and encouraged to submit comments in writing regarding the draft Mitigated Negative Declaration and/or attend the below described public hearings. The public review period for the draft Mitigated Negative Declaration begins on **March 26, 2014** and ends on **April 15, 2014**. Any comments must be submitted in writing, including email, to the Community Development Department by 5:00 p.m. on **April 15, 2014**. The Initial Study and draft Mitigated Negative Declaration are available for review from 8:00 a.m. to 5:00 p.m. at the Community Development Department, City Hall, 70 North First Street, Campbell, CA or online at <http://www.cityofcampbell.com/501/Public-Notices> under 'Environmental Notices'.

The Campbell Planning Commission will consider the project and draft Mitigated Negative Declaration at a public hearing to be held on **April 22, 2014** and submit to the Campbell City Council a recommendation for approval or denial. The Campbell City Council is tentatively scheduled to hold a public hearing on **May 20, 2014**, to consider the Planning Commission's recommendation on the project and draft Mitigated Negative Declaration. Both meetings will be held at 7:30 p.m., or shortly thereafter, in the City Hall City Council Chambers, 70 North First Street, Campbell, CA.

Please be advised that if you challenge the decision on the Mitigated Negative Declaration and/or project in court, you may be limited to raising only those issues you or someone else raised at the public hearings described in this notice, or in written correspondence delivered to the City of Campbell prior to the public hearings. Questions and written comments may be addressed to Rick Smeaton at (408) 866-2142 or by email at ricks@cityofcampbell.com.

CITY OF CAMPBELL
ANNE BYBEE
CITY CLERK



DRAFT

MITIGATED NEGATIVE DECLARATION

The Community Development Director has reviewed the proposed project described below to determine whether it could have a significant effect on the environment as a result of the project completion. "Significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Project Title: Creekside Center

File Number(s):

PLN2013-237 (Planned Development Permit)

PLN2013-238 (Modification of Planned Development Permit)

Project Location: 675 and 705 Creekside Way

Name and Address of Project Proponent:

Hamilton Campbell, LLC.

Attn: Scott R. Trobbe

1690 Dell Avenue

Campbell, CA 95008

Lead Agency Name and Address:

City of Campbell

Community Development Department

70 N. First Street

Campbell, CA 95008

Contact Person(s):

Richard Smeaton, Interim Planner

(408) 866-2142

ricks@cityofcampbell.com

Zoning Designation:

Current: C3 (General Commercial)

Proposed: No Change Proposed

General Plan Designation:

Current: General Commercial

Proposed: No Change Proposed

Other public agencies whose approval is required: None

Surrounding Land Uses / General Plan / Zoning:

North: Highway / Highway right-of-way / NA

South: Los Gatos Creek & Offices / Open Space & Commercial – Prof Office / PF/OS & P-D

East: Offices & General Commercial / General Commercial & Commercial, General Office & Residential / P-D

West: Highway / Highway right-of-way / NA

Project Description:

Commercial Development:

The project is an application for a Modification of a Planned Development Permit and a Planned Development permit to allow for the construction of a five-story 172,000 sq. ft. office building, a one-story 11,500 sq. ft. office building, and a seven-story parking structure with two levels of underground parking. The project site is proposed to provide a total of 1,025 parking spaces. The project is consistent with the existing Zoning and General Plan designations. The Site Maps (reference p. 5) depict the construction and location of the three structures.

Building Height:

The 172,000 sq. ft. office building would be five-stories (77 ft. in height, 86 ft. in height with mechanical and architectural elements) and the 11,500 sq. ft. office building would be one-story (24 ft. in height).

Parking:

Existing surface parking lots would be removed and replaced by new development. One freestanding seven-story (74 ft. 6 in. in height) parking structure with two levels of underground parking would be built, with a total of 817 parking spaces. The 172,000 sq. ft. office building would have a surface parking lot with 9 parking spaces located to the south of it, and an additional 156 parking spaces located in an underground parking garage located beneath it. An additional 37 car surface parking lot would be built at the south east corner of the site to provide parking for the 11,500 sq. ft. office building. The site will provide a total of 1,025 parking spaces.

Assignment of Parking Spaces:

The parking structure would split the assignment of parking between the proposed 172,000 sq. ft. office building, the existing hotel property to the north, and the existing Office Park at 900 E. Hamilton Ave. This dedication of 328 parking spaces is required pursuant to a 1985 plan which combined parking from 900 Hamilton Ave. and the proposed Creekside Center development.

Shared parking is discussed under checklist topic 16 Transportation and Traffic.

Vehicular Access and Intersection Improvements:

The project would be served by three driveways from Creekside Way. The primary driveway to the north would be opposite the existing entrance into the 900 Hamilton office building and provide access to the hotel to the north and proposed 172,000 sq. ft. office building. A traffic signal will be installed in this surrounding area and minor median changes at this intersection.

The second driveway, 150 ft. to the south of the first, would provide access exclusively to the parking garage.

The third driveway, 84 ft. to the south of the second, would be opposite another existing driveway, which would provide an entrance to the surface parking for the 11,500 sq. ft. office building and the PG&E substation.

Landscaping:

The perimeter of the site would be landscaped with Chinese Pistache trees (along Creekside Way) and Deodar Cedar and Coast Redwood, and California Live Oak (along Highway 17). There are existing redwood trees along the border of the PG&E site. Some existing trees along the freeway and within the existing parking lots would be removed.

Phases:

The applicant is requesting a 7-year development schedule for the construction of the project. The timing of development of individual structures and site improvements would depend – in part – upon negotiations with the owners of the existing parking easements to determine how the easements will be satisfied during construction of this project.

Finding: The Community Development Director finds that the project described above will not have a significant effect on the environment in that the attached Initial Study identifies one or more potentially significant effects on the environment for which the project proponent, before public release of this draft Mitigated Negative Declaration, has made or agrees to make project revisions that clearly mitigate the effects to a less than significant level.

Mitigation Measures Included in the Project to Reduce Potentially Significant Environmental Effects to a Less Than Significant Level:**Mitigation Measure AES – 1**

1.1 The building will need to either effectively screen reflected light through landscaping and/or be constructed with low reflective glass to reduce the amount of glare that could reflect on to adjoining properties and right-of-way.

Mitigation Measure AIR – 1

1.1. Use dust-proof chutes for loading construction debris onto trucks.

- 1.2. *Water or cover stockpiles of debris, soil, and other materials that can be blown by the wind.*
- 1.3. *Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.*
- 1.4. *Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the construction site.*
- 1.5. *Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets, as directed by the City Engineer.*
- 1.6. *Enclose, cover, water twice daily or, or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).*
- 1.7. *Install erosion control measures to prevent runoff from the project site.*

Mitigation Measure BIO-1

- 1.1 *A breeding bird survey should be conducted by a qualified biologist within the study area and the surrounding 100-foot area 14 days before the initiation of work (during the avian breeding season). The biologist should established suitable buffer areas around active nests. The biologist may either monitor the nest while work is conducted within the buffer area and determine whether or not the buffer area may be reduced, or work can be avoided in the buffer area entirely until the biologist determines that the nest has fledged or failed.*

Mitigation Measure CUL – 1

- 1.1 *If archaeological or paleontological resources are encountered during excavation or construction, construction personnel shall be instructed to immediately suspend all activity in the immediate vicinity of the suspected resources and the City and a licensed archeologist or paleontologist shall be contacted to evaluate the situation. A licensed archeologist or paleontologist shall be retained to inspect the discovery and make any necessary recommendations to evaluate the find under current CEQA guidelines prior to the submittal of a resource mitigation plan and monitoring program to the City for review and approval prior to the continuation of any on-site construction activity.*

Mitigation Measure CUL-2

- 2.1 *In the event a human burial or skeletal element is identified during excavation or construction, work in that location shall stop immediately until the find can be properly treated. The City and the Santa Clara County Coroner's office shall be notified. If deemed prehistoric, the Coroner's office would notify the Native American Heritage Commission who would identify a "Most Likely Descendant (MLD)." The archeological consultant and MLD, in conjunction with the project sponsor, shall formulate an appropriate treatment plan for the find, which might include, but not be limited to, respectful scientific recording and removal, being left in place, removal and reburial on site, or elsewhere. Associated grave goods are to be treated in the same manner.*

Mitigation Measure GEO – 1

- 1.1. *The applicant shall comply with the recommendations in the Updated Geotechnical Investigation, dated October 3, 2013 by Cornerstone Earth Group. Such*

recommendations shall be incorporated into the project's final engineering design to minimize the damage from seismic shaking, unsuitable fill, and other geological deficiencies. The project shall use standard engineering techniques and conform to the requirements of the International Building Code to reduce the potential for seismic damage and risk to future occupants.

Mitigation Measure NOISE – 1

- 1.1. *Construction activities shall be limited to weekdays between 8:00 a.m. and 5:00 p.m. and Saturdays between 9:00 a.m. and 4:00 p.m. No construction shall take place on Sundays or holidays unless an exception is granted by the Building Official.*
- 1.2. *Truck routes to and from the construction site shall be established to avoid access to the project site via residential streets where possible.*
- 1.3. *All construction equipment with internal combustion engines used on the project site shall be properly muffled and maintained in good working condition.*
- 1.4. *Unnecessary idling of internal combustion engines shall be strictly prohibited.*
- 1.5. *All stationary noise-generating construction equipment, such as air compressors and portable power generators, shall be located as far as possible from noise-sensitive receptors such as existing residences and businesses.*
- 1.6. *Prior to the issuance of building permits, the project site shall be posted with the name and contact number of the lead contractor in a location visible from the public street so that the contractor can be made aware of noise complaints.*

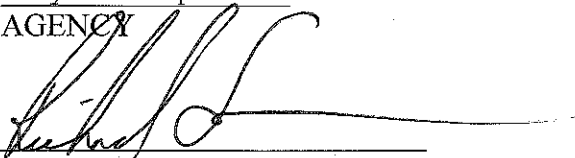
PUBLIC REVIEW PERIOD

Any person may file a written protest of the draft Mitigated Negative Declaration before 5:00 p.m. on **April 15th, 2014**. Such protest must be filed at the Community Development Department, City Hall, 70 North First Street, Campbell, California. The written protest should make a "fair argument" that the project will have one or more significant effects on the environment based on substantial evidence.

Richard Smeaton
PROJECT PLANNER

Interim Planner
TITLE

City of Campbell
AGENCY

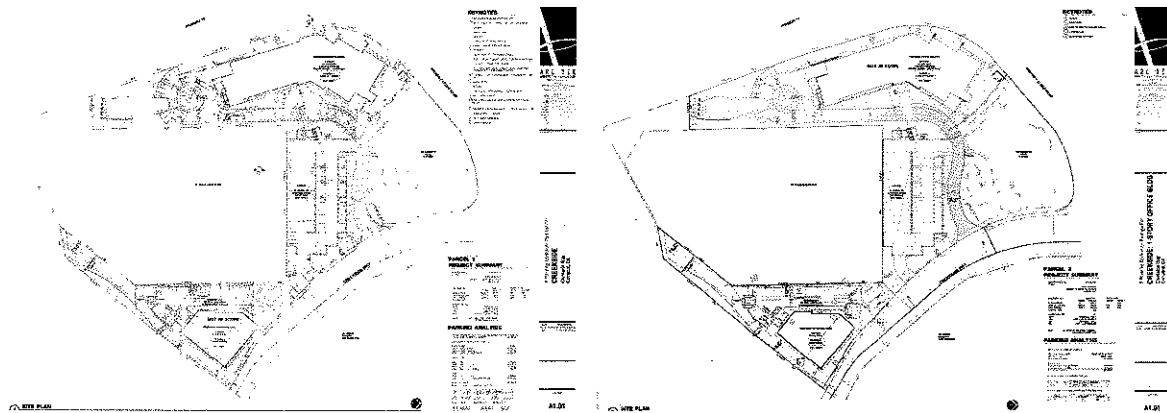

SIGNATURE

March 24, 2014
DATE

INITIAL STUDY

675 & 705 CREEKSIDE WAY

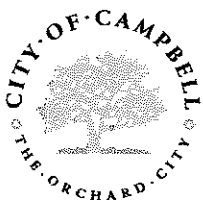
*An environmental evaluation
prepared in compliance with the
California Environmental Quality Act*



Prepared by
Richard Smeaton, AICP
Interim Planner

City of Campbell
Community Development Department
Planning Division
70 N. First Street
Campbell, CA 95008

Public Review Period
March 26, 2014 – April 15, 2014



I. PROJECT OVERVIEW

Project Title: Creekside Center

File Number(s):

PLN2013 – 237 (Planned Development Permit)

PLN2013 – 238 (Modification of Planned Development Permit)

Project Location: 675 – 705 Creekside Way

Name and Address of Project Proponent:

Hamilton Campbell, LLC.

Attn: Scott R. Trobbe

1690 Dell Avenue

Campbell, CA. 95008

Lead Agency Name and Address:

City of Campbell

Community Development Department

70 N. First Street

Campbell, CA 95008

Contact Person(s):

Richard Smeaton, Interim Planner

(408) 866-2142

ricks@cityofcampbell.com

Aki Snelling, Planning Manager

(408) 866-2732

akis@cityofcampbell.com

Zoning Designation:

Current: P-D (Planned Development)

Proposed: No Change Proposed

General Plan Designation:

Current: General Commercial

Proposed: No Change Proposed

Other public agencies whose approval is required:

- None

Surrounding Land Uses / General Plan / Zoning:

North: Highway / Highway right-of-way / NA

South: Los Gatos Creek & Offices / Open Space & Commercial – Prof Office / PF/OS & P-D

East: Offices & General Commercial / General Commercial & Commercial, General Office & Residential / P-D

West: Highway / Highway right-of-way / NA

Project Location: The project site consists of two parcels located at the Highway 17 northbound off ramp to Creekside Way and Hamilton Avenue and bound on the south by Los Gatos Creek (figures 1 and 2). The site mostly surrounds a PG&E substation, which also fronts on a section of the creek. The 4.99 acre site is currently developed with a parking lot on the central and southern portions of the property and is vacant on the west side of the site that abuts the Highway 17 (reference p. 4, Location Map). Abutting land uses include Highway 17 right-of-way to the west and north. To the north is a hotel, Highway 17 right-of-way and a VTA Light Rail Station. To the east are professional office buildings and retail commercial uses. To the south is the Los Gatos Creek, owned and managed by the Santa Clara Valley Water District, and professional offices.

The City of Campbell Zoning Map classifies the project site as P-D (Planned Development). The corresponding General Plan Land Use Designation is General Commercial.

Project Description:**Commercial Development:**

The project is an application for a Modification of a Planned Development Permit and a Planned Development permit to allow for the construction of a five-story 172,000 sq. ft. office building, a one-story 11,500 sq. ft. office building, and a seven-story parking structure, with two levels of underground parking. The project site is proposed to provide a total of 1,025 parking spaces. The project is consistent with the existing Zoning and General Plan designations. The Site Maps (reference p. 5) depict the construction and location of the three structures.

Building Height:

The 172,000 sq. ft. office building would be five-stories (77 ft. in height, 86 ft. in height with mechanical and architectural elements) and the 11,500 sq. ft. office building would be one-story (24 ft. in height).

Parking:

Existing surface parking lots would be removed and replaced by new development. One freestanding seven-story (74 ft. 6 in. in height) parking structure with two levels of underground parking would be built, with a total of 817 parking spaces. The 172,000 sq. ft. office building would have a surface parking lot with 9 parking spaces located to the south of it, and an additional 156 parking spaces located in an underground parking garage located beneath it. An additional 37 car surface parking lot would be built at the south east corner of the site to provide parking for the 11,500 sq. ft. office building. The site will provide a total of 1,025 parking spaces.

Assignment of Parking Spaces:

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Shared parking is discussed under checklist topic 16, Transportation and Traffic.

Vehicular Access and Intersection Improvements:

The project would be served by three driveways from Creekside Way. The primary driveway to the north would be opposite the existing entrance into the 900 Hamilton office building and provide access to the hotel to the north and proposed 172,000 sq. ft. office building. A traffic signal will be installed in this surrounding area and minor median changes at this intersection.

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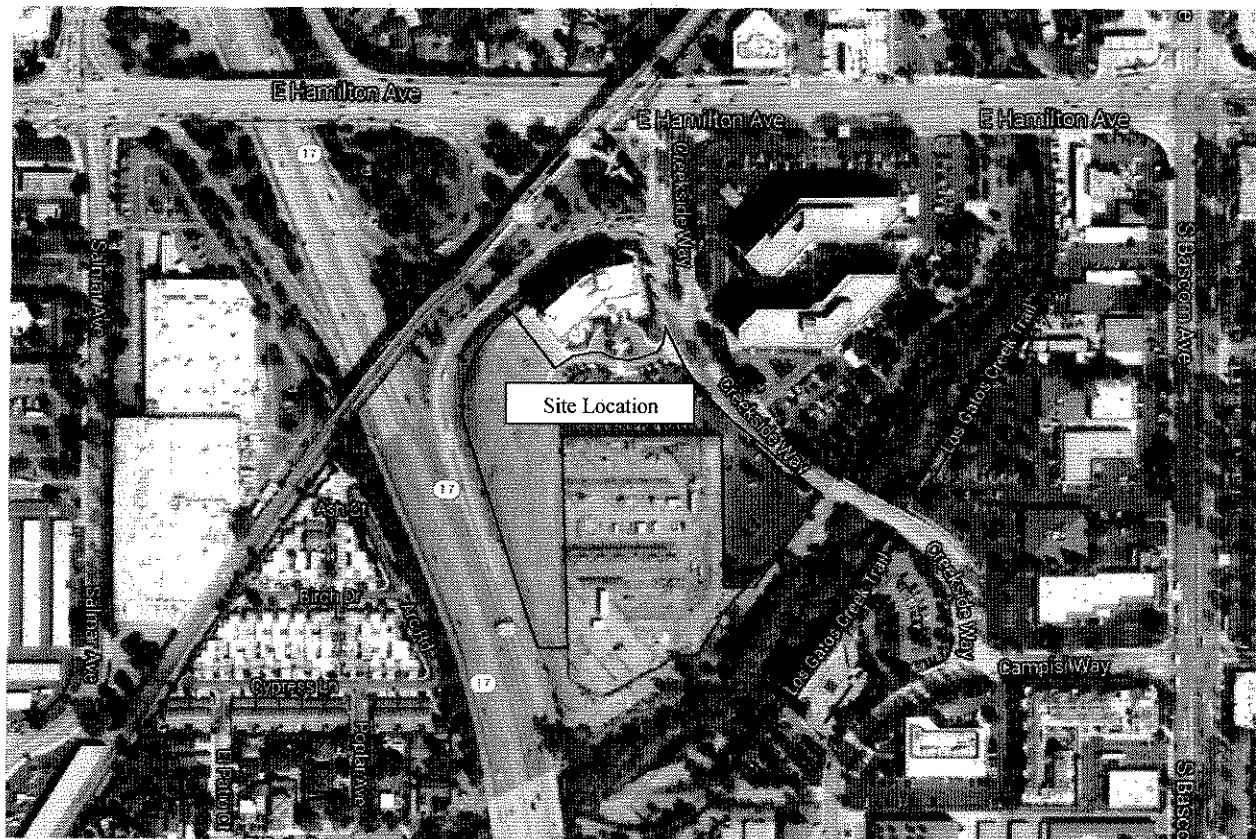
Landscaping:

The perimeter of the site would be landscaped with Chinese Pistache trees (along Creekside Way) and Deodar Cedar and Coast Redwood, and California Live Oak (along Highway 17). There are existing redwood trees along the border of the PG&E site. Some existing trees along the freeway and within the existing parking lots would be removed.

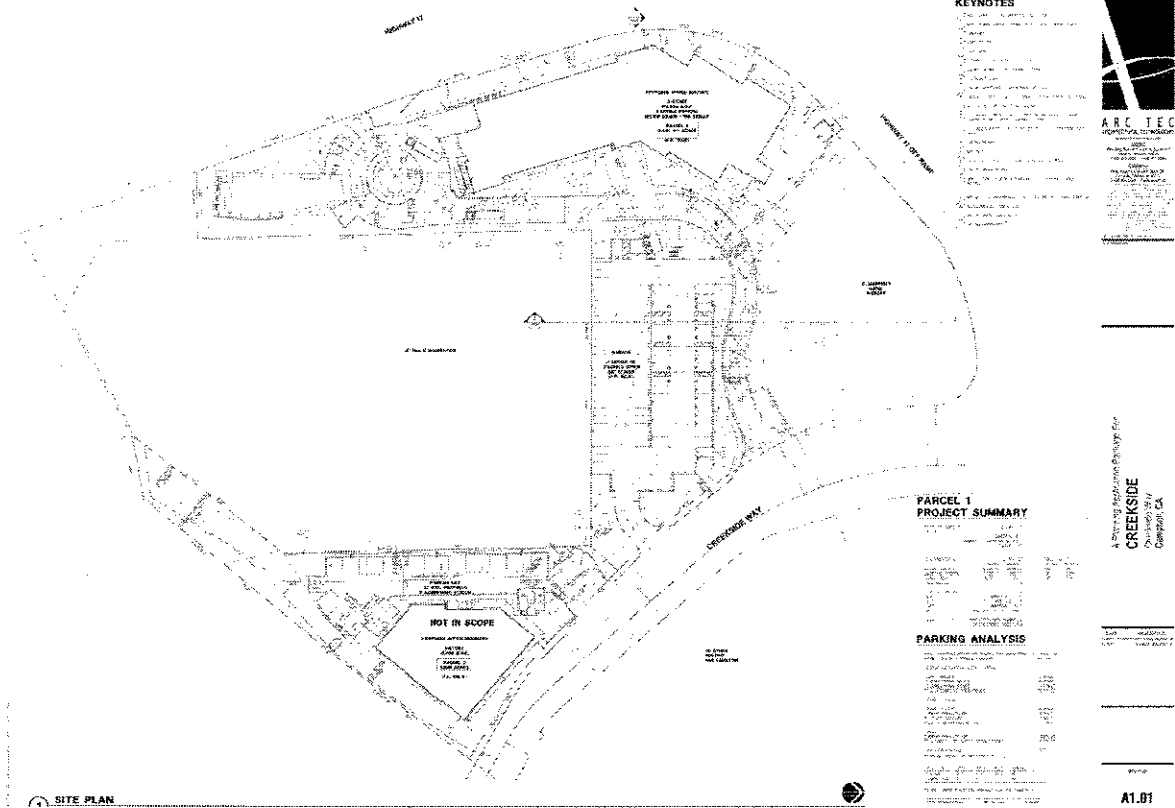
Phases:

The applicant is requesting a 7-year development schedule for the construction of the project. The timing of development of individual structures and site improvements would depend – in part – upon negotiations with the owners of the existing parking easements to determine how the easements will be satisfied during construction of this project.

Location Map



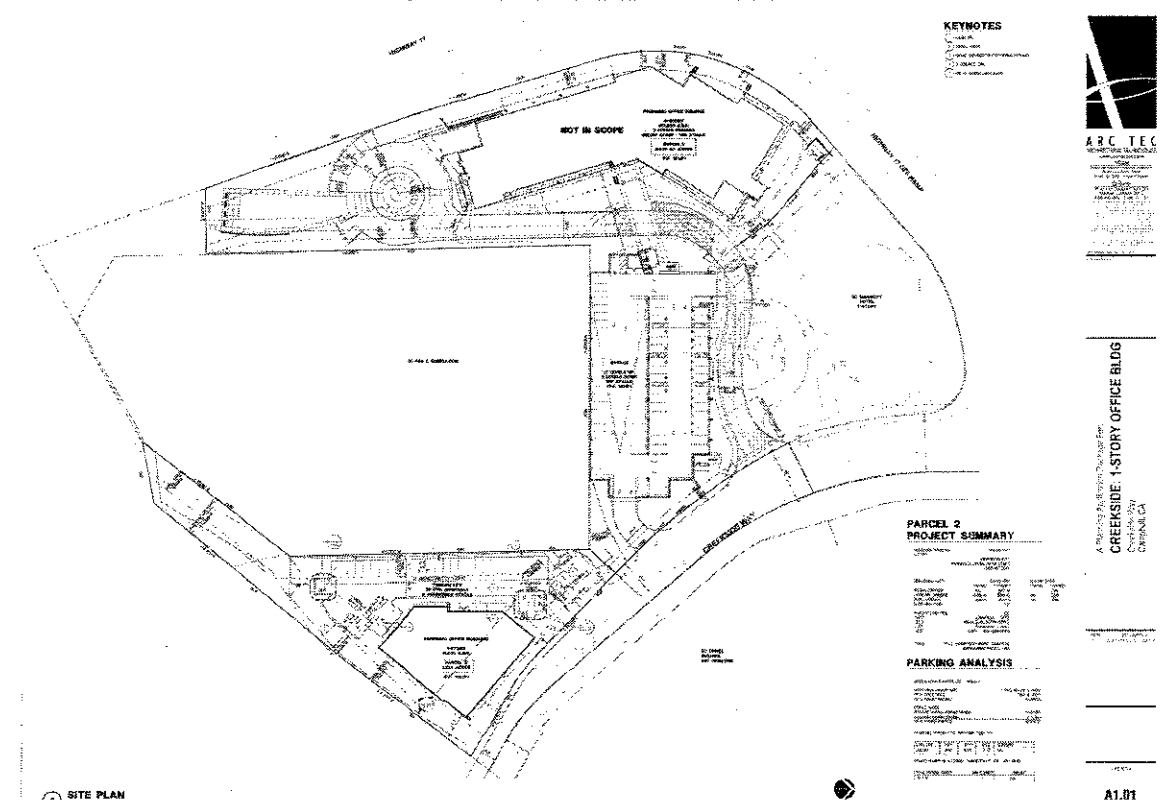
Site Maps



Arling Associates, Inc.
CREEKSIDE
Creekside Blvd
Carmichael, CA

DATE: 10/10/2010
BY: [Signature]

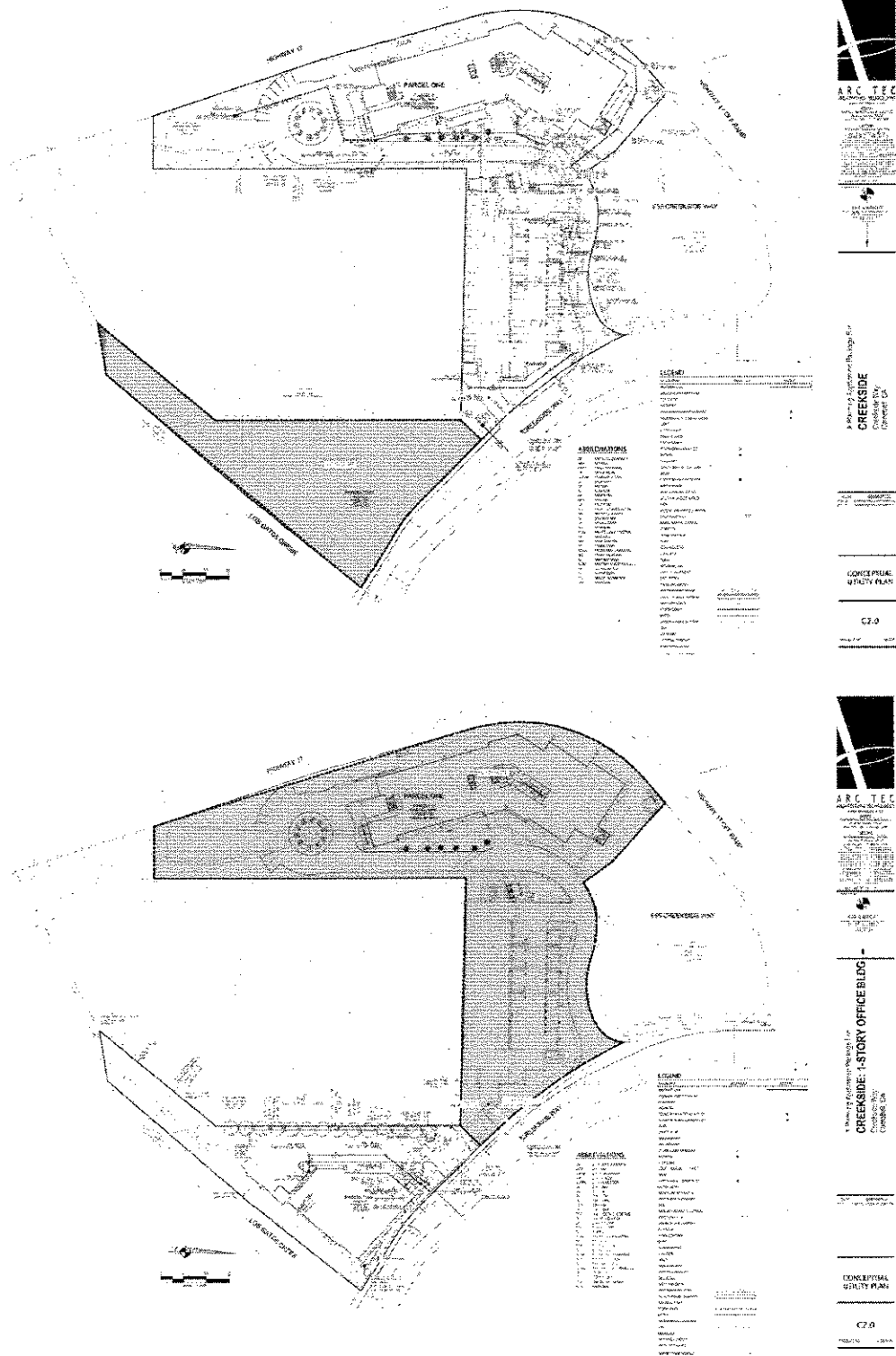
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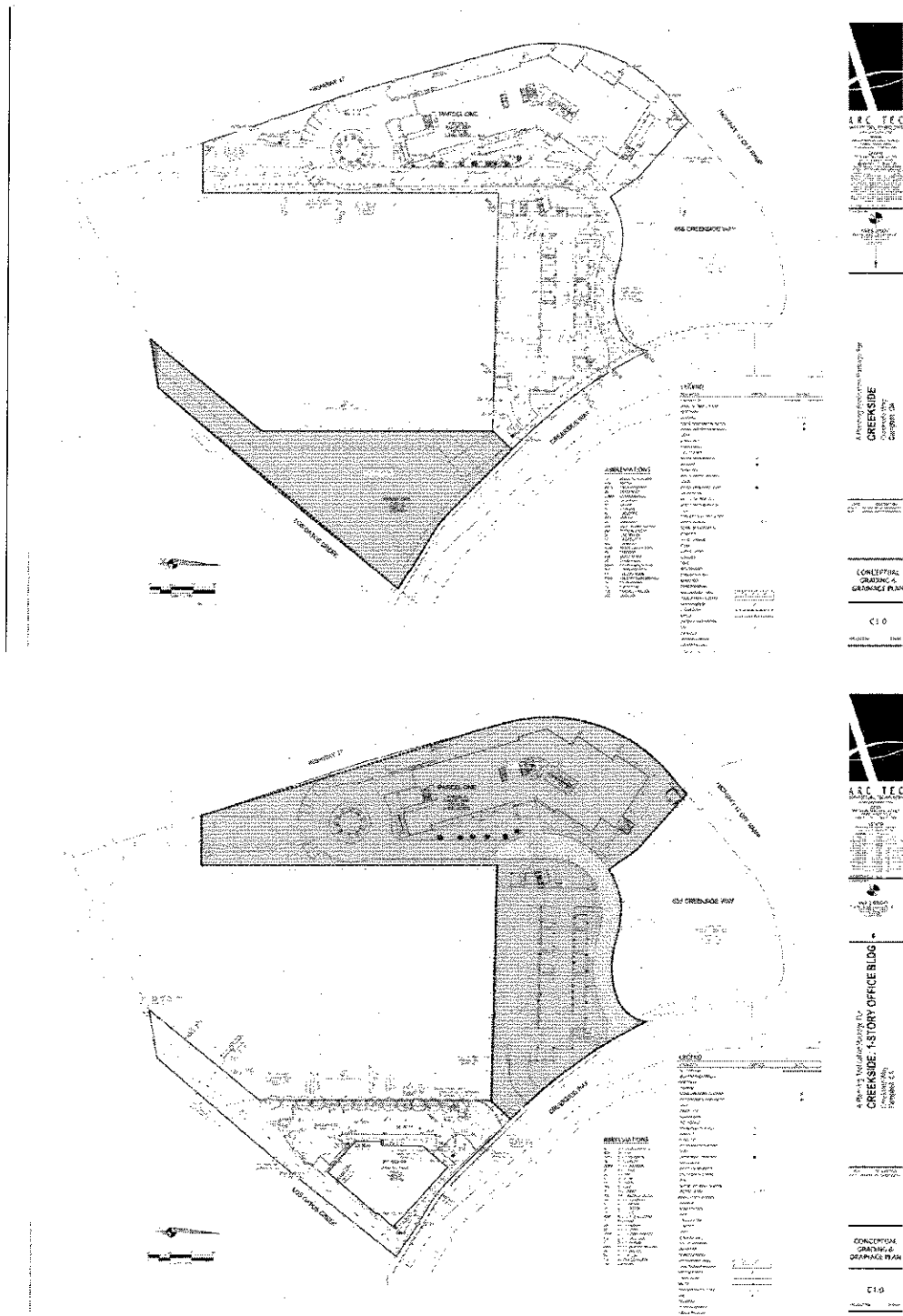
Arling Associates, Inc.
CREEKSIDE: 4-STORY OFFICE BLDG
Creekside Blvd
Carmichael, CA

DATE: 10/10/2010
BY: [Signature]

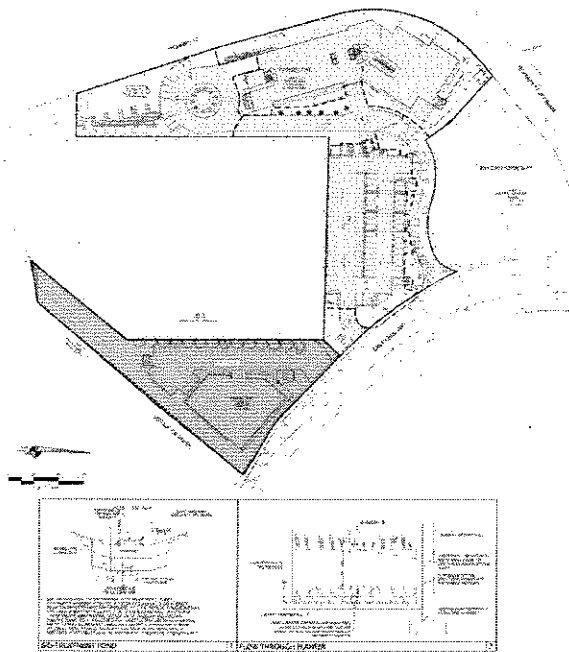
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Conceptual Grading & Drainage Plans



Preliminary Stormwater Control Plan



TREATMENT AREA LEGEND

1. DETAIL OF PARKING AREA	2. DETAIL OF PARKING AREA
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STORMWATER CONTROL NOTES

1. DETAIL OF PARKING AREA	2. DETAIL OF PARKING AREA
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IMPORTING AREA TABLE

AREA	IMPORTING AREA
1. DETAIL OF PARKING AREA	2. DETAIL OF PARKING AREA

STORMWATER AREA CALCULATIONS

AREA	STORMWATER AREA
1. DETAIL OF PARKING AREA	2. DETAIL OF PARKING AREA

STORMWATER MANAGEMENT

STORMWATER MANAGEMENT

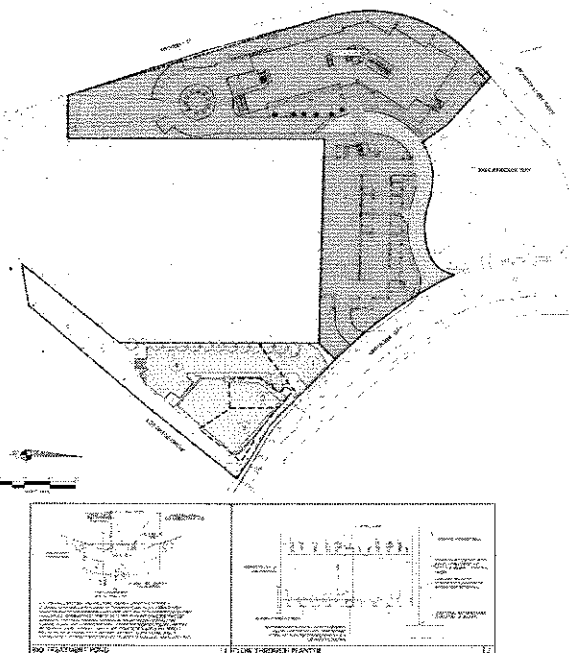


ARC TEC
ARCHITECTURAL
ENGINEERING
CONSULTANTS
INC.

PRELIMINARY
STORMWATER
CONTROL PLAN

CS-0

CS-0



TREATMENT AREA LEGEND

1. DETAIL OF PARKING AREA	2. DETAIL OF PARKING AREA
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STORMWATER CONTROL NOTES

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STORMWATER MANAGEMENT

STORMWATER MANAGEMENT



ARC TEC
ARCHITECTURAL
ENGINEERING
CONSULTANTS
INC.

PRELIMINARY
STORMWATER
CONTROL PLAN

CS-0

CS-0

II. ENVIRONMENTAL IMPACT EVALUATION:

The following evaluation has been prepared to determine if the proposed project may result in a “significant impact” on the environment. For the purposes of this study, a significant impact means a substantial or potentially substantial change in the physical environment. The following terms used in the evaluation are defined as specified below:

"Potentially Significant Impact" means that there is either substantial evidence that an effect may be significant or, due to lack of existing information, may have potential to be a significant effect.

"Less than Significant With Mitigation Incorporated" means the incorporation of one or more mitigation measures can reduce the effect from potentially significant to a less than significant level.

"Less Than Significant Impact" means that there is sufficient evidence available to determine that the effect is less than significant and no mitigation is necessary to reduce the impact to a lesser level.

"No Impact" means that the effect does not apply to the proposed project, or clearly will not impact nor be impacted by the project.

A description of the proposed mitigation measures and the factual data or evidence used to reach conclusions regarding impact significance follows each section. The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Less Than Significant with Mitigation Incorporation" as indicated by the checklist on the following pages. The impacts of the project, as well as a recommended mitigation measures, are summarized in Section III: Recommendation and Determination.

- | | | |
|---|---|--|
| ☒ (1) Aesthetics
(Page 10) | ☐ (2) Agriculture Resources
(Page 12) | ☒ (3) Air Quality
(Page 13) |
| ☒ (4) Biological Resources
(Page 15) | ☐ (5) Cultural Resources
(Page 17) | ☐ (6) Geology/Soils
(Page 18) |
| ☐ (7) Greenhouse Gas Emissions
(Page 20) | ☒ (8) Hazards & Hazardous
Material (Page 21) | ☒ (9) Hydrology/Water
Quality (Page 23) |
| ☐ (10) Land Use/Planning
(Page 25) | ☐ (11) Mineral Resources
(Page 27) | ☒ (12) Noise
(Page 28) |
| ☐ (13) Population/Housing
(Page 30) | ☐ (14) Public Services
(Page 31) | ☐ (15) Recreation
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| ☐ (16) Transportation/Traffic
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1. AESTHETICS

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Have a substantial adverse effect on a scenic vista?	☐	☒	☐	☐
(b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
(c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☒	☐	☐
(d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

Discussion:

(a to c) The project will alter the existing visual character of the site and its surroundings through the demolition of existing surface parking lots and the construction of two office buildings and one parking structure. The bulk of the proposed 431-foot long office building would be located only 20 feet from the Highway 17 property line. It could intrude in the landscape character of Highway 17, unless existing trees on the project site adjacent to the freeway are protected and trees of a similar mix and character are planted between the building and the highway.

Signage placed on or adjacent to the office building directed towards highway users could be out of character with the area, unless the City enforces its sign ordinance. If this measure is reflected in the proposed landscape plan, and an overall Master Sign Plan is prepared for City approval, these impacts should be reduced to less than significant levels.

Moreover, the development is consistent with the broader neighborhood and will improve the visual character of the area. The area is subject to various policies and strategies of the Campbell General Plan, intended to facilitate development that improves the visual character of the community through good design and site planning. Compliance with landscape requirements and the Sign Ordinance should reduce the impact to a less than significant level.

Design characteristics of the proposed 172,000 sq. ft. office building should help to visually break down the mass of the structure and minimize its effect on the scenic character of Highway 17. The mass of the proposed office building is to be broken down by the use of modulation (of the first and fifth floors) and wing walls. Modulation serves to break up the building massing horizontally while the wing walls serve to break up the mass vertically. This is shown on the buildings architectural elevations. The building would be five-stories in height (77 ft. in height, 86 ft. in height with mechanical and architectural elements). Design elements will mitigate some of the massing of the building so that the project should not adversely affect the view from the highway.

Design characteristics of the proposed 11,500 sq. ft. office building will not affect the scenic character of Highway 17 and would serve to create a street frontage along Creekside Way. The mass of the proposed building is broken down by vertical column elements and horizontal parapet elements and aluminum sunshades. The building would be one-story in height (24 ft. in height)

The parking structure, located more than 200 feet away from the highway, would be less visible than the office buildings. The structure is screened from adjacent right-of-ways on three sides by existing structures.

Incorporation of existing trees, coupled with new landscaping should reduce the visual impact of the project to less than significant levels.

(d): Low-angled winter sun could reflect off of the proposed 172,000 sq. ft. office building and could generate significant reflected sunlight and glare onto surrounding properties and Highway 17, unless low reflective glass is specified for the proposed project. The use of screening devices, including trees and/or low reflectivity glass should reduce the glare impacts to a less than significant level.

Mitigation Measure AES-1

1.1 The building will need to either effectively screen reflected light through landscaping and/or be constructed with low reflective glass to reduce the amount of glare that could reflect on to adjoining properties and right-of-way.

Additionally, all new lighting is subject to the City's Lighting Design Standards (CMC Sec. 21.18.090)—which requires lighting to be designed and installed so that light rays are not emitted across property lines—the project would not result in new sources of substantial light or glare. IF the proposed project incorporates screening devices, including trees, and/or low reflectivity glass, subject to approval of the City, the impact would be reduced to a less than significant level.

2. AGRICULTURAL RESOURCES

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
(b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
(c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

Discussion:

(a to c): The project site had historically been used for agricultural production, but is currently developed primarily with a surface parking lot. Neither the project site nor surrounding properties contain farmland or support agricultural activity that could be impacted by the project. As a result, no impact to farmland or agricultural/horticultural uses will occur.

3. AIR QUALITY

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
(b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
(c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
(d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
(e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion:

(a): The City of Campbell is located within the southern region of the San Francisco Bay Area air basin. The California Air Resources Board coordinates and oversees both state and federal air quality control programs in California. The management of air quality in the basin is the responsibility of the Bay Area Air Quality Management District (BAAQMD). Specifically, the BAAQMD is responsible for monitoring ambient air pollutant levels throughout the basin, and developing and implementing attainment strategies to ensure that future emissions will be within Federal and State standards.

The Bay Area Air Basin is currently classified as a “non-attainment” area for the state ozone standard, meaning that the level of ozone during a one-hour period exceeds the standard of 0.09 parts per million (ppm) on more than one day per year, excluding those occasions when a violation was caused by an exceptional event. For particulate matter less than 10 micrometers in diameter (PM₁₀), the Bay Area Air Basin is currently designated as a “non-attainment” area for the state standard. All other pollutants are designated as “attainment” or “unclassified” for federal standards and as an “attainment” area for the state standard.

The BAAQMD has established thresholds for determining whether a given project has the potential for a significant impact upon air quality. If a project exceeds the threshold(s), detailed air quality analyses are typically required, as well as review by BAAQMD staff. If a project does not exceed the thresholds, then it is assumed to have a less than significant impact upon air quality, unless there are special circumstances. For office developments, the BAAQMD has established 280,000 sq. ft. as the thresholds for operational-related air pollutants. As the project would result in creation of 183,500 sq. ft., it is below the minimum thresholds for air quality analysis and, therefore would not conflict with or obstruct implementation of the applicable air quality plan.

(b): As the project would result in the eventual construction of two office buildings and a parking structure, construction activities such as excavation, construction vehicle traffic and equipment and wind blowing over exposed earth could generate exhaust emissions and fugitive particulate matter emissions that could affect local and regional air quality. However, concentrations of these emissions are not anticipated to be substantial, and would be temporary. Construction activities are also a source of organic gas emissions. Solvents in adhesives, non-water-based paints, thinners, some insulation materials and caulking materials would evaporate into the atmosphere and would participate in the photochemical reaction that creates urban ozone. Asphalt used in paving is also a source of organic

gases for a short time after its application. Construction vehicles would produce cumulatively insubstantial amounts of ozone emissions. Short-term dust could potentially be produced during excavation and construction. The BAAQMD CEQA Guidelines identify thresholds of significance for construction emissions. BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions. With the implementation of the ***Mitigation Measure AIR – 1***, potential short-term air quality impacts associated with construction would be reduced to a less than significant level. The project would therefore, not violate any air quality standard or contribute substantially to an existing or projected air quality violation.

Mitigation Measure AIR – 1

- 1.1. Use dust-proof chutes for loading construction debris onto trucks.*
- 1.2. Water or cover stockpiles of debris, soil, and other materials that can be blown by the wind.*
- 1.3. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.*
- 1.4. Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the construction site.*
- 1.5. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets, as directed by the City Engineer.*
- 1.6. Enclose, cover, water twice daily or, or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).*
- 1.7. Install erosion control measures to prevent runoff from the project site.*

(c): As described above, the proposed project would not result in any cumulatively considerable net increase of ozone or PM₁₀, the two criteria pollutants, for which the project region is non-attainment, under an applicable federal or state ambient air quality standard with implementation of ***Mitigation Measure AIR – 1***.

(d): The BAAQMD defines sensitive receptors as facilities where sensitive receptor population groups (e.g., children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses can include residences, hospitals, schools, child-care centers, retirement centers, convalescent homes, and medical clinics. The proposed office buildings would not permit residential uses and is not designed for hospitals or medical clinics, therefore would have a less than significant impact on sensitive receptors.

(e): No element of construction or normal activities associated with office buildings or a parking structure would result in the creation of objectionable odors.

4. BIOLOGICAL RESOURCES

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
(b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
(c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
(d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
(e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
(f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion:

(a to d): According to the California Natural Diversity Database and the City's General Plan, and the Biological Review report conducted by WRA Environmental Consultants, no species identified as a candidate, sensitive or special status species, or habitat for such species are known to occupy the project site. The riparian corridor of the Los Gatos Creek and the trees on the site were identified as potential White-Tailed Kite nesting habitat. Tree removal and noise disturbance from project activities may impact

Mitigation Measure BIO-1

1.1 A breeding bird survey should be conducted by a qualified biologist within the study area and the surrounding 100-foot area 14 days before the initiation of work (during the avian breeding season). The biologist should established suitable buffer areas around active nests. The biologist may either monitor the nest while work is conducted within the buffer area and determine whether or not the buffer area may be reduced, or work can be avoided in the buffer area entirely until the biologist determines that the nest has fledged or failed.

(e): The project site includes foliage that was planted as part of the construction of the surface parking lots. Thirty-five of the trees are slated for removal, but none is considered "protected" under the City of Campbell Tree Protection Ordinance (CMC Ch. 21.32). As a Condition of Approval, the applicant shall be required to submit a final landscaping plan with Building Permit construction documents, which shall specify the exact number, type, size, and location of all new trees to be planted, in conformance with the City's Tree Protection Ordinance. Therefore, the project will incur a less than significant impact.

(f): No adopted Habitat Conservation Plan, Natural Community Conservation Plan or approved local, regional or state habitat conservation plans apply to the project or the project site.

5. CULTURAL RESOURCES

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
(b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
(c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
(d)	Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Discussion:

(a): The project site does not contain known historical resources as defined in §15064.5 of the CEQA Guidelines.

(b and c): The project site is currently vacant near the hotel with surface parking to the south, and landscaping that contain no known archaeological, paleontological, or other cultural resources. Should any cultural resources be discovered during project construction, the implementation of the following mitigation measure would reduce any potential impacts to a less than significant level:

Mitigation Measure CUL-1

1.1 If archaeological or paleontological resources are encountered during excavation or construction, construction personnel shall be instructed to immediately suspend all activity in the immediate vicinity of the suspected resources and the City and a licensed archeologist or paleontologist shall be contacted to evaluate the situation. A licensed archeologist or paleontologist shall be retained to inspect the discovery and make any necessary recommendations to evaluate the find under current CEQA guidelines prior to the submittal of a resource mitigation plan and monitoring program to the City for review and approval prior to the continuation of any on-site construction activity.

(d): No human remains are known to exist on the project site. Should human remains be discovered during excavation or construction, the implementation of the following mitigation measure would reduce any potential impacts to a less than significant level:

Mitigation Measure CUL-2

2.1 In the event a human burial or skeletal element is identified during excavation or construction, work in that location shall stop immediately until the find can be properly treated. The City and the Santa Clara County Coroner's office shall be notified. If deemed prehistoric, the Coroner's office would notify the Native American Heritage Commission who would identify a "Most Likely Descendant (MLD)." The archeological consultant and MLD, in conjunction with the project sponsor, shall formulate an appropriate treatment plan for the find, which might include, but not be limited to, respectful scientific recording and removal, being left in place, removal and reburial on site, or elsewhere. Associated grave goods are to be treated in the same manner.

GEOLOGY AND SOILS

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
	ii) Strong seismic ground shaking?	☐	☐	☒	☐
	iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
	iv) Landslides?	☐	☐	☒	☐
(b)	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
(c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
(d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
(e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
(f)	Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☐	☐	☒

Discussion:

(a): The project site is located within the seismically active San Francisco Bay Area. According to maps prepared under the Alquist-Priolo Earthquake Fault Zone Act, there are no known active faults within the City of Campbell. Therefore, ground rupture is not likely to occur at the site. The nearest major earthquake faults are the Monte Vista Shannon Fault, San Andreas Fault, the Hayward (southeast extension), Sargent, the Calaveras Fault Hayward (total length) and Zayante-Vergeles, all of which pose the greatest earthquake threat because of their high quake potential. The project will likely be subjected to at least one moderate to severe earthquake that will cause moderate to severe ground shaking during the useful life of the proposed office buildings and parking structure. Because construction practices in the State of California—pursuant to the California Building Code—take into account that earthquakes could potentially damage buildings, they are designed to withstand moderate ground-shaking, resulting in a less than significant impact. Lastly, according to the State Seismic Hazard Zones Map, the project site is not located in any hazard zone and therefore does not have the potential for liquefaction or earthquake-induced landslides.

(b): The potential for unstable soil conditions and erosion would be less than significant because the project will be required to comply with the recommendations of the site geotechnical analysis. Measures to control construction dust, as discussed in ***Mitigation Measure AIR - 1***, will also mitigate for wind-blown erosion.

(c and d): A Soil and Foundation Investigation report prepared for this project evaluated the geotechnical conditions of the site. The review included test borings drilled to depths of 35 to 45 feet. Subterranean soils included stiff to hard, silty and sandy clay, with occasional seams of medium dense clayey sand. This upper band was followed by very dense poorly graded sand with silt and gravel sand.

In some of the drill hole locations this band was followed by very stiff, low plasticity clays. No groundwater was encountered. Based on the results of the boring sampling, the report includes recommendations for site preparation and grading. With incorporation of **Mitigation Measure GEO – 1**, requiring compliance with all measures identified by the Updated Geotechnical Investigation report, the project would not be located soil that is unstable, or that would become unstable as a result of the project.

Mitigation Measure GEO – 1

1.1. *The applicant shall comply with the recommendations in the Updated Geotechnical Investigation, dated October 3, 2013 by Cornerstone Earth Group. Such recommendations shall be incorporated into the project's final engineering design to minimize the damage from seismic shaking, unsuitable fill, and other geological deficiencies. The project shall use standard engineering techniques and conform to the requirements of the International Building Code to reduce the potential for seismic damage and risk to future occupants.*

(e): The project would not involve the use of septic tanks or alternative waste water disposal systems.

(f): As discussed in Section 5 (Cultural Resources), no unique paleontological resources or unique geological features are known to exist on the project site. However, should such resources exist any disturbance would be a potentially significant impact. Incorporation of **Mitigation Measure CUL – 1** will ensure that in such event, treatment of paleontological resources or unique geological features would be conducted in an appropriate manner as to preserve their integrity.

6. GREENHOUSE GAS EMISSIONS

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant effect on the environment?	☐	☐	☒	☐
(b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion:

(a): Gases that trap heat in the atmosphere are referred to as green house gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like an actual greenhouse does. California State law defines greenhouse gases as including, but not limited, to Carbon Dioxide Hydrofluorocarbons, Methane Perfluorocarbons, Nitrous Oxide, and Sulfur Hexafluoride. The accumulation of GHGs is the principal cause of global climate change. Although definitions of climate change vary between and across regulatory authorities and the scientific community, climate change is the observed phenomena of the alteration of the earth's climate through natural fluctuations and anthropogenic activities that have altered the composition of the global atmosphere.

GHGs are reviewed under the California Environmental Quality Act (CEQA) in compliance with statutory provision of the Global Warming Solutions Act of 2006. The City of Campbell's overall approach to calculating GHG is based on the technical advisory of the Governor's Office of Planning and Research (OPR), *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* and CEQA thresholds of significance (Guidelines) adopted by the Bay Area Air Quality Management District (BAAQMD). The Guidelines provide that a development project, other than a stationary source, would have a significant cumulative impact of GHGs unless:

- The project can be shown to be in compliance with a qualified Climate Action Plan; or
- Project emissions of CO₂ equivalent GHGs (CO₂e) are less than 1,100 metric tons per year; or
- Project emissions of CO₂ equivalent GHGs are less than 4.6 metric tons per year per service population (residents plus employees).

For office commercial developments, the Guidelines establish a threshold of significance of 346,000 sq. ft. Since the project would result in the eventual construction of only 183,500 sq. ft., it would not exceed the threshold, and therefore not result in a measurable increase of GHG emissions. Consequently, what incremental increases in GHG emissions may result from project-related vehicular traffic and energy use attributable to the new users and would not result in a significant environmental effect.

(b): The City of Campbell has not adopted a Climate Action Plan or any comparable policy or regulation pertaining to the reduction or monitoring of greenhouse gases.

7. HAZARDS AND HAZARDOUS MATERIALS

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☐	☐	☒
(b)	Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
(c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
(d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐
(e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
(f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
(g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
(h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

Discussion:

(a and b): No routine transport, use or disposal of hazardous materials would be associated with the project. A slight hazardous potential would exist during project construction when materials and construction equipment are at the site; however, long-term hazard risk is very low. Hazard risks during construction would be regulated by the City's standard conditions of approval and will be required to be performed in accordance with state and federal hazardous materials regulations and current Best Management Practices (BMP's) for construction activities. The use of toxic chemicals for landscaping (pesticides, herbicides, etc.) will not be above what is generally required for landscape maintenance and is not considered significant.

(c): There are no schools or proposed schools within a ¼ mile of the project site. However, the operation of the project will not include hazardous emission or handling of hazardous or acutely hazardous materials, substances. Further, as discussed in Section 3 (Air Quality), construction and demolition related air pollutants that may constitute a hazard are regulated through Best Management Practices as required by City ordinances and reiterated through *Mitigation Measure AIR – 1*.

(d): The project site is not listed on the Hazardous Waste and Substances Sites List (available at http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm) compiled pursuant to Government Code Section 65962.5, therefore it would not create a significant hazard to the public or the environment.

(e to f): The project site is not located within the Santa Clara County Airport Land Use Commission jurisdiction, within two miles of a public airport or within the vicinity of a private airstrip.

(g): The project would not interfere with emergency response or evacuation plans. Sufficient emergency access and emergency services staff would be provided for the project site in compliance with the State Uniform Building Code Standards and requirements of the Santa Clara County Fire and Health Departments.

(h): Construction equipment will be located and used to avoid a potential fire danger. Buildings will be designed to protect against fire through compliance with the City of Campbell Building Code. Therefore, the potential for increased fire hazard in the area would be less than significant.

There is a potential for transformers on the adjacent PG&E site to be knocked over during an earthquake, and cause fires. However, all transformers are equipped with circuit breakers and no combustible materials are maintained by PG&E on the substation site, so the risk of such an incident would not be significant (Mike Harbick, Pacific Gas and Electric, personal communication).

A row of trees is located along the north, east and west sides of the PG&E substation. There are also substantial trees between the site and Highway 17, which are maintained by Caltrans. Project construction will be carried out to avoid the risk of fire from the use of equipment in proximity to existing trees, brush or grass.

Buildings will be designated to minimize fire danger. Solid fire walls will be used on the two walls of the parking garages which would border the PG&E substation, in compliance with City codes. Other Uniform Fire Code requirements for commercial construction will also apply.

8. HYDROLOGY AND WATER QUALITY

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
(b)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site.	☐	☐	☒	☐
(c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
(d)	Create the potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm?	☐	☐	☒	☐
(e)	Create significant increases in erosion of the project site or surrounding areas?	☐	☐	☐	☒
(f)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☒	☐	☐
(g)	Otherwise substantially degrade water quality?	☐	☒	☐	☐
(h)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
(i)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
(j)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
(k)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
(l)	Potentially impact stormwater runoff from construction activities?	☐	☒	☐	☐
(m)	Potentially impact stormwater runoff from post-construction activities?	☐	☐	☐	☒
(n)	Result in a potential for discharge of stormwater pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas?	☐	☐	☐	☒
(o)	Result in the potential for discharge of stormwater to affect the beneficial uses of the receiving waters?	☐	☐	☐	☒
(p)	Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒

Discussion:

(a): The project will be adequately served by the existing water supplies, as confirmed by Garry Benson, San Jose Water Company, through personal communication (9/18/98), the local area water utility. As such, the project will not deplete or otherwise interfere with groundwater supplies.

(b to c): The project would entirely alter the existing drainage pattern of the project site through removal of parking areas and re-grading to accommodate the proposed two office buildings and the parking garage. As discussed below, the project includes advanced stormwater treatment and retention that will prevent erosion, siltation, runoff related flooding, or increases in flow velocity or volume of

stormwater runoff. The changes to the project site as a result of on-site improvements will not substantially alter the existing drainage pattern of the surrounding area, alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site.

(d) There are no waterways on the project site, although Los Gatos Creek is adjacent to the site. According to the Federal Emergency Management Agency's Flood Insurance Rate Maps, the site is within Zone C: Areas of Minimal Flooding. Since the site is not within a flood plain, it is not expected to experience flooding in the event of a 100-year storm. Since the Los Gatos Creek channel is designed to accommodate a 100-year frequent flood, exposure of people or property to flooding would be less than significant.

(e) As discussed below, the project includes advanced stormwater treatment and retention that will prevent erosion.

(f to g): In compliance with Provision C.3 of the National Pollution Discharge Elimination System (NPDES), the project incorporates stormwater management measures. The project's stormwater treatment plan (reference p. 7) indicates use of bio-retention areas (vegetated swales) that allow water to percolate into the ground through a passive (natural) infiltration medium before flowing to a central storm drain within the street. The bio-retention areas would be located alongside the office building to the south, east of the parking structure and south of the western office building. The landscaping of the retention areas will be restricted, thereby ensuring their continued effectiveness. The proposed treatment system will treat and contain stormwater on-site and therefore not exceed the capacity of existing or planned storm water drainage systems, provide substantial additional sources of polluted stormwater runoff, or otherwise substantially degrade water quality.

(h): There are no proposed housing units proposed as part of this development, therefore there would not place housing or other structures within a 100-year flood hazard area.

(j to k): The project site is not located in an area defined by the Association of Bay Area Governments as a dam failure inundation area. As the project is not modifying flood protection measures or creating a condition where adjacent properties are exposed to a new significant risk of loss, injury or death involving flooding, no additional exposure to water-related hazards is expected as a result of the project construction or operation.

(l): As discussed in Section 3 (Air Quality), construction and demolition activities are regulated through Best Management Practices as required by City ordinances and reiterated by **Mitigation Measure AIR – 1**, which is designed to limit air and water contamination related to construction activity. With the implementation of this measure, potential short-term air and water quality impacts associated with construction would be reduced to a less than significant level.

(m to p): The daily activities associated with office buildings do not generally discharge pollutants or contaminants to an extent that would impact stormwater quality or receiving waters. Therefore, the project would not result in an environmental impact.

9. LAND USE and PLANNING

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Physically divide an established community?	☐	☐	☐	☒
(b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
(c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion:

(a): Projects that have the potential to physically divide an established community typically include construction that would eliminate formal or informal travel ways through a property. No such pathways or other forms of informal access through the project site currently exist. Therefore, the project would not physically divide an established community.

(b): The proposed project includes two office building and a parking structure in an integrated commercial development. Development on this overall site is allowed under existing P-D planned Development Zoning, which covers the entire site, and is broadly consistent with the General Plan, which includes Commercial on the northern parcel and Commercial and Open Space on the southern parcel.

The proposed uses are consistent with the purpose of the P-D district, which is intended to provide a degree of flexibility which is not available in other zones so as to allow developments that are more consistent with site characteristics, while creating an optimum quantity and use of open space and good design (CMC sec. 21.12.030). All of the proposed commercial uses are consistent with the P-D zone.

General Plan goals and policies and the General Plan Appendix support the use of the proposed site for commercial uses:

Policy LUT-1.5: Land Use Planning and the Regional Transportation System: Support land use planning that complements the regional transportation system.

Strategy LUT-1.5a: Transit-Oriented Developments: Encourage transit oriented developments including employment centers such as office and research and development facilities and the city's highest density residential projects by coordinating the location, intensity, and mix of land uses with transportation resources, such as Light Rail.

Policy LUT-5.3: Variety of Commercial and Office Uses: Maintain a variety of attractive and convenient commercial and office uses that provide needed goods, services and entertainment.

Strategy LUT-17.2a: Lot Sizes: Ensure that new development and renovation provides low-density residential development and encourage larger than minimum lot sizes.

Policy LUT-14.2: Development Intensities: Allow higher development intensities within the Pruneyard / Creekside area.

The project is allowed in the P-D zoning district and is supported by policies of the General Plan.

(c): No habitat conservation plan or natural community conservation plans are applicable to the project site.

10. MINERAL RESOURCES

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
(b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion:

(a to b): No known mineral resources are present at the project site.

11. NOISE

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
(b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
(c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
(d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
(e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
(f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion:

(a to c): The City's Noise Ordinance (CMC Sec. 21.16.070.E) provides the following noise exposure standards for new residential development:

- Noise from stationary sources. New residential development shall conform to a stationary source noise exposure standard of 65 dBA for exterior noise levels and 45 dBA for interior noise levels.
- Traffic-related noise. New residential development shall conform to a traffic-related noise exposure standard of 60 dBA CNEL for outdoor noise in noise-sensitive outdoor activity areas and 45 dBA CNEL for indoor noise.

Ambient noise levels are high from traffic on adjacent Highway 17, and noise from project-generated traffic and proposed facilities would be low, so any increase in project-induced noise would be less than significant.

An expanded initial study was conducted for “Pruneyard Place” development (City of Campbell, October 1997), which is located about 1500 feet south of the Campbell Creekside Project, adjacent to Highway 17. The Pruneyard study showed that the ambient noise levels on the Pruneyard site are generally above the City of Campbell’s General Plan noise guidelines. The study noted that an increase in the ambient noise levels of 3dBA would represent an approximate doubling in traffic volume, and would be barely discernible to the human ear.

Extrapolating from the noise analysis for the very similar Pruneyard project adjacent to the freeway, noise levels on the Campbell Creekside Drive, and periodically from trains on the Union Pacific Railroad. The traffic analysis discussion under section 16 Transportation and Traffic found that traffic congestions at study intersections would be less than significant. Cumulative traffic would be significant; but noise levels from slower moving traffic would be less during affected peak hours.

The City would require that buildings be constructed to reduce exterior noise to lesser levels in occupied interior spaces. The noise analysis concluded that the exterior noise levels for much of the Pruneyard complex would be between 65 and 70 Ldn. It is assumed that the Creekside Project will be

exposed to similar levels and with standard construction interior noise levels would range from 50 and 60 Ldn. As such, the project would not result in increase in ambient noise within the vicinity of the project site

(d): Construction of the project will temporarily increase ambient noise levels in the project vicinity. Project construction includes the operation of construction equipment, excavation and other development activities. The implementation of the following mitigation measure would reduce potential noise impacts during project construction to a less than significant level:

Mitigation Measure NOISE – 1

- 1.1. *Construction activities shall be limited to weekdays between 8:00 a.m. and 5:00 p.m. and Saturdays between 9:00 a.m. and 4:00 p.m. No construction shall take place on Sundays or holidays unless an exception is granted by the Building Official.*
- 1.2. *Truck routes to and from the construction site shall be established to avoid access to the project site via residential streets where possible.*
- 1.3. *All construction equipment with internal combustion engines used on the project site shall be properly muffled and maintained in good working condition.*
- 1.4. *Unnecessary idling of internal combustion engines shall be strictly prohibited.*
- 1.5. *All stationary noise-generating construction equipment, such as air compressors and portable power generators, shall be located as far as possible from noise-sensitive receptors such as existing residences and businesses.*
- 1.6. *Prior to the issuance of building permits, the project site shall be posted with the name and contact number of the lead contractor in a location visible from the public street so that the contractor can be made aware of noise complaints.*

(e and f): The project is not located within the vicinity of an airport land use plan or within two miles of an airport. The project is not located within the vicinity of a private airstrip.

12. POPULATION AND HOUSING

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
(b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐
(c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion:

(a): The project site is well served by existing roadway and utility infrastructure. No significant new off-site utilities or street improvements will be constructed that would stimulate additional development in the area. Moreover, as discussed under checklist topic 9(b) Land Use and Planning, nearly the entire City is built-out, so growth occurs through the process of economic development and City approval of development – not through the availability of infrastructure. The potential for the development of the project encouraging growth in the area is less than significant.

(b and c): The project will not require the demolition of and existing housing, and therefore will not result in the displacement of any people or housing units, which would necessitate the construction of replacement housing elsewhere.

13. PUBLIC SERVICES

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Would the project result in substantial adverse physical impacts associated with the provision of or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
	i) Fire Protection?	☐	☐	☒	☐
	ii) Police Protection?	☐	☐	☒	☐
	iii) Schools?	☐	☐	☐	☒
	iv) Parks?	☐	☐	☐	☒
	v) Other public facilities?	☐	☐	☐	☒

Discussion:

(a-i and a-ii): The development of the project will not require the Santa Clara County Fire Department or the City of Campbell Police Department to provide additional personal or equipment to maintain current emergency response times (Wayne Hokanson, Santa Clara Fire Department, personal communication 9/17/98; Richard Shipman, City of Campbell Police Department, personal communication, 9/17/98)

(a-iii) The project will not require school services.

(a-iv and a-v) The project will require public services such as open space, and street maintenance, commensurate with the scale of the project. Stakeholder agencies reviewed the project. As this project will result in only a nominal increase in population, a less than significant impact to existing services was determined by the reviewing agencies.

14. RECREATION

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
(b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

Discussion:

(a): Visitors and workers on the site would arrive from widely dispersed communities, which normally provide recreational facilities for their resident populations. Therefore, the demand for recreational facilities created by the proposed project would be less than significant.

(b): The project does not include any recreational facilities.

15. TRANSPORTATION and TRAFFIC

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
(b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
(c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
(d)	Substantially increase hazards due to a design feature (e. g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
(e)	Result in inadequate emergency access?	☐	☐	☐	☒
(f)	Result in inadequate parking capacity?	☐	☐	☐	☒
(g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

Discussion:

(a and b): A trip generation analysis based on the Institute of Transportation Engineers (ITE) Trip Generation Manual 9th Edition, 2012, prepared by Whitlock & Weinberger Transportation, Inc. anticipates that the project would result in an average of 3,744 daily trips, including 403 PM peak hour (4:00 – 6:00) trips. While the proposed project would increase vehicle trips and traffic congestions, all study intersections would operate at acceptable levels of service (LOS E or better for major intersections included as part of the study).

Land Use	Units	Net Project Trips					
		Daily		Weekday PM Peak Hour			
		Rate	Trips	Rate	Total	Inbound	Outbound
Hotel	210	8.17	1,716	0.6	126	64	62
Office	170 ksf	11.56	1965	1.58	269	46	223
Office	11.4 ksf	11.03	126	1.49	14	3	14
LRT Reduction		-3%	-63	-3%	-9	-1	-7
Total Net-New Trips			3,744		403	112	292

This nominal increase in trips would not result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, congestion at area intersections, or any other significant impact. Exhibit 3 describes the methodology used in this Initial Study Analysis.

(c): The project will not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

(d): The proposed public roadway is designed consistent with public roadway standards for residential streets as determined by the City Engineer and would not result in hazards due to a design feature or incompatible uses.

(e): The project has been designed to comply with emergency access requirements of the Santa Clara Fire Department. The project plans include an emergency vehicle access plan that illustrates compliance with said standards. The County Fire Department has reviewed the project during the City's department review committee process and will again review the access routes during review of construction drawings.

(f): A site Traffic and Parking Analysis was prepared for the applicant by Barton & Aschman Associates, Inc. as part of a previously approved Planned Development Agreement for the sites, in June 2000. The traffic study was undertaken due to an existing parking easement, which required that the proposed project include 328 parking spaces to accommodate some users of the 900 Hamilton facility. The parking analysis includes the concept of "shared parking." Shared parking accounts for the different land use activities and their different peak accumulation patterns. Due to the mixed-use (office/hotel) nature of the proposed project, the number of parking spaces required is less than the number of spaces required when the same land use activities exist on stand-alone developments. When such land uses are combined in a single development, variances in the parking are acceptable and allowed. Using the Institute of Transportation Engineers parking generation factors, the shared parking analysis included in the Traffic Study indicated that the combined development will generate the need for 633 shared parking spaces. With the addition of the existing parking easement, which includes 328 parking spaces to accommodate the users of the 900 Hamilton facility, this would increase the total parking demand to 961 parking spaces for the previously approved Planned Development.

The proposed site plan adds an additional 13,500 sq. ft. of office space, 11,500 of which is located on a stand-alone lot. This additional square footage is subject to the current city requirement of 1 parking space for every 225 sq. ft. which results in the need for an additional 60 parking spaces.

The combined required number of parking spaces required for the site would be 1021 parking spaces. The site provides 1025 parking spaces and therefore would meet the required number of parking spaces.

(g): The project site is in vicinity of light-rail or comparable bus rapid transit (BRT) line, and as a result is subject to City policies encouraging alternative transporting solutions (e.g., provision of transit-passes, incorporation of bicycle parking, etc.). Additionally, this site will be required to meet the City's adopted requirements for alternative transportation solutions per CMC Sec. 21.28.070 and require a provisions for bicycle and clean-air vehicle parking only for non-residential development subject to the Green Building Standards Code (CALGreen). The project, therefore, will not conflict with adopted policies, plans, or programs supporting alternative transportation.

16. UTILITIES and SERVICE SYSTEMS

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
<i>Would the project:</i>					
(a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☒	☐
(b)	Require or result in the construction of new water or wastewater treatment or collection facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
(c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
(d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
(e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
(f)	Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
(g)	Comply with federal, state, and local statutes and regulations related to solid wastes.	☐	☐	☒	☐

Discussion:

(a to b): The utilities for the proposed project, including sewage disposal, would tap in to publicly maintained on-site sewer system and off-site sewer improvements. The project would not generate significant amounts of wastewater, and would therefore not exceed wastewater treatment requirements for the Regional Water Quality Control Board. The West Valley Sanitation District has confirmed through personal communication with Jonathan Lee (1998), with the construction of on- and off-site improvements, are adequate to support the site.

(c): The stormwater runoff generated by the project site would be collected and treated on-site in compliance with Provision C.3 of the National Pollution Discharge Elimination System (NPDES) requirements as discussed in Section 9 (Hydrology and Water Quality) and will not require expansion or construction of new stormwater treatment facilities. Therefore, the proposed drainage facility for the project site would not cause any significant environmental effects.

(d): The project will be adequately served by the existing water supplies, as confirmed by personal communication with Garry Benson (1998) of the San Jose Water Company, the local area water utility.

(e): The project would connect to the existing waste water treatment system, which currently has sufficient capacity to receive the additional waste water generated from the proposed project. Therefore, the project would not impact the ability of the waste water treatment provider to meet its current commitments for service.

(f to g): Existing capacity at local landfills can accommodate the amount of waste generated as a result of project operation. The project would comply with Federal, State and local statutes and regulations related to solid waste.

17. MANDATORY FINDINGS OF SIGNIFICANCE

Issues		Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
(b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects?)	☐	☒	☐	☐
(c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion:

(a): Based on the findings of the Initial Study, construction and operation of the project, with mitigation, the project would not substantially degrade the quality the environment; reduce the habitat, population, or range of species; nor eliminate important examples of California history or prehistory.

(b): The project would not cause any significant cumulative impacts to the following topical issues:

Traffic congestion at study intersections. The Traffic Study prepared for the project evaluated the operating conditions of key study intersections for existing, background, project, and cumulative traffic conditions. Based on the results of the Traffic Study, all study intersections are projected to operate at acceptable levels for each traffic condition. The Traffic Study also indicates that no significant impacts are expected on State Route 17 freeway segments.

Land Use and Planning. The project in combination with any other commercial projects in the vicinity would not induce growth, because the project alone would not induce growth.

Geologic Problems. Seismic and soil conditions are site-specific, and will not contribute to cumulative impacts.

Water. No other development in the vicinity should cumulatively affect runoff and water quality as no other developments will concurrently.

Air Quality. The project would not exceed BAQMD thresholds and no other developments would occur in the vicinity of the project during the construction, so cumulative impacts would be less than significant. Construction dust would be handled on a site-specific basis.

Biological Resources. Although no other projects would be concurrently constructed in the vicinity, cumulative biological impacts may occur. However, measures to mitigate for project construction impacts on biological resources would also apply for cumulative biological impacts.

Energy. The project would have no impact on energy and mineral sources, so it would not contribute to cumulative impacts.

Hazards. All hazards discussed in Section 8 are site specific, and will not contribute to cumulative impacts.

Noise. There are no potential projects that may be under construction at the same time in the vicinity. Therefore, no cumulative noise impacts would occur as measures to mitigate for project construction noise would be utilized.

Public Services. Since the project would not make any significant demands on public services, it would not contribute to cumulative impacts to public services.

Utilities/Service Systems. Since the project would have less than significant or no impacts to public utilities, it would have no cumulative impact.

(c): Based on the findings of the Initial Study, there is no evidence to demonstrate that the project would cause a substantial adverse effect on human beings, either directly or indirectly.

III. RECOMMENDATION and DETERMINATION

On the basis of this initial evaluation, and incorporation of the recommended mitigation measures into the project design:

1.	I find that the project could not have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	☐
2.	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	☒
3.	I find the proposed project may have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	☐
4.	I find that the proposed project may have a “potentially significant impact” or “potentially significant unless mitigated impact” on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	☐
5.	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or Negative Declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or Negative Declaration, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	☐

Richard Smeaton
PROJECT PLANNER

Interim Planner
TITLE

City of Campbell
AGENCY


SIGNATURE

March 24th, 2014
DATE

IV. REFERENCE MATERIALS

Exhibits:

1. Updated Geotechnical Investigation by Cornerstone Earth Group, dated October 3, 2013. (online only at <http://www.cityofcampbell.com/501/Public-Notices> under ' Environmental Notices')
2. Biological Review of Creekside 1 Story Office Building Project by WRA Environmental Consultants, dated October 16, 2013.
3. Traffic Engineering Analysis Update for Creekside Center Project, by Whitlock & Weinberger Transportation, Inc., dated March 14th, 2014.
4. Site Traffic and Parking Analysis Executive Summary by Barton & Aschman Associates, Inc., 2000.

Reference Documents:

1. Bay Area Air Quality Management District (BAAQMD), June 2010, *CEQA Air Quality Guidelines*.
2. Bay Area Air Quality Management District (BAAQMD), December 2008, *Source Inventory of Bay Area Greenhouse Gas Emissions*.
3. California Environmental Protection Agency (CEPA) California Air Resources Board (CARB), April 2005, *Air Quality and Land Use Handbook: A Community Health Perspective*.
4. California Environmental Protection Agency (CEPA) California Air Resources Board (CARB), November 16, 2007, *Staff Report: California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit*.
5. California Natural Diversity Database, 2000.
6. California Office of Planning and Research (OPR), June 19, 2008, *Technical Advisory: CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review*.
7. CEQA Guidelines, 2012 version.
8. City of Campbell General Plan.
9. City of Campbell Zoning Code.
10. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, Community Map Number 06085C0241H, Effective Date May 18, 2009.
11. State of California, Seismic Hazard Zones Map, San Jose West Quadrangle, February 7, 2002.
12. U.S. Environmental Protection Agency, April 15, 2009, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007*.

EXHIBIT 1

SOIL AND FOUNDATION INVESTIGATION

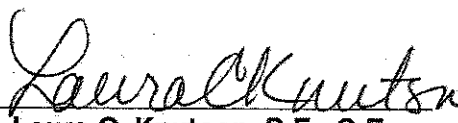
Available on-line only at:

<http://www.cityofcampbell.com/501/Public-Notices> under ' Environmental Notices'



Type of Services	Updated Geotechnical Investigation
Project Name	Creekside Way Office Building
Location	Creekside Way Campbell, California
Client	Hamilton Campbell, LLC
Client Address	1690 Dell Avenue Campbell, California
Project Number	157-7-3
Date	October 3, 2013

Prepared by


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Type of Services	Updated Geotechnical Investigation
Project Name	Creekside Way Office Building
Location	Creekside Way Campbell, California

SECTION 1: INTRODUCTION

This updated geotechnical report was prepared for the sole use of Hamilton Campbell, LLC for the Creekside Way Office Building in Campbell, California. As you know, we prepared a geotechnical report for a previous site development plan on the site titled, "Geotechnical Investigation, Creekside Way Office Building, Creekside Way, Campbell, California," dated October 17, 2012. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- Geotechnical Report titled, "Creekside Office Development," prepared by Treadwell & Rollo, dated October 6, 1998.
- Geotechnical Feasibility Investigation titled, "Creekside Development," prepared by TRC, dated March 14, 2008.
- ALTA Land Title Survey titled, "Creekside Way," prepared by Kier & Wright, dated April, 2013.
- A plan set for the main office building and parking structure including preliminary architecture, civil and landscape sheets titled, "Creekside, Creekside Way, Campbell, Ca," prepared by Arc Tec, July 23, 2013.
- A plan set for the one-story office building including preliminary architecture, civil and landscape sheets titled, "Creekside: 1-Story Office Building, Creekside Way, Campbell, Ca," prepared by Arc Tec, July 23, 2013.

1.1 PROJECT DESCRIPTION

The project will consist of constructing an office building at the west side of the site, which is planned to be a five-story building over two-level below-grade parking structure. The office building will be of steel and concrete-framed construction with a finished floor at Elevation 182 feet. In addition, the existing at-grade parking lots will be demolished for construction of a parking garage and one-story building. The proposed nine-level parking garage in the north central parking lot will include seven-stories above grade and two levels below grade and be of concrete-frame construction. In the southeastern parking lot, construction of a one-story, 11,500 square-foot office building of either wood-, steel- or CMU-construction is proposed. Appurtenant at-grade parking and driveways, a site retaining wall supporting the drive and

parking lot to the south of the western office building, utilities, landscaping and other improvements necessary for site development are also planned.

Site grading is anticipated to be minor for the eastern at-grade office building, on the order of 1 to 3 feet of cut and fill. For the two-level below-grade parking garages, cuts to about 22 to 25 feet are anticipated. Structural loads were not available at this time; however, based on information provided by SEI, the project structural engineer, for the previous project description, we extrapolated anticipated loads. Dead plus live structural loads are anticipated to be on the order of 1,400 kips for interior columns and about 15 kips per foot for perimeter wall loads for the nine-level parking structure and up to about 800 kips with perimeter loads of about 10 to 12 kips per foot for the western five-story office building with two levels of below-grade parking garage. The single story office building is anticipated to have interior column loads of 50 kips or less and perimeter wall loads of 3 kips per foot or less.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposals dated June 7, 2012 and August 22, 2013. The original scope of work from 2012 consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, review of the previous geotechnical reports prepared for the site, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. The scope for the 2013 proposal was to update our recommendations to address the revised project description. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

1.3.1 Current Field Exploration

Field exploration consisted of nine borings drilled on July 23 through 25, 2012 with truck-mounted, hollow-stem auger drilling equipment and five Cone Penetration Tests (CPTs) advanced on July 23, 2012. The borings were drilled to depths of 30 to 45 feet; the CPTs were advanced to depths of 19 to 27 feet where they met practical refusal. Seismic shear wave velocity measurements were collected from CPT-1 and CPT-5. One of the borings (Boring EB-5) was advanced adjacent to CPT-3 for direct evaluation of physical samples to correlated soil behavior. The borings and CPTs were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Site Plan, Figure 2. Details regarding our field program are included in Appendix A.

1.3.2 Previous Field Exploration

As mentioned, two previous consultants conducted geotechnical investigations for similar project descriptions. Treadwell & Rollo's (T&R's) work included drilling six exploratory borings to depths up to 51½ feet using rotary-wash drilling methods, and advancing six CPTs with

depths ranging up to 45 feet; several of their CPTs met practical refusal shallower than 45 feet. TRC advanced three CPTs that achieved depths of 45 feet. The approximate locations of the previous explorations are shown on Figure 2, and copies of the logs are included in Appendix E.

1.4 LABORATORY TESTING PROGRAM

1.4.1 Current Laboratory Testing

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, grain size analyses, washed sieve analyses, Plasticity Index tests, and triaxial compression tests. Details regarding our laboratory program are included in Appendix B.

1.4.2 Previous Laboratory Testing

Laboratory testing performed during the 1997 T&R investigation included consolidation tests, triaxial compression tests, Plasticity Index tests, R-value tests, and two corrosion suite of tests. Laboratory testing was not performed by TRC. These laboratory test results are included in Appendix E.

1.5 CORROSION EVALUATION

Six samples from our borings from depths from 2 to 10 feet were tested for saturated resistivity, pH, and soluble sulfates and chlorides. JDH Corrosion Consultants prepared a brief corrosion evaluation based on the laboratory data, which is attached to this report in Appendix C. In general, the on-site soils can be characterized as moderately corrosive to corrosive to buried metal, and non-corrosive to buried concrete. Our results are similar to what was reported by T&R.

1.6 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations, the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 REGIONAL SEISMICITY

The San Francisco Bay area is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, the U.S. Geological Survey's Working Group on California Earthquake Probabilities 2007 estimates there is a 63 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area region between 2007 and 2036. As seen with damage in San Francisco and Oakland due to the 1989 Loma Prieta earthquake that was centered about 50 miles south of San Francisco, significant damage can

occur at considerable distances. Higher levels of shaking and damage would be expected for earthquakes occurring at closer distances.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	4.5	7.3
San Andreas (1906)	8.1	13.0
Hayward (Southeast Extension)	9.3	15.0
Sargent	10.4	16.8
Calaveras	12.1	19.5
Hayward (Total Length)	12.7	20.4
Zayante-Vergeles	14.2	22.8

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The site includes two parcels (APN 288-01-015 and -025) and encompasses about 4.5 acres. The larger parcel (APN 288-01-025) is currently occupied by vacant land in the narrow, triangular area adjacent to Highway 17, and at-grade parking between the Marriott Hotel to the north and the PG&E substation to the south. The smaller parcel (APN 288-01-015) is occupied by an at-grade parking lot the east of the substation.

Based on review of the topographic plan provided, site grades are relatively level within the planned structure areas, with the parking lots graded towards drainage structures. Grades range from approximately Elevation 177 to 182 feet in the western office building area. Within the two parking lots, grades range from about Elevation 178 to 182 feet (datum unknown). The western and northern side of the site slopes down to the Highway 17 off-ramp to Creekside Way to about Elevation 165 to 172 feet and with a slope inclination of about 2.5:1 (horizontal:vertical) or flatter.

Los Gatos Creek exists to the southeast of the site and at its closest point the top of creek bank is approximately 50 feet south of the proposed southeastern office building. The bottom of the creek is about 30 feet below adjacent on-site grades.

Existing surface pavements, where encountered, generally consisted of 1¾ to 3½ inches of asphalt concrete over 5½ to 9 inches of aggregate base. Based on visual observations, the existing pavements are in fair condition with localized areas that are in poor condition.

3.2 SUBSURFACE CONDITIONS

Western Office Building Area: In this area our explorations, as well as the previous explorations, generally encountered very stiff to hard lean sandy clay blanketing the site down to depths of approximately 13 to 22 feet with occasional seams of medium dense clayey sand. This upper clay layer was underlain by about 2 to 3 feet of medium dense silty and clayey sands overlying dense to very dense poorly graded sand with silt and gravel. In the northern explorations, the sands extended to depths of about 50 feet, and in the southern explorations, the sands extended to depths of about 32 to 33 feet and were then underlain by very stiff, low plasticity clays.

Since undocumented fill was potentially identified in the previous T&R boring B-4, our Boring EB-6 was performed near it. Fill was not identified in any of our borings performed in the office building area.

Northern Parking Structure Area: Below the surface pavements, our recent explorations, as well as the previous explorations by others, generally encountered stiff to hard lean sandy clay blanketing the site down to depths of approximately 17 to 22 feet with occasional seams of medium dense clayey sand. This upper clay layer was underlain by medium dense to very dense poorly graded sand with silt and gravel to depths of about 33 to 35 feet. Very stiff lean clays with interbedded layers of dense sands were encountered below about 35 feet to the bottom of the explorations at 51½ feet.

Southeastern Office Building Area: Below the surface pavements, our recent explorations, as well as the previous explorations by others, generally encountered stiff to hard lean sandy clay blanketing the site down to depths of approximately 17 to 22 feet, with the exception of the southeastern explorations (EB-1, T&R C-1, and TRC C-3) which encountered a medium dense silty sand layer between depths of about 8 to 14 feet. Below the surficial clays, medium dense to very dense poorly graded sand with silt and gravel was encountered to depths of at least 44 feet. The T&R borings encountered stiff sandy clays between depths of about 44 and 50 feet.

3.2.1 Plasticity/Expansion Potential

We performed two Plasticity Index (PI) tests on representative samples. Test results were used to evaluate expansion potential. The results of the surficial PI tests indicated PIs ranging from 13 to 16, indicating low to moderate expansion potential to wetting and drying cycles. Similar results were obtained by T&R in their three surficial samples which had PIs ranging from 9 to 15, indicating low expansion potential.

3.2.2 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from 0 to 4 over the estimated laboratory optimum moisture.

3.2.3 Sulfate Contents

Laboratory testing indicated that the soluble sulfate contents ranged from 4 to 94 ppm, indicating negligible corrosion potential to buried concrete.

3.3 GROUND WATER

Ground water was not encountered in any of our borings during drilling to depths of up to 45 feet, terminating in sands. Depth to ground water maps (CGS, San Jose West Quadrangle, 2002), indicate that the high ground water level at depths deeper than 50 feet below current grades. The T&R report stated that ground water could be as shallow as 10 to 18 feet, based on leaving two of the rotary-wash boring holes overnight to observe the stabilized level of the drilling fluids. TRC indicated that ground water was present at depths of 20 to 30 feet, based on pore pressure measurements from their CPTs. As the T&R drilling method may not have resulted in accurate measurements depending on the time needed for drilling fluids to penetrate the permeable layers, the shallower depth of 10 feet does not seem reasonable.

Los Gatos Creek was measured to have a water level at the time of our 2012 investigation at about Elevation 150 feet, while the site grades range from 178 to 182 feet. Our deeper borings within the western office building area extended to about Elevation 133 feet without encountering ground water. Los Gatos Creek in the reaches between Los Gatos and Campbell is known to provide significant ground water recharge due to the presence of the thick sand and gravel layers. It has been our experience that sites adjacent to Los Gatos Creek experience significant water level fluctuations due to thick deposits of granular alluvial soils and changes in seasonal creek flows. For the purposes of this report, we have conservatively estimated a depth of 20 feet as the high ground water level for our liquefaction evaluation, representing short-term conditions during times of sustained high creek levels. For our consolidation evaluation, we judged a ground water depth of 30 feet to better represent long-term conditions.

Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone, or a Santa Clara County Fault Hazard Zone. As shown in Figure 3, no known surface expression of fault traces is thought to cross the site; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) was estimated for analysis using a value equal to $S_{DS}/2.5$ as allowed in the California Building Code. For our liquefaction analysis we used a PGA of 0.45g.

4.3 LIQUEFACTION POTENTIAL

The site is not located within a State-designated Liquefaction Hazard Zone (CGS, San Jose West Quadrangle, 2002) or a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2003), due to the mapped high ground water depth greater than 50 feet. However, we screened the site for liquefaction during our site exploration by retrieving samples from the site, performing visual classification on sampled materials, and performing various tests to further classify the soil properties. We also performed liquefaction analyses on the CPTs performed by TRC, as we were provided the original raw data for our use.

4.3.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 2001). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 3 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed in the "Subsurface" section above, several sand layers were encountered below the short-term design ground water depth of 20 feet. Following the procedures in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008) and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation.

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the "Estimated Ground Shaking" section above, and is corrected for

overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are unreliable in sands below ground water. We also did not use the "N" values from the rotary-wash borings performed by T&R as there was no accompanying laboratory testing for fines content. The tip pressures are corrected for effective overburden stresses, taking into consideration both the ground water level at the time of exploration and the design ground water level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_c) to estimate the plasticity of the layers. The results of our CPT analyses and the calculations are attached as Appendix D.

4.3.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in soil softening and post-liquefaction total settlement ranging up to about ¼-inch in the southeastern office building area, less than ¼-inch in the northern parking structure area, and up to about 1¼ inches in the western office building area based on the Yoshimine (2006) method. As discussed in SP 117A, differential movement for level ground sites over deep soil sites will be up to about two-thirds of the total settlement. In our opinion, differential settlements are anticipated to be less than about ½-inch over a horizontal distance of 30 feet.

4.3.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates that the 20-foot thick layer of non-liquefiable cap is sufficient to prevent ground rupture; therefore the above total settlement estimates are reasonable.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

The Los Gatos Creek is approximately 50 feet from the proposed edge of the southeastern office building. As part of our liquefaction analyses, we calculated the Lateral Displacement Indices (LDI) for the potentially liquefiable layers based on methods presented in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008). LDI is a summation of the maximum shear strains versus depth, which is a measurement of the potential

maximum lateral displacement at that exploration location (Zhang et al., 2004). This method estimates the permanent shear strains expected within each liquefied zone, which in turn are integrated over the applicable depth to estimate the permanent lateral displacement at the ground surface. This method can be empirically adjusted based on calibrations to case histories and based on evaluating the geologic heterogeneity of the site (i.e. are the zones with calculated lateral displacements continuous across the site for lateral spreading to occur. The LDI vectors are adjusted to provide a likely range of displacements. This method differs from Youd, Hansen, and Bartlett (2002) in that it is not an estimate of permanent ground displacements based on empirical models derived from regression models.

Summations of the LDI values to a depth equal to twice the open face height, as recommended in the method, were included in our analyses. For our site, the height of the open face was conservatively estimated at 35 feet. Where the ratio of the distance of the exploration to the top of bank was more than 40 times the open face height, the risk is judged to be low, and calculations of LDI have been excluded.

Our analysis indicated there is a thin sand seam in our CPT-5 and TRC C-3 at depths of about 28 and 24½ feet, respectively, which has the potential for lateral displacement with estimated displacements on the order of a few to several inches. The sand layer in TRC C-1 at a depth of 40 to 43 feet that had a calculated LDI of 0.5 feet has been excluded as there was no corresponding layer at that depth seen in the other explorations.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered at the site were predominantly stiff to very stiff clays and medium dense to very dense sands, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, an area determined to be outside 0.2% annual chance floodplain. We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

The Association of Bay Area Governments has compiled a database of Dam Failure Inundation Hazard Maps (ABAG, 1995). The generalized hazard maps were prepared by dam owners as required by the State Office of Emergency Services; they are intended for planning purposes only. Based on our review of these maps, the site is partially located within a dam failure inundation area for the Lexington/Elsman Reservoirs.

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Potential for liquefaction-induced settlements
- Potential for lateral spreading
- Presence of sands at basement level
- Temporary perched water conditions
- Differential movement at on-grade to on-structure transitions
- Soil Corrosion Potential

5.1.1 Potential for Liquefaction-Induced Settlements

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event combined with a high ground water table during times of sustained high creek levels. Although the potential for liquefied sands to vent to the ground surface through cracks in the surficial soils is low, our analysis indicates that liquefaction-induced settlements up to about 1¼ inches could occur across the site, resulting in differential settlement up to ½-inch over a horizontal distance of 30 feet.

Foundations should be designed to tolerate the anticipated total and differential settlements and are specifically noted for each building in the following sections. Based on our review of the preliminary foundation loads, it should be feasible to support the proposed buildings on shallow foundations; however, the building foundations will need to be designed to tolerate total and differential settlement due to static loads and liquefaction-induced settlement. Detailed foundation recommendations are presented in the "Foundations" section.

5.1.2 Potential for Lateral Spreading

If strong seismic shaking occurs at the same time as sustained high creek levels, resulting in the potential liquefaction noted above, our analysis indicated there is a relatively thin zone in the sands encountered at depths of about 28 and 24½ feet in our CPT-5 and TRC's C-3, respectively, within the proposed southeastern office building that is theoretically capable of undergoing lateral spreading with estimated displacements of about 2 to 9 inches. As discussed in the "Lateral Spreading" section, the layer encountered in TRC C-1 in the proposed western office building at a depth of 40 to 43 feet that had a calculated LDI of 0.5 feet has been excluded as there was no corresponding layer at that depth seen in the other explorations. While the estimated lateral displacements are relatively low, to reduce the potential for differential lateral movement of the southeastern office building foundations, the structure should be supported on interconnected grid footings (or grade beams). Alternatively, the office

may be supported on a mat foundation. This is discussed in further detail in the "Foundations" section.

5.1.3 Presence of Sands at Basement Level

Sands will be encountered within the lower portion of both two-level below-grade parking garage excavations. Contractors should anticipate forming of foundation and other excavations, as well as preparing subgrade just prior to placement of rock and the concrete slab-on-grade. Shoring contractors should also anticipate some sloughing during shoring construction. This is discussed further in the "Earthwork" and "Foundations" sections.

5.1.4 Temporary Perched Water Conditions

As discussed, Los Gatos Creek in the reaches between Los Gatos and Campbell is known to provide significant ground water recharge due to the presence of the thick sand and gravel layers. It has been our experience that sites adjacent to Los Gatos Creek experience significant water level fluctuations due to thick deposits of granular alluvial soils and changes in seasonal creek flows. For the purposes of this report, we have conservatively estimated a depth of 20 feet as the high ground water level for our liquefaction evaluation, representing short-term conditions during times of sustained high creek levels. We anticipate that the planned garage excavations will extend on the order of 22 to 25 feet below current grades. As a protection measure for the garage slabs, we recommend that an underslab subdrain system be constructed. This is discussed further in the "Earthwork" and "Foundations" sections.

5.1.5 Differential Movement At On-Grade to On-Structure Transitions

If the office building is supported by an underground garage, consideration should be given to providing additional support of improvements that will transition from on-grade support to on-structure. We recommend consideration be given to where engineered fill is placed behind basement retaining walls that subslabs be included beneath flatwork or pavements that can cantilever at least 3 feet beyond the wall. If surface improvements are included that are highly sensitive to differential movement, additional measures may be necessary. We also recommend that retaining wall backfill be compacted to 95 percent where surface improvements are planned (see "Retaining Wall" section).

5.1.6 Soil Corrosion

A preliminary soil corrosion screening was performed by JDH Corrosion Consultants based on the results of analytical tests on samples of the near-surface soil. In general, the JDH report concludes that the corrosion potential for buried concrete does not warrant the use of sulfate resistant concrete. In addition, the corrosion potential for buried metallic structures, such as metal pipes, is considered moderately corrosive to corrosive. JDH recommends that special requirements for corrosion control be made to protect metal pipes. A more detailed discussion of the site corrosion evaluation is presented in Appendix C.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter explorations performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION, CLEARING AND PREPARATION

6.1.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements within the proposed development area. Demolition of existing improvements is discussed in detail below. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 3 to 6 inches below existing grade in vegetated areas.

6.1.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the "Compaction" section of this report.

6.1.3 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. A discussion of recycling existing improvements is provided later in this report.

6.1.4 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risks associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout. In general, the risk is relatively low for single utility lines less than 4 inches in diameter, and increases with increasing pipe diameter.

6.2 REMOVAL OF EXISTING FILLS

While fills were not encountered in our borings, any fills encountered during site grading should be completely removed from within building areas and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. Provided the fills meet the "Material for Fill" requirements below, the fills may be reused when backfilling the excavations. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should be screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 9 to 12 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below.

6.3 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 15 feet at the site may be classified as OSHA Site C materials. Recommended soil parameters for temporary shoring are provided in the "Temporary Shoring" section of this report.

Excavations performed during site demolition and fill removal should be sloped at 3:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be slope at a 1:1 inclination unless the OSHA soil classification indicates that slope should not exceed 1.5:1.

6.4 BELOW-GRADE EXCAVATIONS

Below-grade excavations may be constructed with temporary slopes in accordance with the "Temporary Cut and Fill Slopes" section above if space allows. Alternatively, temporary shoring may support the planned cuts up to about 25 feet for the below-grade parking structures. We have provided geotechnical parameters for shoring design in the section below. The choice of shoring method should be left to the contractor's judgment based on experience, economic considerations and adjacent improvements such as utilities, pavements, and foundation loads. Temporary shoring should support adjacent improvements without distress and should be the contractor's responsibility. A pre-condition survey including photographs and installation of monitoring points for existing site improvements should be included in the contractor's scope. We should be provided the opportunity to review the geotechnical parameters of the shoring design prior to implementation; the project structural engineer should be consulted regarding support of adjacent structures.

6.4.1 Temporary Shoring

Based on the site conditions encountered during our investigation, the potential cuts may be supported by soldier beams and tie-backs, or potentially other methods. Where shoring will extend more than about 10 feet, restrained shoring will most likely be required to limit detrimental lateral deflections and settlement behind the shoring. In addition to soil earth pressures, the shoring system will need to support adjacent loads such as construction vehicles and incidental loading, existing structure foundation loads, and street loading. We recommend that heavy construction loads (cranes, etc.) and material stockpiles be kept at least 15 feet behind the shoring. Where this loading cannot be set back, the shoring will need to be designed to support the loading. The shoring designer should provide for timely and uniform mobilization of soil pressures that will not result in excessive lateral deflections. Minimum suggested geotechnical parameters for soldier beam and lagging shoring design are provided in the table below.

Table 2: Suggested Temporary Shoring Design Parameters

Design Parameter	Design Value
Minimum Lateral Wall Surcharge (upper 5 feet)	120 psf
Cantilever Wall – Triangular Earth Pressure	40 pcf
Restrained Wall – Trapezoidal Earth Pressure	Increase from 0 to 24H* psf
Passive Pressure – Starting at 2 feet below the bottom of the excavation	400 pcf up to 2,500 psf maximum uniform pressure

* H equals the height of the excavation; passive pressures are assumed to act over twice the soldier pile diameter

The restrained earth pressure may also be distributed as described in Figure 24 of the *FHWA Circular No. 4 – Ground Anchors and Anchored Systems* (with hinge points at $\frac{1}{4}H$ and $\frac{3}{4}H$).

On the western wall of the western office building, the wall extends to the edge of the top of slope above the off-ramp from Highway 17 as well as partially down the slope. Shoring designers should take this into consideration when laying out the tieback depths and inclination angles, and whether there should be a reduction in bond stress if there is less than 15 feet of soil cover over portions of the bond zone.

If shotcrete lagging is used for the shoring facing, the permanent retaining wall drainage materials, as discussed in the "Wall Drainage" section of this report, will need to be installed during temporary shoring construction. At a minimum, 2-foot-wide vertical panels should be placed between soil nails or tiebacks that are spaced at 6-foot centers. For 8-foot centers, 4-foot-wide vertical panels should be provided. A horizontal strip drain connecting the vertical panels should be provided, or pass-through connections should be included for each vertical panel.

We performed our borings with hollow-stem auger drilling equipment and as such were not able to evaluate the potential for caving soils, which can create difficult conditions during soldier beam, tie-back, or soil nail installation; caving soils can also be problematic during excavation and lagging placement. The contractor is responsible for evaluating excavation difficulties prior to construction. Where relatively clean sands (especially encountered below ground water) or difficult drilling or cobble conditions were encountered during our exploration, pilot holes performed by the contractor may be desired to further evaluate these conditions prior to the finalization of the shoring budget.

In addition to anticipated deflection of the shoring system, other factors such as voids created by soil sloughing, and erosion of granular layers due to perched water conditions can create adverse ground subsidence and deflections. The contractor should attempt to cut the excavation as close to neat lines as possible; where voids are created they should be backfilled as soon as possible with sand, gravel, or grout.

As previously mentioned, we recommend that a monitoring program be developed and implemented to evaluate the effects of the shoring on adjacent improvements. All sensitive improvements should be located and monitored for horizontal and vertical deflections and distress cracking based on a pre-construction survey. For multi-level excavations, the installation of inclinometers at critical areas may be desired for more detailed deflection monitoring. The monitoring frequency should be established and agreed to by the project team prior to start of shoring construction.

The above recommendations are for the use of the design team; the contractor in conjunction with input from the shoring designer should perform additional subsurface exploration they deem necessary to design the chosen shoring system. A California-licensed civil or structural engineer must design and be in responsible charge of the temporary shoring design. The contractor is responsible for means and methods of construction, as well as site safety.

6.5 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the "Compaction" section below.

Both garage slab areas will be overlying sandy subgrade soils. These sands will likely become disturbed due to construction traffic; therefore, subgrade preparation should be performed just prior to placement of the rock layer and concrete.

6.6 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the "Subsurface" section in this report, the in-situ moisture contents are about 3 to 5 percent over the estimated laboratory optimum in the upper 10 feet of the soil profile. The contractor should anticipate drying the soils prior to reusing them as fill. In addition, repetitive rubber-tire loading will likely de-stabilize the soils.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.6.1 Scarification and Drying

The subgrade may be scarified to a depth of 6 to 12 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.6.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthetic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.6.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.7 MATERIAL FOR FILL

6.7.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.7.2 Re-Use of On-Site Site Improvements

We anticipate that significant quantities of asphalt concrete (AC) grindings and aggregate base (AB) will be generated during site demolition. If the AC grindings are mixed with the underlying AB to meet Class 2 AB specifications, they may be reused within the new exterior pavement and flatwork structural sections. AC/AB grindings may not be reused within the proposed office building areas. Laboratory testing will be required to confirm the grindings meet project specifications.

6.7.3 Potential Import Sources

Imported material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the proposed at-grade office building area. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source

should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report.

Table 3: Compaction Requirements

Description	Material Description	Minimum Relative ¹ Compaction (percent)	Moisture ² Content (percent)
General Fill (within upper 5 feet)	On-Site Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Soils	95	>1
Basement Wall Backfill	Without Surface Improvements	90	>1
Basement Wall Backfill	With Surface Improvements	95 ⁴	>1
Trench Backfill	On-Site Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Flatwork Subgrade	On-Site Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base ³	90	Optimum
Pavement Subgrade	On-Site Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base ³	95	Optimum
Asphalt Concrete	Asphalt Concrete	95	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)

2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)

3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

4 – Using light-weight compaction or walls should be braced

6.9 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock ($\frac{3}{8}$ -inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

6.10 PERMANENT CUT AND FILL SLOPES

All permanent cut and fill slopes in soil should have a maximum inclination of 2:1 (horizontal:vertical) for slopes up to 10 feet high; slopes greater than 10 feet should be inclined at no greater than 2.5:1. Fill slopes should be overbuilt and trimmed back, exposing engineered fill when complete.

6.11 SITE DRAINAGE

6.11.1 Surface Drainage

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. However, if retention, detention or infiltration facilities

are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

6.11.2 Subsurface Drainage – Garage Underslab Subdrains

As discussed in the “Conclusions” section, we recommend the installation of a subdrain system beneath the two garage slabs-on-grade to address the potential for temporary perched ground water conditions. The potential for experiencing temporary perched water conditions is judged to be higher in the north central parking garage, which is closer to the creek. The subdrain system should consist of a series of perforated pipes placed within a 12-inch wide by 12-inch-thick permeable gravel layer – either ¾-inch clean crushed rock or Caltrans Class 2 Permeable Material. If crushed rock is used, a permeable geotextile filter fabric, such as Mirafi 140N or approved equivalent, should be placed around the pipe rock section. The perforated pipes should be tied to the sloping solid pipe system discussed below.

The retaining wall drainage system should extend to the bottom of footing and multiple pass-through locations included within the structure that tie to solid piping that slopes at a minimum of 0.5 percent to drain to a sump system. This system should be detailed in the project plumbing plans.

6.12 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project’s drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and are expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of storm water.
- Locally, average seasonal high ground water is considered to be at a depth of 30 feet, with short duration perched conditions as high as 20 feet, and therefore is expected to be at least 10 feet below the base of at-grade infiltration measures.

- In our opinion, infiltration locations within 10 feet of the buildings would create a geotechnical hazard.
- Infiltration measures, devices, or facilities may conflict with the location of existing or proposed underground utilities or easements. Infiltration measures, devices, or facilities should not be placed on top of or very near to underground utilities such that they discharge to the utility trench, restrict access, or cause stability concerns.
- Local Water District policies or guidelines may limit locations where infiltration may occur, require greater separation from seasonal high ground water, or require greater setbacks from potential sources of pollution.

6.12.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.12.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding clay.
- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.
- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.12.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.
- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.
- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.
- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.
- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.
- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.
- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.12.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the "Retaining Walls" section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed structures may be supported on shallow foundations provided the recommendations in the "Earthwork" section and the sections below are followed.

7.2 SEISMIC DESIGN CRITERIA

We understand that the project structural design will be based on the 2010 California Building Code (CBC), which provides criteria for the seismic design of buildings in Chapter 16. The "Seismic Coefficients" used to design buildings are established based on a series of tables and figures addressing different site factors, including the soil profile in the upper 100 feet below grade and mapped spectral acceleration parameters based on distance to the controlling seismic source/fault system. Based on our borings and review of local geology, the site is underlain by deep alluvial soils with typical SPT "N" values between 15 and 50 blows per foot. As we have judged the potential for ground rupture/sand boil development and lateral spreading due to liquefaction to be low, and the total and differential seismic settlements to be tolerable to the existing shallow foundation system without ground improvement, we have judged that the site conditions do not indicate collapsible soils that would require a Soil Classification F. Therefore, we have classified the site as Soil Classification D. The mapped spectral acceleration parameters S_s and S_1 were calculated using the USGS computer program *Earthquake Ground Motion Parameters*, Version 5.1.0, revision date February 10, 2011, based on the site coordinates presented below and the site classification. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 4: CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.292553°
Site Longitude	-121.936705°
0.2-second Period Mapped Spectral Acceleration ¹ , S_s	1.694g
1-second Period Mapped Spectral Acceleration ¹ , S_1	0.612g
Short-Period Site Coefficient – F_a	1.0
Long-Period Site Coefficient – F_v	1.5

Table continued on next page

Table 4: CBC Site Categorization and Site Coefficients, continued

Classification/Coefficient	Design Value
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	1.694g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{M1}	0.918g
0.2-second Period, Design Earthquake Spectral Response Acceleration - S_{DS}	1.129g
1-second Period, Design Earthquake Spectral Response Acceleration - S_{D1}	0.612g

¹For Site Class B, 5 percent damped.

7.3 SPREAD FOOTING FOUNDATIONS

All planned structures may be supported on spread footing foundations. Spread footings should bear on natural, undisturbed soil or engineered fill, and have the minimum dimensions presented in the table below. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil.

Table 5: Minimum Footing Dimensions

Building	Minimum Footing Width (inches)	Minimum Depth to Bottom of Footing (inches)
One-Story Office Building	12	15
Five-Story Office Building and Nine-Story Parking Structure	18	24

Footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report are capable of supporting maximum allowable bearing pressures of 4,000 psf for dead loads, 6,000 psf for combined dead plus live loads, and 8,000 psf for all loads including wind and seismic, for foundations constructed two levels below grade. Any foundations constructed at-grade to one level below grade may be designed using 3,000 psf for dead loads, 4,500 psf for combined dead plus live loads, and 6,000 psf for all loads including wind and seismic.

These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

As noted in the "Conclusions" section, there is a theoretical possibility of lateral spreading resulting in about 2 to 9 inches of lateral displacement within the southeastern office building

area. While the estimated lateral displacements are low, for added protection for the office building, the structure should be supported on interconnected grid footings or footings should be structurally tied together with grade beams. Alternatively, the office may be supported on a mat foundation. If mat foundation recommendations are desired, we should be retained to perform supplemental engineering analysis.

7.3.1 Footing Settlement

Structural loads have not yet been finalized; however, preliminary loads provided by SEI and our experience with similar projects were used to estimate building loads for our settlement analyses, as shown in the following table.

Table 6: Assumed Structural Loading

Building	Foundation Area	Range of Estimated Loads
Five-Story Office Building with Two Below-Grade Garage Levels	Interior Isolated Column Footing	650 to 800 kips
	Perimeter Strip Footing	10 to 12 kips per lineal foot
Nine-Story Parking Garage with Two Below-Grade Levels	Interior Isolated Column Footing	1,000 to 1,400 kips
	Perimeter Strip Footing	15 kips per lineal foot
One-Story Office Building	Interior Isolated Column Footing	50 kips
	Perimeter Strip Footing	3 kips per lineal foot

Based on the above assumed building loads and the allowable bearing pressures presented above, we estimate the following total and differential settlements:

Table 7: Estimated Foundation Settlements

Building	Estimated Total Static Settlement	Estimated Differential Settlement (Static + Seismic)
Five-Story Office Building with Two Below-Grade Garage Levels	½- to 1 inch	<1 inch in 30 feet
Nine-Story Parking Garage with Two Below-Grade Levels	½- to 1 inch	<1 inch in 30 feet
One-Story Office Building	+/- ½-inch	<¾-inch in 30 feet

As the above loads were based on limited information from the structural engineer, we recommend that we review the final building and parking garage loads to further evaluate building settlement, and provide supplemental settlement criteria, as needed.

7.3.2 Lateral Loading

Lateral loads may be resisted by friction between the bottom of at-grade footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.4 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 400 pcf may be used in design for the at-grade office building option. The two-level below-grade garage spread footings may use an ultimate frictional resistance of 0.45 applied to the dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.3.3 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

The foundations for the two-level below-grade garages will be located within sands. The sands likely will not maintain vertical temporary excavations; therefore, the contractor should be prepared to form footing excavations.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 INTERIOR SLABS-ON-GRADE

As the Plasticity Index (PI) of the surficial soils is 16 or less, the proposed at-grade office building slab-on-grade may be supported on 4 inches of non-expansive fill overlying subgrade prepared in accordance with the recommendations in the "Earthwork" section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil

has been allowed to dry out, the subgrade should be re-moisture conditioned to near optimum moisture content.

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

8.2 PARKING STRUCTURE SLAB-ON-GRADE

Parking garage slabs-on-grade should be at least 5 inches thick and if constructed with minimal reinforcement intended for shrinkage control only, should have a minimum compressive strength of 3,000 psi. If the slab will have heavier reinforcing because the slab will also serve as a structural diaphragm, the compressive strength may be reduced to 2,500 psi at the structural engineer's discretion. The garage slab should also be supported on at least 12 inches of either $\frac{3}{4}$ -inch clean, crushed rock or predominantly angular, Caltrans Class 2 Permeable Material placed and compacted in accordance with the "Compaction" section of this report. If crushed rock is used, a permeable geotextile fabric such as Mirafi 140N should be placed on the soil subgrade.

As discussed in the "Conclusions" section, we recommend the installation of a subdrain system beneath the two garage slabs-on-grade to address the potential for temporary perched ground water conditions. The potential for experiencing temporary perched water conditions is judged to be higher in the north central parking garage, which is closer to the creek. The subdrain system should consist of a series of perforated pipes spaced at 20 feet on center that are placed in 12-inch-wide by 12-inch-deep trenches and backfilled with a permeable gravel layer. The gravel layer should consist of either $\frac{3}{4}$ -inch clean crushed rock or Caltrans Class 2 Permeable Material. If crushed rock is used, a permeable geotextile filter fabric, such as Mirafi 140N or approved equivalent, should be placed around the pipe rock section. The perforated pipes should be tied to the sloping solid pipe system discussed in the "Retaining Wall" section below. As an alternative to perforated pipe, minimum 1-inch-thick soil strip drains, such as Contech, Akwadrain or approved equivalent, may be placed on the subgrade at 20 feet on center.

If there will be areas within the garage that are moisture sensitive, such as equipment and elevator rooms, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

As the two-level below-grade garage slab-on-grade will bear on relatively clean sands and gravels, observation and testing of the subgrade preparation will happen just prior to placement of the capillary break layer or concrete placement.

8.3 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil-thick vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of ½- to ¾-inch crushed rock with less than 5 percent passing the No. 200 sieve, should be placed below the vapor retarder and consolidated in place with vibratory equipment. The capillary break layer may be used to satisfy the non-expansive fill requirement.
- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.
- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.
- Polishing the concrete surface with metal trowels is not recommended.
- Where floor coverings are planned, all concrete surfaces should be properly cured.
- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869-98 and F710-98 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

8.4 EXTERIOR FLATWORK

8.4.1 Pedestrian Concrete Flatwork

Exterior concrete flatwork subject to pedestrian and/or occasional light pick up loading should be at least 4 inches thick and supported on at least 4 inches of Class 2 aggregate base overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below. To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls except where limited sections of

structural slabs are included to help span irregularities in retaining wall backfill at the transitions between at-grade and on-structure flatwork.

8.4.2 Pedestrian Pavers

Concrete unit pavers subject to pedestrian and/or occasional light pick up loading should be at least 60 mm thick and supported on at least 4 inches of Class 2 aggregate base overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. Pavers that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below. Where pavers will span transitions from on-grade to on-structure, consideration should be given to including a concrete sub-slab supported on the basement wall capable of spanning over the first 2 to 3 feet of wall backfill.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Caltrans Highway Design Manual (latest edition), estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on the results of the previous laboratory testing performed on two surficial samples collected from the proposed pavement areas and engineering judgment considering the variable surface conditions.

Table 8: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	8.0	10.5
4.5	2.5	10.0	12.5
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	13.0	16.5
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be use the pavements.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the "Concrete Slabs and Pedestrian Pavements" section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 9: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
0.8	5.0
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 6 inches of Class 2 aggregate base compacted as recommended in the "Earthwork" section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

9.3 VEHICULAR CONCRETE UNIT PAVERS

Where vehicular concrete unit pavers are desired in standard traffic areas, we recommend that the pavers be underlain by a 6-inch-thick concrete sub-slab designed as discussed above, including the aggregate base section. Pavers should be placed on a bituminous or mortar setting bed over the concrete sub-slab. Where the pavers will be used as an emergency vehicle access (EVA), the pavers should be placed over at least 8 inches of Class 2 aggregate base and prepared subgrade as recommended in the "Earthwork" section. A maximum 1 inch thick sand setting bed may be used to level the pavers on the aggregate base.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls be designed for the following pressures:

Table 10: Recommended Lateral Earth Pressures

Sloping Backfill Inclination (horizontal:vertical)	Lateral Earth Pressure*	
	Unrestrained – Cantilever Wall	Restrained – Braced Wall
Level	45 pcf	45 pcf + 8H
3:1	55 pcf	55 pcf + 8H
2½:1	60 pcf	60 pcf + 8H
2:1	65 pcf	65 pcf + 8H
Additional Surcharge Loads	⅓ of vertical loads at top of wall	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure

** H is the distance in feet between the bottom of footing and top of retained soil

Basement walls should be designed as restrained walls. If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

The 2010 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We reviewed the seismic earth pressures for the proposed basement using procedures generally based on the Mononobe-Okabe method. Because the walls are greater than 10 to 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the seismic increment when added to the recommended active earth pressure against the recommended fixed wall earth pressures. Because the wall is restrained, or will act as a restrained wall, and will be designed for 45 pcf (equivalent fluid pressure) plus a uniform earth pressure of 8H psf, based on current recommendations for seismic earth pressures (Lew et al., SEAOC 2010), it appears that active earth pressures plus a seismic increment do not exceed the fixed wall earth pressures. Therefore, an additional seismic increment above the design earth pressures is not required as long as the walls are designed for the restrained wall earth pressures recommended above.

10.3 WALL DRAINAGE

10.3.1 At-Grade Site Walls

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable

Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.3.2 Below-Grade Walls

Miradrain, AmerDrain or other equivalent drainage matting should be used for wall drainage where below-grade walls are temporarily shored and the shoring will be flush with the back of the permanent walls. The drainage panel should be connected at the base of the footings by a horizontal drainage strip and closed or through-wall system such as the TotalDrain system from AmerDrain. Due to the potential for perched water, for the two below-grade structures, we recommend that the wall drainage system extend to the bottom of footing. The pass-through connections should connect to a sloping solid pipe system (at least 0.5 percent slope) connecting to a sump. Pass through connections should be spaced no further apart than 50 feet along the perimeter wall.

Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade unless capped by hardscape. The drainage panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil. If the shoring system will be offset behind the back of permanent wall, the drainage systems discussed in the "At-Grade Site Walls" section may also be used.

10.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

As discussed previously, consideration should be given to the transitions from on-grade to on-structure. Providing subslabs or other methods for reducing differential movement of flatwork or pavements across this transition should be included in the project design.

10.5 FOUNDATIONS

Retaining walls may be supported on a continuous spread footing designed in accordance with the recommendations presented in the "Foundations" section of this report. At-grade site walls located at the top of the slope on the west side of the site will likely need to be supported on footings deepened to provide enough lateral restraint. Alternatively, that wall may be supported on drilled pier foundations designed with an allowable vertical skin friction of 500 psf and a lateral capacity based on an equivalent fluid pressure of 300 pcf up to a maximum of 2,000 psf uniform pressure over a width of two pier diameters per shaft. The upper 24 inches of the pier measured from the downslope side should be neglected for both vertical and lateral capacity. Piers should be spaced at a minimum of three pier diameters.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Hamilton Campbell, LLC specifically to support the design of the Creekside Way Office Building project located in Campbell, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and ground water conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Hamilton Campbell, LLC may have provided Cornerstone with plans, reports and other documents prepared by others. Hamilton Campbell, LLC understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications,

and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

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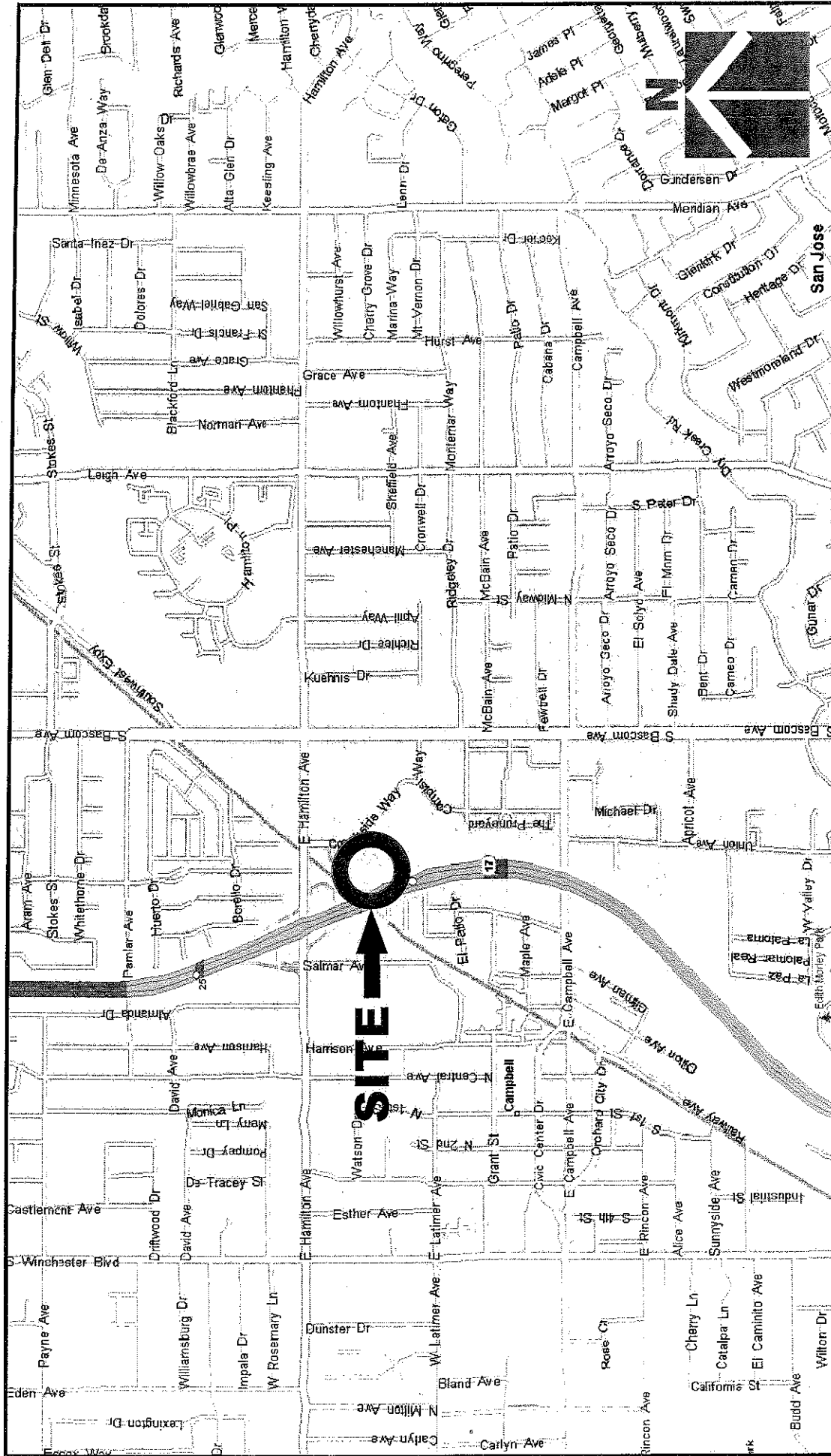
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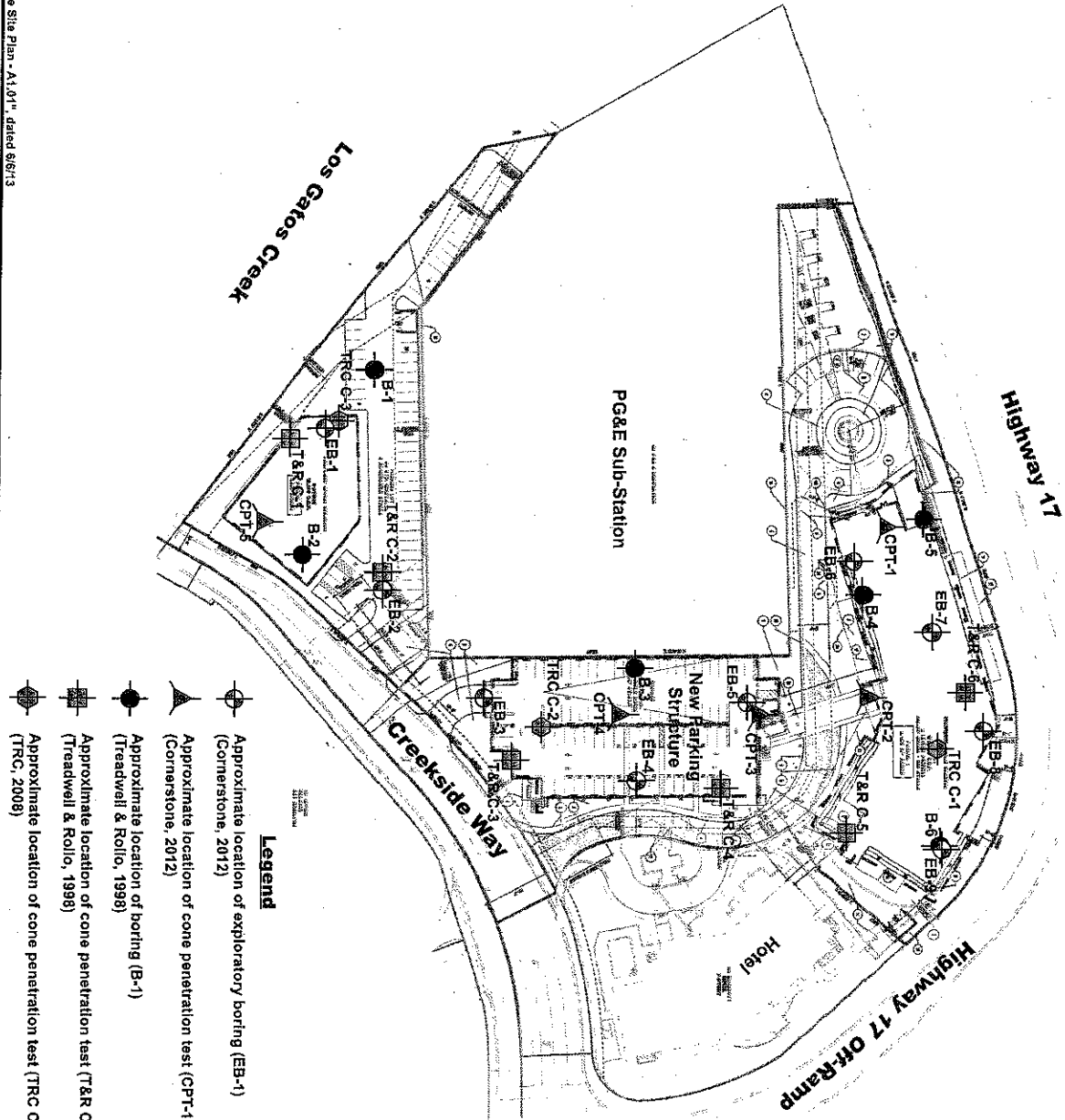
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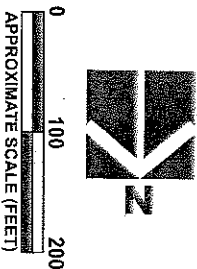
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Vicinity Map		Project Number 157-7-3
Creekside Way Office Building Campbell, CA		Figure Number Figure 1
CORNERSTONE EARTH GROUP		Date September 2013 Drawn By RRN



- Legend**
- Approximate location of exploratory boring (EB-1) (Cornerstone, 2012)
 - Approximate location of cone penetration test (CPT-1) (Cornerstone, 2012)
 - Approximate location of boring (B-1) (Treadwell & Rollo, 1998)
 - Approximate location of cone penetration test (T&R C-1) (Treadwell & Rollo, 1998)
 - Approximate location of cone penetration test (TRC C-1) (TRC, 2008)



**CORNERSTONE
EARTH GROUP**

Site Plan

**Creekside Way Office Building
Campbell, CA**

Project Number
157-7-3

Figure Number
Figure 2

Date
September 2013

Drawn By
RRN

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Nine 8-inch-diameter exploratory borings were drilled on July 23 through 25, 2012 to depths of 30 to 45 feet. Five CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on July 23, 2012, to depths ranging from 19 to 27 feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries, a hand held GPS unit, and other site features as references. Boring and CPT elevations were based on interpolation of plan contours were not determined. The locations and elevations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	$Cu > 4$ AND $1 < Cc < 3$	GW	WELL-GRADED GRAVEL	
			$Cu > 4$ AND $1 > Cc > 3$	GP	POORLY-GRADED GRAVEL	
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	$Cu > 6$ AND $1 < Cc < 3$	SW	WELL-GRADED SAND	
			$Cu > 6$ AND $1 > Cc > 3$	SP	POORLY-GRADED SAND	
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT < 50	INORGANIC	$PI > 7$ AND PLOTS > "A" LINE	CL	LEAN CLAY	
			$PI > 4$ AND PLOTS < "A" LINE	ML	SILT	
		ORGANIC	LL (oven dried) Y_{LL} (not dried) < 0.75	OL	ORGANIC CLAY OR SILT	
	SILTS AND CLAYS LIQUID LIMIT > 50	INORGANIC	PI PLOTS > "A" LINE	CH	FAT CLAY	
			PI PLOTS < "A" LINE	MH	ELASTIC SILT	
		ORGANIC	LL (oven dried) Y_{LL} (not dried) < 0.75	OH	ORGANIC CLAY OR SILT	
	HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

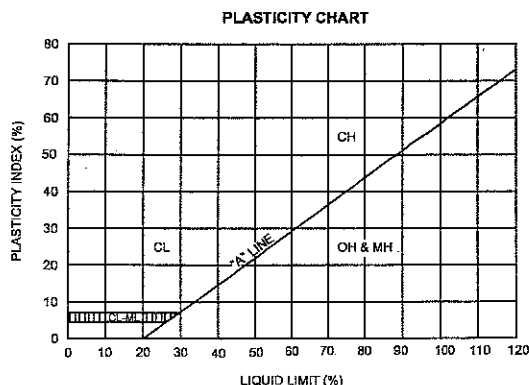
OTHER MATERIAL SYMBOLS	
	Poorly-Graded Sand with Clay
	Clayey Sand
	Sandy Silt
	Artificial/Undocumented Fill
	Poorly-Graded Gravelly Sand
	Topsoil
	Well-Graded Gravel with Clay
	Well-Graded Gravel with Silt
	Sand
	Silt
	Well Graded Gravelly Sand
	Gravelly Silt
	Asphalt
	Boulders and Cobble

SAMPLER TYPES

	SPT		Shelby Tube
	Modified California (2.5" I.D.)		No Recovery
	Rock Core		Grab Sample

ADDITIONAL TESTS

CA - CHEMICAL ANALYSIS (CORROSIVITY)	PI - PLASTICITY INDEX
CD - CONSOLIDATED DRAINED TRIAXIAL	SW - SWELL TEST
CN - CONSOLIDATION	TC - CYCLIC TRIAXIAL
CU - CONSOLIDATED UNDRAINED TRIAXIAL	TV - TORVANE SHEAR
DS - DIRECT SHEAR	UC - UNCONFINED COMPRESSION
PP - POCKET PENETROMETER (TSF)	(1.5) - (WITH SHEAR STRENGTH IN KSF)
(3.0) - (WITH SHEAR STRENGTH IN KSF)	UU - UNCONSOLIDATED UNDRAINED TRIAXIAL
RV - R-VALUE	
SA - SIEVE ANALYSIS: % PASSING #200 SIEVE	
	WATER LEVEL



PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5 - 1.0
DENSE	30 - 60	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 60	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.



**CORNERSTONE
EARTH GROUP**

**LEGEND TO SOIL
DESCRIPTIONS**

Figure Number
A-1



DATE STARTED 7/23/12 DATE COMPLETED 7/24/12
 DRILLING CONTRACTOR Exploration Geoservices Inc.
 DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
 LOGGED BY SJV
 NOTES Hole left open for 30 minutes after completion, no ground water

PROJECT NAME Creekside Way
 PROJECT NUMBER 157-7-1
 PROJECT LOCATION Campbell, CA
 GROUND ELEVATION 180 FT +/- BORING DEPTH 35 ft.
 LATITUDE _____ LONGITUDE _____
 GROUND WATER LEVELS:
☒ AT TIME OF DRILLING Not Encountered
☒ AT END OF DRILLING Not Encountered

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 8/24/12 09:40 - P:\DRAFTING\GINT FILES\157-7-1 CREEKSIDE WAY.GPJ

		SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT pcf	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
ELEVATION (ft)	DEPTH (ft)									○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL				
180.0	0		3 inches asphalt concrete over 9 inches aggregate base											
179.7			Lean Clay with Sand (CL) hard, moist, brown, fine sand, some silt, low plasticity	29	MC-1	111	15							>4.5
179.0				16	MC-2B	98	16							>4.5
175.0	5		Sandy Lean Clay (CL) hard, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel, low plasticity	26	MC-3B	119	11							>4.5
172.5			Silty Sand with Gravel (SM) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	34	MC-4B	84	6							
165.5	15		Lean Clay with Sand (CL) stiff, moist, brown, fine sand, low plasticity	7	SPT-5B		15							
163.0			Sandy Lean Clay with Gravel (CL) hard, moist, brown, fine to medium sand, fine to coarse subrounded gravel, low plasticity	35	MC-6B		7		17					>4.5
160.8	20		Poorly Graded Sand with Silt and Gravel (SP-SM) dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	37	SPT-7		5		10					
	25			40	SPT-8		6							
149.0	30													

Continued Next Page



PROJECT LOCATION Campbell, CA

[illegible]



CORNERSTONE EARTH GROUP

BORING NUMBER EB-2

PAGE 1 OF 1

DATE STARTED 7/23/12 DATE COMPLETED 7/23/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES _____

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 181 FT +/- BORING DEPTH 29 ft.

LATITUDE _____ LONGITUDE _____

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▼ AT END OF DRILLING Not Encountered

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER	△ TORVANE	● UNCONFINED COMPRESSION	▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL	
181.0	0		3½ inches asphalt concrete over 8 inches aggregate base											
180.7	0.3		Lean Clay with Sand (CL)	26	MC-1B	113	13	13						>4.5
180.0	1.0		very stiff, moist, brown, fine sand, some silt, low plasticity Liquid Limit = 30, Plastic Limit = 17	15	MC-2B	90	12					▲		>4.5
	5			35	MC-3B	103	11							>4.5
172.5	10		Sandy Silty Clay (CL-ML)	28	MC-4B	105	7							>4.5
	15		hard, moist, brown, fine sand, trace fine subangular to subrounded gravel, low plasticity	31	MC-5B	94	10							>4.5
163.0	20		Silty Sand with Gravel (SM)	34	SPT-6		3		14					
	25		Poorly Graded Sand with Silt and Gravel (SP-SM)	20	SPT-7		5		9					
158.0			medium dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel very dense @ approximately 26'	50	SPT-8		6							
152.0	30		Bottom of Boring at 29.0 feet.	6"										



CORNERSTONE EARTH GROUP

BORING NUMBER EB-3

PAGE 1 OF 2

DATE STARTED 7/23/12 DATE COMPLETED 7/23/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES

PROJECT NAME Creskide WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 180 FT +/- BORING DEPTH 34.5 ft

LATITUDE LONGITUDE

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▽ AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf	TEST METHOD
180.0	0		2½ inches asphalt concrete over 5½ inches aggregate base								
179.7			Lean Clay with Sand (CL)								
179.3			very stiff, moist, brown, fine sand, some silt, low plasticity	10	MC-1B	110	16				○
				11	MC-2B	101	16				○
	5			15	MC-3B	105	12				○ >4.5
172.0			Sandy Lean Clay (CL)								
			hard, moist, brown, fine to medium sand, some fine to coarse subangular to subrounded gravel, low plasticity	20	MC-4B	96	8				○ >4.5
170.0	10		Sandy Silt (ML)	9	SPT-5		8				
			very stiff, moist, brown, fine sand, some clay, low plasticity								
167.5			Lean Clay with Sand (CL)								
			very stiff, moist, brown, fine sand, some silt, low plasticity	21	MC-6B	104	12				○ >4.5
	15										
162.5			Sandy Silty Clay (CL-ML)								
			very stiff, moist, brown, fine sand, trace fine subrounded to subangular gravel, low plasticity	19	MC-7B	101	9				○ >4.5
	20										
157.5			Poorly Graded Sand with Silt and Gravel (SP-SM)								
			very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50 6"	SPT-8		3				
	25										
153.5			Poorly Graded Sand with Silt (SP-SM)								
			medium dense, moist, gray and brown, fine to medium sand, trace subangular to subrounded gravel	24	SPT-9		6		7		
	30										
149.0											

Continued Next Page



CORNERSTONE EARTH GROUP

BORING NUMBER EB-3

PAGE 2 OF 2

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT pcf	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER				
										△ TORVANE				
										● UNCONFINED COMPRESSION				
										▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL				
										1.0	2.0	3.0	4.0	
149.0														
148.0														
			Poorly Graded Sand with Silt and Gravel (SP-SM)											
			very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50	×		5							
145.5			Bottom of Boring at 34.5 feet.	6"	SPT-10									
	35													
	40													
	45													
	50													
	55													
	60													
	65													



CORNERSTONE EARTH GROUP

BORING NUMBER EB-4

PAGE 1 OF 1

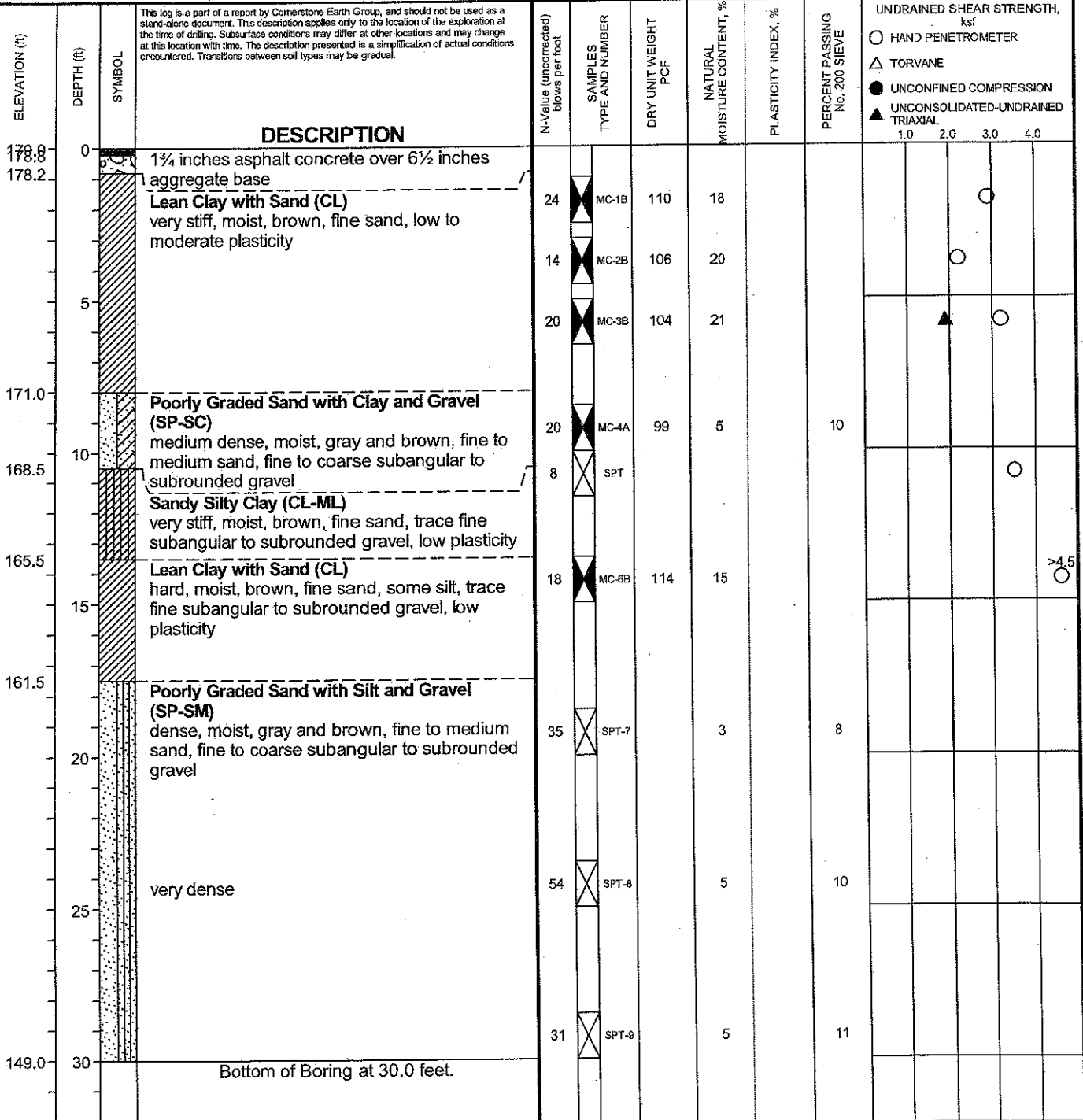
DATE STARTED 7/24/12 DATE COMPLETED 7/24/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES _____

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 179 FT +/- BORING DEPTH 30 ft.

LATITUDE _____ LONGITUDE _____

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▽ AT END OF DRILLING Not Encountered



CORNERSTONE EARTH GROUP

BORING NUMBER EB-5

PAGE 1 OF 1

DATE STARTED 7/24/12 DATE COMPLETED 7/24/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES

PROJECT NAME Creskide WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 181 FT +/-BORING DEPTH 29.5 ft.

LATITUDE

LONGITUDE

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▽ AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf	○ HAND PENETROMETER	△ TORVANE	● UNCONFINED COMPRESSION	▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
181.0	0		2½ inches asphalt concrete over 7 inches aggregate base											
180.7			Lean Clay with Sand (CL)	20	MC-1B	104	16							
180.1			very stiff, moist, brown, fine sand, low to moderate plasticity											
177.5			Sandy Silty Clay (CL-ML)	8	MC-2B	93	15							
176.0			very stiff, moist, brown, fine sand, low plasticity											
176.0	5		Lean Clay with Sand (CL)	25	MC-3B	104	15							
176.0			hard, moist, brown, fine sand, low plasticity											
173.0			Sandy Silty Clay (CL-ML)	15	MC-4B	102	9							
173.0			hard, moist, brown, fine sand, trace fine subangular to subrounded gravel, low plasticity											
170.0			Lean Clay with Sand (CL)	13	SPT-5		14							
170.0			hard, moist, brown, fine sand, some fine subangular to subrounded gravel, low plasticity											
160.0			Poorly Graded Sand with Silt and Gravel (SP-SM)	22	MC-6B		13							
160.0			very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel											
151.5				50 3"	SPT-7		4							
151.5				50 6"	SPT-8		4							
151.5	30		Bottom of Boring at 29.5 feet.											



CORNERSTONE EARTH GROUP

BORING NUMBER EB-6

PAGE 1 OF 2

DATE STARTED 7/24/12 DATE COMPLETED 7/24/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES _____

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 179 FT +/- BORING DEPTH 45 ft.

LATITUDE _____ LONGITUDE _____

GROUND WATER LEVELS:

▼ AT TIME OF DRILLING Not Encountered▼ AT END OF DRILLING Not Encountered

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT pcf	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf			
										○ HAND PENETROMETER	△ TORVANE	● UNCONFINED COMPRESSION	▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
179.0	0		Lean Clay with Sand (CL) hard, moist, brown, fine sand, moderate plasticity Liquid Limit = 35, Plastic Limit = 19	25	MC-1B	108	13	16					>4.5
				34	MC-2B	114	10						>4.5
	5			20	MC-3B	101	9						>4.5
171.5			Sandy Lean Clay (CL) very stiff, moist, brown, fine sand, some silt, low plasticity	17	MC-4B	93	9					▲	>4.5
	10												
166.0			Clayey Sand with Gravel (SC) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	37	MC-5B	102	6						
163.5	15		Poorly Graded Sand with Silt and Gravel (SP-SM) dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	34	SPT-6		3		9				
				42	SPT-7		4						
	20												
			becomes very dense	78	SPT-8		4						
	25			66	SPT-9		4		10				
				50	SPT-10		5						
	30												
148.0													

Continued Next Page



CORNERSTONE EARTH GROUP

BORING NUMBER EB-6

PAGE 2 OF 2

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0				
148.0														
147.0			Lean Clay with Sand (CL) hard, moist, brown, fine sand, low to moderate plasticity	33	MC-11B	111	20							>4.5
35														
40				35	MC-12B	106	18							>4.5
137.0			Sandy Silt (ML) very stiff, moist, brown, fine sand, some clay, low plasticity											
135.0			Lean Clay with Sand (CL) very stiff, moist, brown, fine sand, low to moderate plasticity	23	MC-13B	97	21							
134.0			Bottom of Boring at 45.0 feet.											
45														
50														
55														
60														
65														



BORING NUMBER EB-7

PAGE 1 OF 1

DATE STARTED 7/25/12 DATE COMPLETED 7/25/12
 DRILLING CONTRACTOR Exploration Geoservices Inc.
 DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem Auger
 LOGGED BY SJV
 NOTES _____

PROJECT NAME Creekside Way
 PROJECT NUMBER 157-7-1
 PROJECT LOCATION Campbell, CA
 GROUND ELEVATION 178 FT +/- BORING DEPTH 30 ft.
 LATITUDE _____ LONGITUDE _____
 GROUND WATER LEVELS:
 ▽ AT TIME OF DRILLING Not Encountered
 ▼ AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL				
				1.0	2.0	3.0	4.0							
178.0	0		Lean Clay with Sand (CL) hard, moist, brown, fine sand, low to moderate plasticity	38	MC-1B	116	8							>4.5
				39	MC-2B	116	13							>4.5
173.5	5		Sandy Lean Clay (CL) very stiff to hard, moist, brown, fine sand, low to moderate plasticity	50 5.5"	MC-3B	119	13							>4.5
				26	MC-4B	113	15							>4.5
	10			23	MC-5B									>4.5
162.5	15		Silty Sand with Gravel (SM) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	18	SPT-6		4		15					
159.5	20		Poorly Graded Sand with Silt and Gravel (SP-SM) very dense to dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50 6"	SPT-7		2							
	25			40	SPT-8		6		12					
				46	SPT-9		5							
				50	SPT-10		7		11					
148.0	30		Bottom of Boring at 30.0 feet.											



CORNERSTONE EARTH GROUP

BORING NUMBER EB-8

PAGE 1 OF 2

DATE STARTED 7/25/12 DATE COMPLETED 7/25/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 178 FT +/- BORING DEPTH 44.5 ft.

LATITUDE _____ LONGITUDE _____

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▽ AT END OF DRILLING Not Encountered

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT, pcf	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER	△ TORVANE	● UNCONFINED COMPRESSION	▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL	
178.0	0		Lean Clay with Sand (CL) hard, moist, brown, fine sand, low to moderate plasticity	39	MC-1B	106	12							>4.5
				43	MC-2B	118	13							>4.5
	5			64	MC-3B	120	13							>4.5
170.0	10		Sandy Lean Clay (CL) hard, moist, brown, fine sand, low to moderate plasticity	30	SPT-4		9							
166.0	15		Lean Clay with Sand (CL) very stiff, moist, brown, fine sand, low to moderate plasticity	18	MC-5B	110	16						▲	>4.5
162.0			Sandy Lean Clay (CL) hard, moist, brown, fine sand, some fine subangular to subrounded gravel, low plasticity	16	MC-6B	109	10							>4.5
160.0			Clayey Sand with Gravel (SC) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel	48	MC-7B	109	7							>4.5
158.3	20		Silty Sand with Gravel (SM) very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	61	SPT-8		4		13					
				50	SPT-9		4		15					
	25			60	SPT-10		4							
				50	SPT-11		6		13					
147.0	30													

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CORNERSTONE EARTH GROUP

BORING NUMBER EB-8

PAGE 2 OF 2

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CA

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT pcf	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf			
										○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0			
147.0			Silty Sand with Gravel (SM) very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel										
	35			50 3"	⊗ SPT-12		8						
	40			50 6"	⊗ SPT-13		5		13				
133.5	45		Bottom of Boring at 44.5 feet.	50 5"	⊗ SPT-14		6						
	50												
	55												
	60												
	65												



CORNERSTONE EARTH GROUP

BORING NUMBER EB-9

PAGE 1 OF 1

DATE STARTED 7/25/12 DATE COMPLETED 7/25/12DRILLING CONTRACTOR Exploration Geoservices Inc.DRILLING METHOD Mobile B-61, 8 inch Hollow-Stem AugerLOGGED BY SJV

NOTES _____

PROJECT NAME Creekside WayPROJECT NUMBER 157-7-1PROJECT LOCATION Campbell, CAGROUND ELEVATION 180 FT +/- BORING DEPTH 29.5 ft.

LATITUDE _____ LONGITUDE _____

GROUND WATER LEVELS:

▽ AT TIME OF DRILLING Not Encountered▼ AT END OF DRILLING Not Encountered

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf				
										○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0				
180.0	0		Lean Clay with Sand (CL) hard, moist, brown, fine sand, low to moderate plasticity	42	MC-1B	121	10							>4.5
176.0				28	MC-2B	99	7							>4.5
175.0	5		Sandy Lean Clay (CL) hard, moist, brown, fine sand, low to moderate plasticity	11	SPT-3		5		32					
			Clayey Sand with Gravel (SC) medium dense, moist, brown, fine to medium sand, fine to coarse subangular to subrounded gravel											
172.0			Lean Clay with Sand (CL) hard, moist, brown, fine to medium sand, trace fine gravel, low plasticity	14	SPT-4		12							>4.5
168.0	10													
166.0			Clayey Sand with Gravel (SC) medium dense, moist, gray brown, fine to coarse sand, fine to coarse subangular to subrounded gravel	22	MC-5B	90	7							>4.5
	15		Lean Clay with Sand (CL) hard, moist, brown, fine sand, some silt, low plasticity	48	MC-6B	115	11							>4.5
				26	MC-7B	103	11							>4.5
158.5	20													
			Poorly Graded Sand with Silt and Gravel (SP-SM) dense to very dense, moist, gray and brown, fine to medium sand, fine to coarse subangular to subrounded gravel	50 6"	SPT-8		3		12					
	25			40	SPT-9		2		11					
				50 5"	SPT-10		4							
150.5	30		Bottom of Boring at 29.5 feet.											

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 88 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

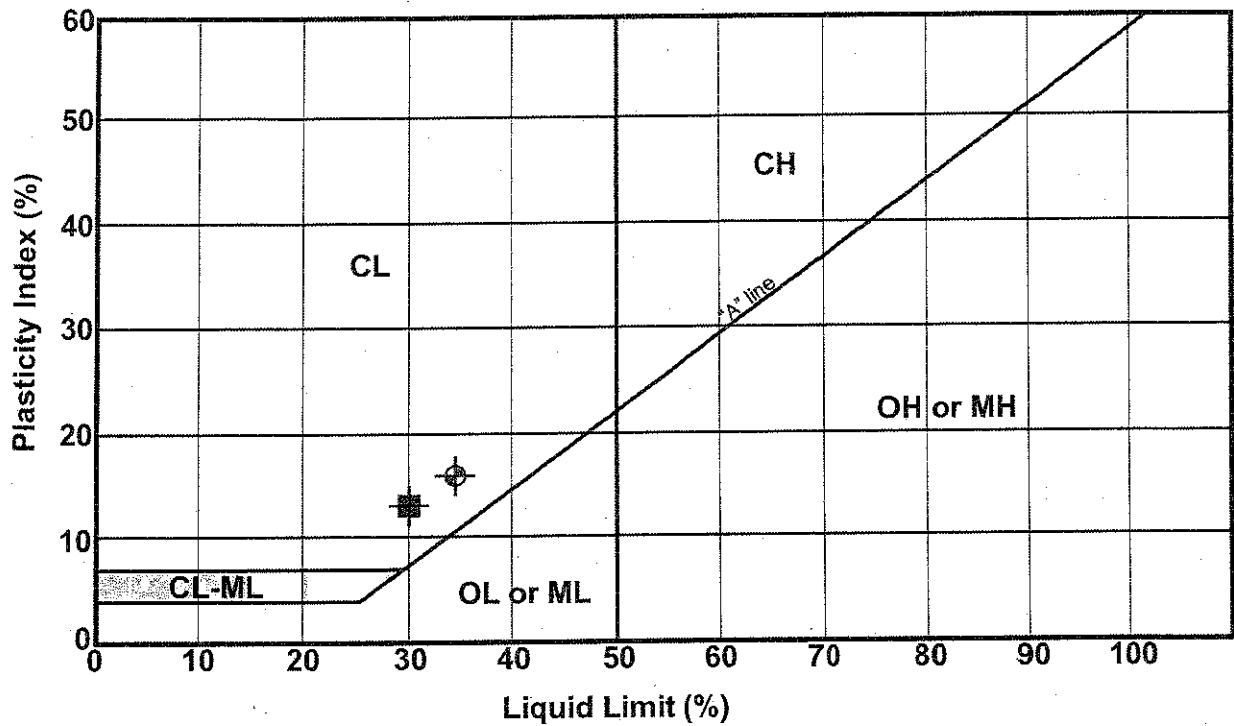
Dry Densities: In place dry density determinations (ASTM D2937) were performed on 47 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on 21 samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: Two Plasticity Index determinations (ASTM D4318) were performed on samples of the subsurface soils to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are shown on the boring logs at the appropriate sample depths.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on six relatively undisturbed sample(s) by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of this test are included as part of this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-2	2.0	13	30	17	13	—	Lean Clay with Sand (CL)
■	EB-6	2.0	13	35	19	16	—	Lean Clay with Sand (CL)



**CORNERSTONE
EARTH GROUP**

Plasticity Index Testing Summary

Creskide Way
Campbell, CA

Project Number

157-7-1

Figure Number

Figure B1

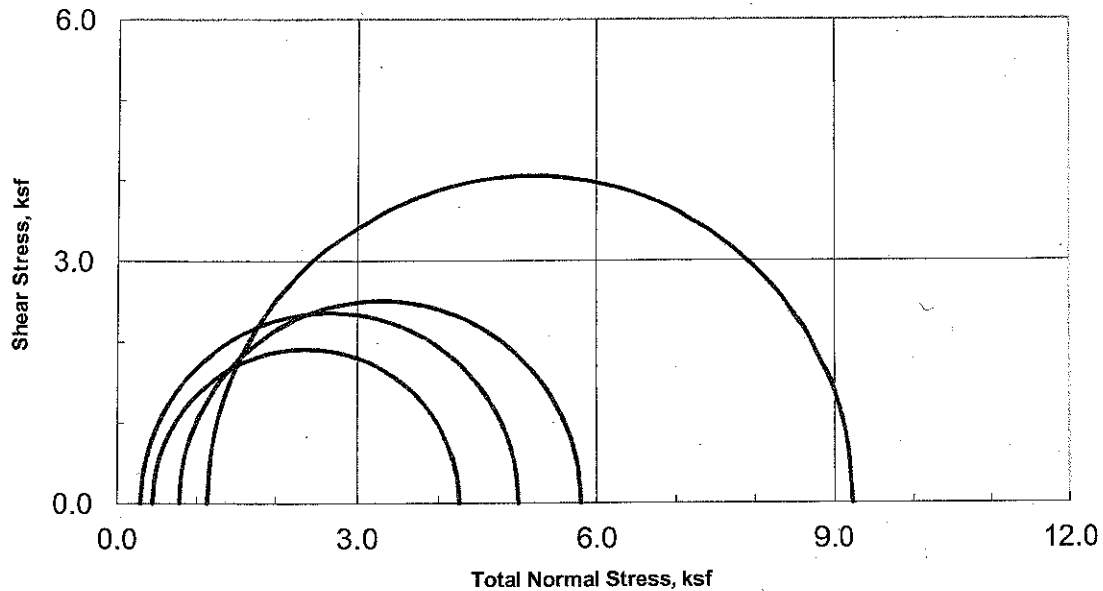
Date
August 2012

Drawn By
ELL

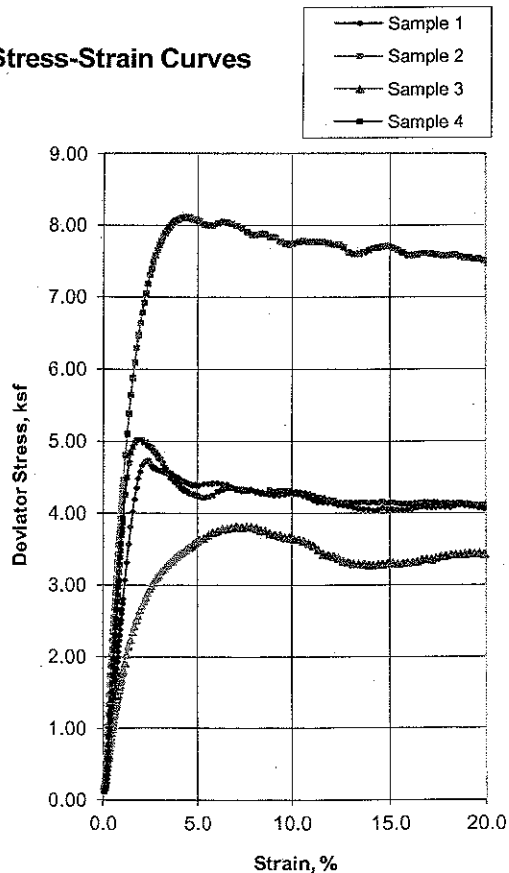


Unconsolidated-Undrained Triaxial Test

ASTM D-2850



Stress-Strain Curves



Sample Data

	1	2	3	4
Moisture %	12.1	12.2	20.5	9.2
Dry Den, pcf	89.9	104.3	104.1	92.9
Void Ratio	0.875	0.616	0.620	0.814
Saturation %	37.5	53.7	89.1	30.5
Height in	5.02	5.02	5.00	5.03
Diameter in	2.39	2.42	2.43	2.41
Cell psi	2.1	7.8	3.1	5.4
Strain %	2.30	4.40	7.10	1.90
Deviator, ksf	4.725	8.120	3.814	5.016
Rate %/min	1.00	1.00	1.00	1.00
in/min	0.050	0.050	0.050	0.050

Job No.:	640-445a			
Client:	Cornerstone Earth Group			
Project:	Creekside Way - 157-7-1			
Boring:	EB-2	EB-3	EB-4	EB-6
Sample:	2B	6B	3B	4B
Depth ft:	4.0	14.5	6	10

Visual Soil Description

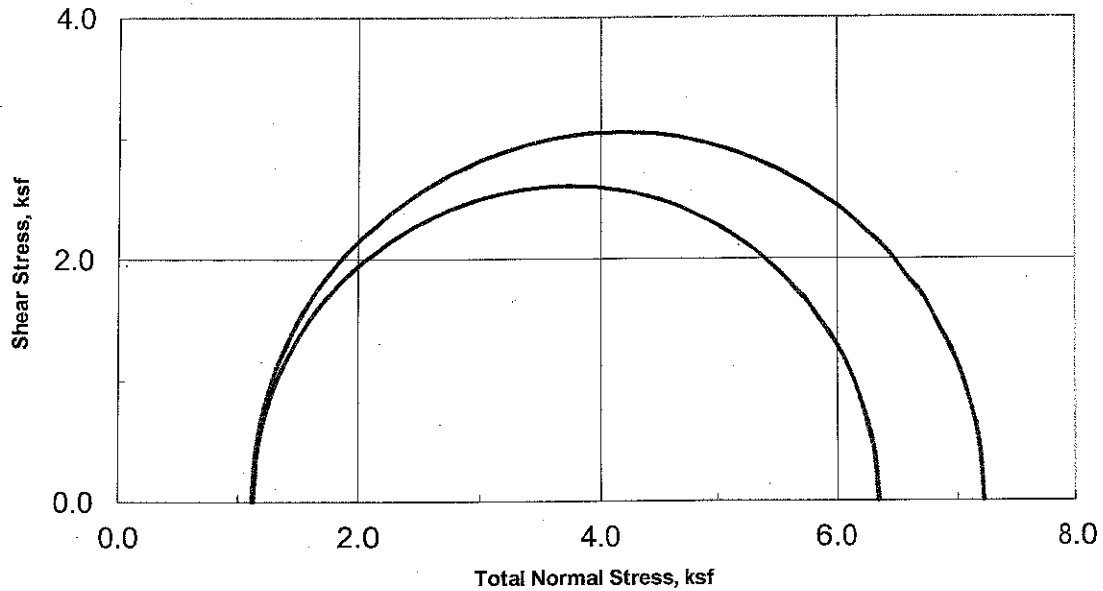
Sample #	
1	Dark Olive Brown Sandy CLAY
2	Olive Brown Sandy CLAY
3	Olive Brown Sandy CLAY w/ Gravel
4	Olive Brown Clayey SAND

Remarks:

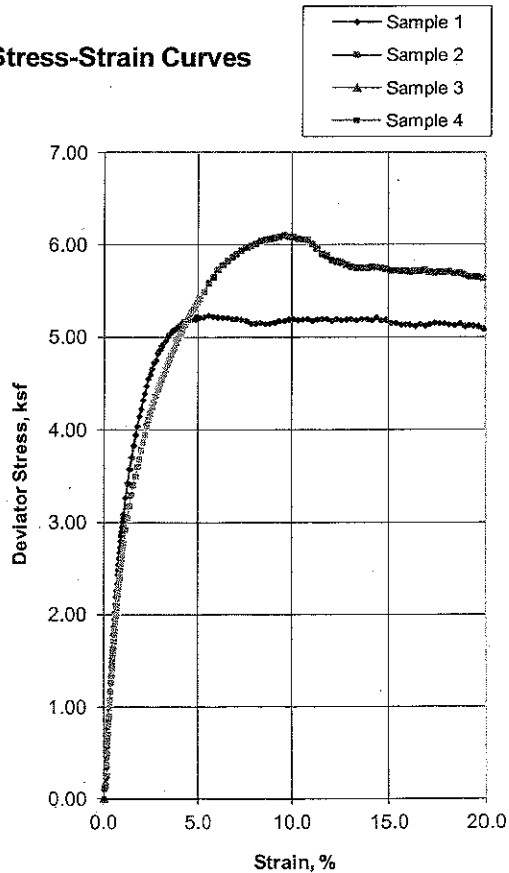


Unconsolidated-Undrained Triaxial Test

ASTM D-2850



Stress-Strain Curves



Sample Data

	1	2	3	4
Moisture %	12.2	16.3		
Dry Den,pcf	107.5	109.7		
Void Ratio	0.568	0.537		
Saturation %	58.0	82.0		
Height in	5.12	5.00		
Diameter in	2.41	2.41		
Cell psi	7.8	7.8		
Strain %	5.50	9.60		
Deviator, ksf	5.230	6.100		
Rate %/min	1.00	1.00		
in/min	0.051	0.050		
Job No.:	640-445b			
Client:	Cornerstone Earth Group			
Project:	Creekside Way - 157-7-1			
Boring:	EB-7	EB-8		
Sample:	5B	5B		
Depth ft:	14.5	14.5		

Visual Soil Description

Sample #	
1	Olive Brown Clayey SAND w/ Gravel
2	Olive Brown Sandy CLAY
3	
4	

Remarks:

APPENDIX C: SITE CORROSIVITY EVALUATION

JDH CORROSION CONSULTANTS REPORT DATED AUGUST 17, 2012

August 17, 2012

Cornerstone Earth Group
1259 Oakmead Parkway
Sunnyvale, California 94085

Attention: **Paul Cunningham, P.E.**
Senior Staff Engineer

Subject: **Site Corrosivity Evaluation**
Creekside Way, Campbell, CA
Project No. 157-7-1

Dear Paul,

In accordance with your request, we have reviewed the laboratory soils data for the above referenced project site. Our evaluation of these results and our corresponding recommendations for corrosion control for the above referenced project foundations and buried site utilities are presented herein for your consideration.

Soil Testing & Analysis

Soil Chemical Analysis

Six (6) soil samples from the project site were chemically analyzed for corrosivity by **Cooper Testing Laboratories**. Each sample was analyzed for chloride and sulfate concentration, pH, resistivity at 100% saturation and moisture percentage. The test results are presented in Cooper Testing Laboratories *Corrosivity Test Summary* dated 8/7/2012. The results of the chemical analysis were as follows:

Soil Laboratory Analysis

Chemical Analysis	Range of Results	Corrosion Classification*
Chlorides	<2 - 44 mg/kg	Non-corrosive*
Sulfates	4 - 94 mg/kg	Non-corrosive**
pH	7.1 - 7.8	Non-corrosive*
Moisture (%)	4.5 - 16.3	Not-applicable
Resistivity at 100% Saturation	1,482 - 7,568 ohm-cm	Corrosive to Moderately Corrosive *

* With respect to bare steel or ductile iron.

** With respect to mortar coated steel

Discussion

Reinforced Concrete Foundations

Due to the low levels of water-soluble sulfates found in these soils, there is no special requirement for sulfate resistant concrete to be used at this site. The type of cement used should be in accordance with California Building Code (CBC) for soils which have less than 0.10 percent by weight of water soluble sulfate (SO_4) in soil and the minimum depth of cover for the reinforcing steel should be as specified in CBC as well.

Underground Metallic Pipelines

The soils at the project site are generally considered to be "corrosive to moderately corrosive" to ductile/cast iron, steel and dielectric coated steel based on the saturated resistivity measurements. Therefore, special requirements for corrosion control are required for buried metallic utilities at this site depending upon the critical nature of the piping. Pressure piping systems such as domestic and fire water should be provided with appropriate coating systems and cathodic protection, where warranted. In addition, all underground pipelines should be electrically isolated from above grade structures, reinforced concrete structures and copper lines in order to avoid potential galvanic corrosion problems.

Recommendations

Reinforced Concrete Slab Foundations

1. We recommend using a Type II concrete mix with a water-to-cement ratio as specified in the California Building Code (CBC) for soils containing less than 0.10% water soluble sulfate by weight. Adhering to the minimum depth of cover for the reinforcing steel in the foundations as specified in the CBC is recommended for the subject structures as well.

Ductile Iron Pipe (Pressure Piping such as Domestic Water and Fire)

1. Direct buried ductile iron pipe should be encased in 8-mil polyethylene as specified in AWWA specification C-105. Epoxy coatings are also an acceptable alternative type of coating system for the pipe and/or fittings such as valves.
2. All rubber gasket joints, fusion-bonded epoxy coated flanges and flexible couplings on ductile iron pipelines should be bonded with insulated copper cable to insure electrical continuity of the pipeline and fittings.
3. Insulating flanges and/or couplings should be installed to electrically isolate the buried portion of pipeline from other metallic pipelines, reinforced concrete structures and above grade buildings or structures.

4. Test stations shall be installed on all ductile iron pipelines at a spacing of 800 to 1,000 feet. Bonding and test stations shall comply with NACE Standards.
5. A sacrificial type of cathodic protection utilizing high-potential **magnesium** anodes should be installed to protect the entire length of buried metallic pipeline. Cathodic protection should be designed in accordance with NACE Standard SP0169-07 and applicable local standards and included with the contract documents to permit installation along with the pipeline.
6. As an alternate, non-metallic piping may be used in lieu of ductile iron piping as allowed by State and local codes. Non-metallic piping does not require the implementation of any special type of corrosion prevention measures. However, all metallic valves, fittings and appurtenances on non-metallic piping will require protection as specified below.

Ductile Iron Fittings & Metallic Valves (On Plastic Pressure Piping)

1. All direct buried ductile iron fittings installed on non-metallic piping shall be provided with a bituminous coating from the factory and encased in an 8-mil polyethylene bag in the field in accordance with AWWA Specification C-105. All bolts, restraining rods, etc. shall be coated with bitumastic prior to encasement in the polyethylene bag.
2. All metallic valves shall be coated from the factory (i.e. using powdered epoxy or equivalent type of coating system) and all bolts shall be coated with bitumastic in the field and the entire valve shall be encased in an 8-mil polyethylene bag in accordance with AWWA Specification C-105.
3. A sacrificial type of cathodic protection utilizing high-potential **magnesium** anodes should be installed to protect the valves and fittings. Cathodic protection should be designed in accordance with NACE Standard SP0169-07 and applicable local standards and included with the contract documents to permit installation along with the pipeline.

Cast Iron (Gravity Sewer and Storm Drain Lines)

No special corrosion considerations are required for the gravity sewer and storm drain lines.

Steel Pipelines (Natural Gas Pipelines & Risers)

1. A fusion-bonded epoxy coating system or a suitable tape coating should be applied to all buried steel pipelines in accordance with ANSI/AWWA C214-95, "AWWA Standard for Tape Coating Systems for the Exterior of Steel Water Pipelines." Also, a tape coating per AWWA Standard C209-95 is recommended for special sections, connections and fittings.
2. Insulating flanges and/or couplings should be installed to electrically isolate the buried portions of steel pipelines from other metallic pipelines, reinforced concrete structures and above grade structures.

3. All rubber gasket joints, fusion epoxy coated flanges and flexible couplings should be bonded with insulated copper cable to insure electrical continuity of the pipeline and fittings.
4. A sacrificial type of cathodic protection using high-potential **magnesium** anodes should be installed to protect the buried portions of steel pipelines used for the natural gas piping systems. Cathodic protection should be designed in accordance with NACE Standard SP0169-07 and applicable local standards and included with the contract documents to permit installation along with the subject pipeline.
5. As an alternate, non-metallic piping may be used in lieu of steel piping as allowed by State and local codes. Non-metallic piping does not require the implementation of any special type of corrosion prevention measures.

Copper Water Pipelines (Service Lines)

1. All copper water laterals shall be provided with a polyethylene sleeve to effectively isolate the copper piping from the earth.
2. All copper water laterals shall be electrically isolated from metallic water mains via the use of insulating type corporation stops installed at the water main.

LIMITATIONS

The conclusions and recommendations contained in this report are based on the information and assumptions referenced herein. All services provided herein were performed by persons who are experienced and skilled in providing these types of services and in accordance with the standards of workmanship in this profession. No other warranties or guarantees, expressed or implied, is provided.

We thank you for the opportunity to be of service to **Cornerstone Earth Group** on this project and trust that you find the enclosed information satisfactory. If you have any questions or if we can be of any additional assistance, please feel free to contact us at (925) 927-6630.

Respectfully submitted,

Mohammed Ali

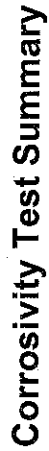
Mohammed Ali, P.E.
JDH Corrosion Consultants, Inc.
Principal



Brendon Hurley

Brendon Hurley
JDH Corrosion Consultants, Inc.
Field Technician

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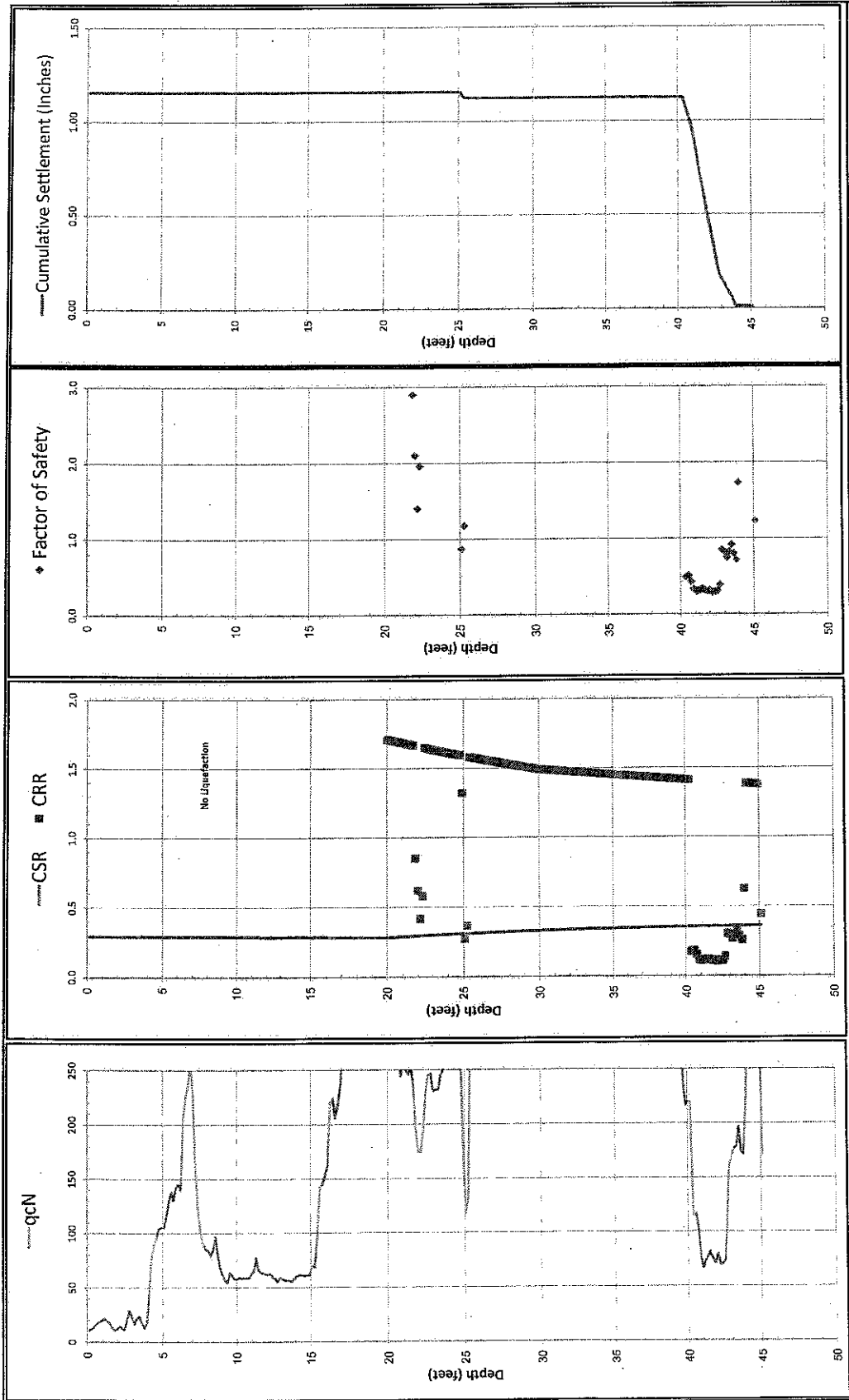


Corrosivity Test Summary

CTL #	640-445	Date:	8/7/2012	Tested By:	PJ	Checked:	PJ
Client:	Cornerstone Earth Group	Project:	Creekside Way				
Remarks:							

[illegible]

APPENDIX D: LIQUEFACTION ANALYSES CALCULATIONS



 CORNERSTONE EARTH GROUP		Liquefaction Analysis Summary		Project Number 157-7-1	
		Creekside Way Campbell, California		Figure Number Figure D-1	
				8/27/2012	CPT No. TRC-1



CERNERSTONE
EARTH GROUP

CPT No. TRC-1

PGA (A_{max}) 0.45

Total Settlement: 1.16 (inches)

Depth (ft)	Qc (tsf)	f _u (tsf)	σ _{vc} (psf)	In situ σ _{vc} (psf)	Q _u	F (%)	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q _u near interfaces (psf layer)	Thin Layer Factor (K _u)	Interpreted Q _u	C _u	Q _u IN	Q _u HCS	Stress Reduction Coeff. R _u	CSR	K _s for Sand	CRR47.5 σ _{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε _v	Settlement (inches)
0.164	11,856	0.251	20.5	20.5	113,752	2.119	2.10	Unsat	19.2	11,211	11.95	11.21	1.70	19.05	47.58	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
0.328	12,643	0.390	41.0	41.0	85,709	3.090	2.30	Unsat	24.4	53.80	11.95	11.21	1.70	20.31	53.80	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
0.492	15,410	0.573	61.5	61.5	85,265	3.728	2.36	Unsat	26.2	60.95	14.57	14.57	1.70	24.76	60.95	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
0.656	18,395	0.704	82.0	82.0	88,124	3.838	2.38	Unsat	28.2	66.80	17.39	17.39	1.70	29.66	66.80	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
0.820	19,371	0.844	102.5	102.5	82,968	4.369	2.42	Unsat	27.9	69.81	18.31	18.31	1.70	31.13	69.81	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
0.984	20,672	0.983	123.0	123.0	81,975	4.701	2.45	Unsat	28.8	73.55	19.82	19.82	1.70	33.70	73.55	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.148	23,088	1.057	143.5	143.5	83,537	4.592	2.44	Unsat	28.4	77.93	21.82	21.82	1.70	37.10	77.93	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.312	23,088	1.025	164.0	164.0	86,521	5.071	2.52	Unsat	31.1	72.81	19.18	19.18	1.70	32.61	72.81	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.476	18,812	0.905	184.5	184.5	59,280	4.887	2.55	Unsat	32.1	69.41	17.59	17.59	1.70	29.91	69.41	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.640	14,216	0.871	205.0	205.0	68,357	6.171	2.59	Unsat	33.3	60.18	13.44	13.44	1.70	22.84	60.18	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.804	10,907	0.805	225.5	225.5	48,309	7.458	2.75	Unsat	36.8	53.66	10.31	10.31	1.70	17.53	53.66	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
1.968	12,616	0.745	248.1	248.1	43,239	5.983	2.85	Unsat	35.3	57.02	11.92	11.92	1.70	20.27	57.02	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.133	15,464	0.784	266.6	266.6	47,717	5.114	2.56	Unsat	32.2	62.66	11.62	11.62	1.70	24.85	62.66	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.297	12,616	0.900	287.1	287.1	46,771	7.216	2.74	Unsat	36.8	57.35	10.87	10.87	1.70	20.27	57.35	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.461	11,503	0.941	307.6	307.6	73,785	8.291	2.57	Unsat	36.1	54.71	10.87	10.87	1.70	18.48	54.71	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.625	21,189	1.020	328.1	328.1	50,465	4.851	2.50	Unsat	35.5	75.26	20.03	20.03	1.70	34.05	75.26	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.789	30,250	0.949	348.6	348.6	70,034	3.165	2.37	Unsat	25.3	82.19	26.59	26.59	1.70	48.81	82.19	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
2.953	24,716	0.743	369.1	369.1	55,515	3.029	2.42	Unsat	28.0	81.24	23.36	23.36	1.70	39.71	81.24	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.117	17,085	0.865	389.6	389.6	52,125	5.133	2.61	Unsat	28.0	77.42	16.13	16.13	1.70	27.42	77.42	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.281	23,922	0.921	410.1	410.1	50,059	3.950	2.54	Unsat	31.5	86.42	22.23	22.23	1.70	37.80	86.42	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.445	25,042	0.948	430.6	430.6	52,017	3.818	2.51	Unsat	30.8	82.92	23.67	23.67	1.70	40.24	82.92	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.609	17,174	1.128	451.1	451.1	47,260	6.444	2.72	Unsat	37.7	79.84	16.23	16.23	1.70	27.60	79.84	1.00	0.293	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.773	13,847	1.276	471.6	471.6	56,872	8.514	2.79	Unsat	40.3	69.70	12.90	12.90	1.70	21.93	69.70	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
3.937	17,361	1.455	492.1	492.1	69,577	8.486	2.70	Unsat	36.9	83.99	16.44	16.44	1.70	27.94	83.99	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.101	51,168	1.952	512.6	512.6	87,766	3.854	2.33	Unsat	25.4	135.99	48.36	48.36	1.70	82.22	135.99	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.265	81,744	2.615	533.1	533.1	153,425	3.209	2.15	Unsat	20.5	185.40	77.26	77.26	1.62	126.09	185.40	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.429	94,875	3.026	553.6	553.6	174,802	3.199	2.12	Unsat	19.7	201.48	89.67	89.67	1.55	139.12	201.48	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.593	100,677	3.308	574.1	574.1	182,072	3.297	2.12	Unsat	18.7	207.99	104.34	104.34	1.48	154.00	207.99	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.757	110,396	3.551	615.1	615.1	195,302	3.095	2.08	Unsat	18.0	216.57	105.57	105.57	1.46	154.00	216.57	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
4.921	111,688	3.651	615.1	615.1	195,302	3.095	2.08	Unsat	18.0	216.57	105.57	105.57	1.46	154.00	216.57	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.085	121,029	4.398	656.6	656.6	192,027	3.502	2.13	Unsat	19.9	230.64	105.55	105.55	1.44	182.34	230.64	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.249	135,516	5.138	676.6	676.6	225,945	3.901	2.14	Unsat	20.3	248.85	128.09	128.09	1.36	186.26	248.85	1.00	0.292	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.413	145,263	6.238	697.1	697.1	240,228	3.994	2.12	Unsat	19.8	260.73	138.22	138.22	1.34	185.26	260.73	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.577	157,788	6.238	717.6	717.6	223,018	4.551	2.15	Unsat	21.5	285.46	132.22	132.22	1.34	173.95	285.46	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.741	137,788	6.238	738.3	738.3	239,680	4.263	2.15	Unsat	20.4	287.18	141.81	141.81	1.32	187.35	287.18	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
5.905	157,512	6.138	758.8	758.8	241,888	4.009	2.12	Unsat	19.8	302.24	146.19	146.19	1.31	190.31	302.24	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.070	145,023	4.508	779.3	779.3	225,942	3.054	2.03	Unsat	17.7	289.82	139.91	139.91	1.31	182.80	289.82	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.234	217,423	5.878	799.8	799.8	333,658	2.708	1.99	Unsat	15.0	337.05	205.50	205.50	1.29	285.65	337.05	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.398	238,881	5.318	820.3	820.3	361,900	2.231	1.81	Unsat	13.2	351.33	225.71	225.71	1.28	302.24	351.33	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.562	259,657	4.726	840.8	840.8	375,223	1.889	1.74	Unsat	11.9	348.67	163.27	163.27	1.26	280.92	348.67	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.726	274,152	4.460	861.3	861.3	405,504	1.264	1.58	Unsat	9.2	245.03	259.12	259.12	1.27	328.47	245.03	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
6.890	258,926	3.007	891.8	891.8	344,797	1.471	1.82	Unsat	8.8	305.58	222.98	222.98	1.26	280.92	305.58	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.054	172,239	2.551	902.3	902.3	249,381	1.481	1.76	Unsat	12.1	245.03	163.27	163.27	1.26	280.92	245.03	1.00	0.291	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.218	105,948	2.682	943.3	943.3	187,439	2.078	1.95	Unsat	18.5	216.23	124.21	124.21	1.29	180.63	216.23	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.382	111,419	2.721	922.8	922.8	187,439	2.519	2.07	Unsat	18.0	191.18	101.09	101.09	1.32	133.20	191.18	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.546	95,716	2.276	963.8	963.8	133,377	2.390	2.04	Unsat	17.9	175.93	90.47	90.47	1.33	120.37	175.93	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.710	89,154	1.751	984.3	984.3	124,259	1.953	2.09	Unsat	17.9	154.05	85.21	85.21	1.34	113.93	154.05	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
7.874	83,096	1.652	1004.8	1004.8	121,519	1.865	2.03	Unsat	16.8	146.89	85.21	85.21	1.33	112.08	146.89	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
8.038	89,294	1.480	1025.3	1025.3	112,990	1.755	2.04	Unsat	15.8	129.50	79.13	79.13	1.33	105.49	129.50	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
8.202	90,398	1.455	1045.8	1045.8	120,536	1.619	1.99	Unsat	15.8	129.50	85.44	85.44	1.31	112.81	129.50	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
8.366	102,472	1.594	1066.3	1066.3	135,732	1.554	1.95	Unsat	17.8	154.05	86.52	86.52	1.30	104.79	154.05	1.00	0.290	1,100	n.a.	n.a.	n.a.	0.00	0.00
8.530	85,189	1.306	1086.8	1086.8	111,638	1.897	2.07	Unsat	18.5	129.50	86.52	86.52	1.32	88.82	129.50	1.00							



CORNERSTONE
EARTH GROUP

OPT No.

TRC-1

PGA (A_{max}) 0.45

Total Settlement 1.16 (inches)

Depth (ft)	Qs (tsf)	f _s (tsf)	C _u (psf)	Insitu σ _v (psf)	Q _i	F (%)	Is	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q _u near Interf. (tsf)	Thin Layer Factor (K _u)	Interpreted Q _u	CN	Q _{uIN}	Q _{uINCL}	Stress Reduction Coeff. f _d	CSR	K _s for Sand	CRR _{60/20} o/c 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain Ex.	Settlement (inches)
11.155	68.667	1.733	1394.4	1394.4	79.140	2.550	2.26		Unsaturated	23.4			64.90	1.20	77.99	128.58	0.99	0.288	1.056	n.a.	n.a.	n.a.	0.00	0.00
11.319	82.232	1.978	1414.9	1414.9	94.233	2.426	2.19		Unsaturated	21.6			77.72	1.18	91.77	144.28	0.98	0.258	1.061	n.a.	n.a.	n.a.	0.00	0.00
11.483	69.237	2.199	1435.4	1435.4	76.633	3.209	2.34		Unsaturated	25.4			66.44	1.19	77.57	129.90	0.98	0.258	1.061	n.a.	n.a.	n.a.	0.00	0.00
11.647	67.039	2.114	1455.9	1455.9	75.551	3.183	2.35		Unsaturated	25.7			63.38	1.18	74.82	128.48	0.98	0.258	1.049	n.a.	n.a.	n.a.	0.00	0.00
11.811	67.012	1.809	1476.4	1476.4	74.992	2.730	2.30		Unsaturated	24.4			61.95	1.17	74.41	124.87	0.98	0.258	1.047	n.a.	n.a.	n.a.	0.00	0.00
11.975	65.547	2.036	1496.9	1496.9	72.819	3.145	2.35		Unsaturated	25.9			63.95	1.17	72.40	124.42	0.98	0.257	1.044	n.a.	n.a.	n.a.	0.00	0.00
12.139	66.991	2.355	1517.4	1517.4	72.799	3.911	2.40		Unsaturated	27.2			62.36	1.16	72.40	124.25	0.98	0.257	1.043	n.a.	n.a.	n.a.	0.00	0.00
12.303	68.388	2.351	1537.9	1537.9	72.751	3.983	2.39		Unsaturated	27.1			62.75	1.15	72.41	124.22	0.98	0.257	1.043	n.a.	n.a.	n.a.	0.00	0.00
12.467	62.427	1.778	1558.4	1558.4	67.869	2.894	2.35		Unsaturated	26.7			58.00	1.16	67.98	117.42	0.98	0.257	1.037	n.a.	n.a.	n.a.	0.00	0.00
12.631	62.020	1.891	1578.9	1578.9	66.969	3.088	2.37		Unsaturated	26.4			58.02	1.15	67.13	116.82	0.98	0.257	1.036	n.a.	n.a.	n.a.	0.00	0.00
12.795	58.439	1.835	1599.4	1599.4	62.664	3.184	2.40		Unsaturated	27.3			55.24	1.14	63.05	111.93	0.98	0.257	1.033	n.a.	n.a.	n.a.	0.00	0.00
12.959	62.861	1.820	1619.9	1619.9	67.032	2.933	2.36		Unsaturated	26.0			59.41	1.13	67.24	116.66	0.98	0.257	1.032	n.a.	n.a.	n.a.	0.00	0.00
13.123	61.125	1.750	1640.4	1640.4	64.737	2.902	2.35		Unsaturated	26.2			57.77	1.13	65.10	113.96	0.98	0.257	1.030	n.a.	n.a.	n.a.	0.00	0.00
13.287	56.958	1.730	1660.9	1660.9	63.080	2.925	2.37		Unsaturated	26.5			56.67	1.12	63.54	110.37	0.98	0.257	1.028	n.a.	n.a.	n.a.	0.00	0.00
13.451	59.986	1.814	1681.4	1681.4	62.712	2.729	2.35		Unsaturated	26.1			55.41	1.10	62.41	105.18	0.98	0.256	1.024	n.a.	n.a.	n.a.	0.00	0.00
13.615	59.524	1.817	1701.9	1701.9	61.837	2.756	2.36		Unsaturated	25.1			56.26	1.11	62.41	105.18	0.98	0.256	1.024	n.a.	n.a.	n.a.	0.00	0.00
13.780	60.829	1.701	1722.5	1722.5	60.517	2.945	2.39		Unsaturated	26.4			58.65	1.10	64.25	113.00	0.98	0.256	1.022	n.a.	n.a.	n.a.	0.00	0.00
13.944	62.047	1.798	1743.0	1743.0	63.709	2.939	2.37		Unsaturated	26.4			60.36	1.09	65.71	115.32	0.98	0.256	1.022	n.a.	n.a.	n.a.	0.00	0.00
14.108	63.865	2.029	1763.5	1763.5	66.191	3.477	2.41		Unsaturated	27.7			61.62	1.08	65.68	118.93	0.98	0.256	1.021	n.a.	n.a.	n.a.	0.00	0.00
14.272	65.194	2.236	1784.0	1784.0	68.191	3.477	2.41		Unsaturated	28.1			61.18	1.08	65.68	118.10	0.98	0.256	1.019	n.a.	n.a.	n.a.	0.00	0.00
14.436	64.733	2.300	1804.5	1804.5	65.332	3.603	2.43		Unsaturated	28.1			60.47	1.07	64.79	114.91	0.98	0.256	1.018	n.a.	n.a.	n.a.	0.00	0.00
14.600	63.974	2.370	1825.0	1825.0	64.181	3.758	2.45		Unsaturated	28.7			61.21	1.07	65.25	114.78	0.98	0.256	1.016	n.a.	n.a.	n.a.	0.00	0.00
14.764	64.760	2.067	1845.5	1845.5	64.808	3.238	2.40		Unsaturated	27.2			60.63	1.06	64.51	114.11	0.98	0.256	1.015	n.a.	n.a.	n.a.	0.00	0.00
14.928	64.353	2.169	1866.0	1866.0	63.833	3.404	2.42		Unsaturated	27.8			70.03	1.05	73.73	120.91	0.98	0.255	1.015	n.a.	n.a.	n.a.	0.00	0.00
15.092	74.093	1.984	1886.5	1886.5	73.225	2.712	2.30		Unsaturated	24.5			68.31	1.05	71.62	124.97	0.98	0.255	1.013	n.a.	n.a.	n.a.	0.00	0.00
15.256	72.276	1.768	1907.0	1907.0	71.011	2.607	2.29		Unsaturated	24.1			66.03	1.04	69.76	145.32	0.97	0.255	1.014	n.a.	n.a.	n.a.	0.00	0.00
15.420	101.603	1.429	1927.5	1927.5	99.695	1.420	2.01		Unsaturated	17.2			142.11	1.03	146.09	166.88	0.97	0.255	1.021	n.a.	n.a.	n.a.	0.00	0.00
15.584	150.356	2.468	1948.0	1948.0	147.155	1.666	1.94		Unsaturated	15.7			144.78	1.02	148.08	213.57	0.97	0.255	1.022	n.a.	n.a.	n.a.	0.00	0.00
15.748	153.178	4.466	1968.5	1968.5	149.142	2.934	2.03		Unsaturated	19.9			153.63	1.02	156.58	217.16	0.97	0.255	1.019	n.a.	n.a.	n.a.	0.00	0.00
15.912	162.538	3.672	1989.0	1989.0	157.487	2.273	2.03		Unsaturated	14.8			162.63	1.02	165.28	214.13	0.97	0.255	1.012	n.a.	n.a.	n.a.	0.00	0.00
16.076	172.091	2.653	2009.5	2009.5	166.908	1.551	1.88		Unsaturated	8.1			220.15	1.01	222.74	237.42	0.97	0.255	1.012	n.a.	n.a.	n.a.	0.00	0.00
16.240	232.914	1.780	2030.0	2030.0	225.781	0.887	1.57		Unsaturated	8.5			224.30	1.01	226.31	238.96	0.97	0.254	1.009	n.a.	n.a.	n.a.	0.00	0.00
16.404	237.309	1.824	2050.5	2050.5	225.870	0.887	1.54		Unsaturated	8.6			205.89	1.01	207.25	237.42	0.97	0.254	1.008	n.a.	n.a.	n.a.	0.00	0.00
16.568	217.830	1.357	2071.0	2071.0	207.124	0.826	1.54		Unsaturated	8.7			217.97	1.00	218.71	238.96	0.97	0.254	1.001	n.a.	n.a.	n.a.	0.00	0.00
16.732	240.608	1.563	2091.5	2091.5	218.245	0.881	1.55		Unsaturated	9.9			236.25	1.00	238.37	258.54	0.97	0.254	0.998	n.a.	n.a.	n.a.	0.00	0.00
16.896	248.952	2.263	2112.0	2112.0	218.474	0.949	1.52		Unsaturated	12.5			237.43	1.00	237.87	323.57	0.97	0.254	0.995	n.a.	n.a.	n.a.	0.00	0.00
17.060	282.233	4.828	2132.5	2132.5	270.372	1.681	1.78		Unsaturated	11.0			333.05	1.00	331.53	374.02	0.97	0.254	0.985	n.a.	n.a.	n.a.	0.00	0.00
17.224	352.369	5.333	2153.0	2153.0	329.169	1.518	1.69		Unsaturated	7.3			487.01	0.99	483.58	490.36	0.97	0.254	0.982	n.a.	n.a.	n.a.	0.00	0.00
17.388	515.259	5.036	2173.5	2173.5	479.514	0.979	1.45		Unsaturated	9.3			392.50	0.99	389.17	414.09	0.97	0.254	0.980	n.a.	n.a.	n.a.	0.00	0.00
17.552	415.691	6.178	2194.0	2194.0	384.837	1.249	1.59		Unsaturated	7.6			308.64	0.99	304.95	311.55	0.97	0.253	0.986	n.a.	n.a.	n.a.	0.00	0.00
17.717	326.541	2.395	2214.6	2214.6	300.666	0.735	1.47		Unsaturated	7.4			280.48	0.99	276.46	281.05	0.97	0.253	0.984	n.a.	n.a.	n.a.	0.00	0.00
17.881	296.752	1.842	2235.1	2235.1	271.879	0.623	1.45		Unsaturated	6.8			277.28	0.98	272.84	274.89	0.97	0.253	0.981	n.a.	n.a.	n.a.	0.00	0.00
18.045	293.360	1.537	2255.6	2255.6	287.526	0.528	1.40		Unsaturated	6.5			304.00	0.98	298.30	299.85	0.97	0.253	0.978	n.a.	n.a.	n.a.	0.00	0.00
18.209	321.630	1.726	2276.1	2276.1	292.073	0.539	1.38		Unsaturated	6.3			347.57	0.98	340.24	341.62	0.97	0.253	0.975	n.a.	n.a.	n.a.	0.00	0.00
18.373	367.833	2.150	2296.6	2296.6	332.675	0.866	1.37		Unsaturated	8.4			383.00	0.98	373.94	385.26	0.97	0.253	0.973	n.a.	n.a.	n.a.	0.00	0.00
18.537	405.219	4.106	2317.1	2317.1	364.959	1.016	1.53		Unsaturated	7.7			445.57	0.97	434.02	440.73	0.97	0.253	0.970	n.a.	n.a.	n.a.	0.00	0.00
18.701	471.417	4.295	2337.6	2337.6	422.875	0.913	1.45		Unsaturated	7.4			479.19	0.97	465.69	475.72	0.97	0.253	0.967	n.a.	n.a.	n.a.	0.00	0.00
18.865	506.984	5.512	2358.1	2358.1	462.868	1.030	1.46		Unsaturated	6.9			523.68	0.97	507.76	512.07	0.97	0.252	0.965	n.a.	n.a.	n.a.	0.00	0.00
19.029	584.055	5.044	2378.6	2378.6	492.866	0.912	1.41		Unsaturated	6.3			571.28	0.97	552.66	554.70	0.97	0.252	0.960	n.a.	n.a.	n.a.	0.00	0.00
19.193	604.410	6.138	2399.1	2399.1	535.445	0.851	1.37		Unsaturated	7.0			591.97	0.97	571.39	576.71	0.96	0.252	0.957	n.a.	n.a.	n.a.	0.00	0.00
19.357	626.304	6.238	2419.6	2419.6	562.514	0.998	1.42		Unsaturated	7.6			614.54	0.96	617.86	628.94	0.96	0.252	0.955	n.a.	n.a.	n.a.	0.00	0.00
19.521	678.746	7.981	2440.1	2440.1	596.337	1.178	1.47		Unsaturated	8.1			646.56	0.96	621.33	639.65	0.96	0.252	0.952	n.a.	n.a.	n.a.	0.00	0.00
19.685	612.033	5.865	2461.1	2461.1	533.140	0.864	1.51		Unsaturated	6.9			578.48	0.96	554.69	559.47	0.96	0.252	0.952	n.a.	n.a.	n.a.		



CORNERSTONE
EARTH GROUP

CPT No. TRC-1

PGA (A_{max}) 0.45

Total Settlement: 1.16 (inches)

Depth (ft)	Q _c (tsf)	f _s (tsf)	σ _v (tsf)	σ _h (tsf)	Institu.	Q	F (%)	I _c	Layer	Flag	Soil Type	Plasticity	Q _h near interface (soil layer)	Thin Layer Factor (F _l)	Interpreted q _h	C _n	q _h N	q _h Q _h	Stress Reduction Coeff. (r _s)	CSR	K _s for Sand	CRR _{7.5} σ _v = 1 tsf	Factor of Safety (CRR/CSR)	Vertical Strain (inches)	Settlement (inches)	
22.146	184.676	1.130	2768.3	2768.3	2768.3	151.465	0.617	1.84	1.84		Sand		10.1		174.55	0.91	158.37	176.67	0.96	0.284	0.945	0.486	0.713	1.40	0.00	0.00
22.310	205.133	1.076	2768.3	2768.3	2768.3	167.742	0.628	1.56	1.56		Sand		8.9		193.89	0.91	176.20	187.57	0.96	0.259	0.937	0.686	0.718	1.96	0.00	0.00
22.474	243.278	0.826	2809.3	2809.3	2809.3	196.411	0.342	1.39	1.39		Sand		6.8		229.84	0.91	210.36	211.90	0.96	0.296	0.915	2.000	1.646	5.58	0.00	0.00
22.638	258.719	1.149	2809.3	2809.3	2809.3	211.720	0.445	1.44	1.44		Sand		7.2		245.48	0.92	225.43	228.73	0.96	0.297	0.913	2.000	1.642	5.53	0.00	0.00
22.802	260.533	1.089	2809.3	2809.3	2809.3	211.014	0.420	1.42	1.42		Sand		7.0		246.25	0.92	225.62	228.27	0.96	0.298	0.911	2.000	1.638	5.50	0.00	0.00
22.966	243.522	1.176	2809.3	2809.3	2809.3	198.447	0.485	1.49	1.49		Sand		7.8		230.17	0.91	209.42	219.42	0.95	0.299	0.908	2.000	1.634	5.47	0.00	0.00
23.130	245.068	1.366	2891.3	2891.3	2891.3	198.991	0.557	1.52	1.52		Sand		8.3		231.63	0.91	210.63	219.42	0.95	0.299	0.906	2.000	1.630	5.45	0.00	0.00
23.294	245.068	1.681	2911.8	2911.8	2911.8	198.991	0.650	1.59	1.59		Sand		9.2		231.78	0.91	210.84	225.03	0.95	0.300	0.904	2.000	1.627	5.42	0.00	0.00
23.458	285.285	1.705	2922.3	2922.3	2922.3	207.008	0.661	1.55	1.55		Sand		8.8		245.07	0.91	223.33	235.78	0.95	0.301	0.902	2.000	1.623	5.39	0.00	0.00
23.622	284.711	2.474	2922.3	2922.3	2922.3	210.621	0.940	1.95	1.95		Sand		10.4		250.20	0.92	229.14	255.16	0.95	0.302	0.900	2.000	1.618	5.36	0.00	0.00
23.786	305.433	3.451	2973.3	2973.3	2973.3	217.196	1.260	1.67	1.67		Sand		10.7		288.69	0.91	263.81	337.59	0.95	0.304	0.898	2.000	1.612	5.31	0.00	0.00
24.114	488.762	1.591	3014.3	3014.3	3014.3	370.521	0.419	1.23	1.23		Sand		4.8		331.13	0.91	302.16	404.47	0.95	0.304	0.894	2.000	1.615	5.26	0.00	0.00
24.278	488.482	3.053	3034.8	3034.8	3034.8	352.772	0.690	1.40	1.40		Sand		6.8		424.51	0.91	385.44	488.38	0.95	0.305	0.892	2.000	1.604	5.26	0.00	0.00
24.442	417.284	7.297	3055.3	3055.3	3055.3	327.614	1.755	1.75	1.75		Sand		12.0		394.39	0.91	357.96	481.14	0.95	0.306	0.890	2.000	1.601	5.23	0.00	0.00
24.606	380.954	6.451	3075.8	3075.8	3075.8	297.457	1.700	1.75	1.75		Sand		12.2		350.08	0.91	325.25	451.70	0.95	0.307	0.888	2.000	1.597	5.21	0.00	0.00
24.770	289.236	5.158	3096.3	3096.3	3096.3	224.789	1.793	1.85	1.85		Sand		13.9		273.38	0.90	247.26	305.72	0.95	0.307	0.886	2.000	1.593	5.18	0.00	0.00
24.934	177.975	3.611	3116.8	3116.8	3116.8	137.392	2.047	2.03	2.03		Sand		24.0		168.22	0.88	148.63	207.46	0.95	0.308	0.889	1.661	1.320	4.28	0.00	0.00
25.098	124.284	3.974	3137.3	3137.3	3137.3	95.257	3.238	2.28	2.28		Sand		21.7		117.47	0.86	100.80	159.10	0.95	0.309	0.932	0.320	0.268	1.17	0.00	0.00
25.262	323.122	4.056	3178.4	3178.4	3178.4	247.868	1.261	1.70	1.70		Sand		11.2		305.41	0.90	274.33	312.61	0.95	0.310	0.878	2.000	1.578	5.09	0.00	0.00
25.426	323.122	3.983	3198.9	3198.9	3198.9	245.328	1.248	1.70	1.70		Sand		11.2		303.15	0.90	271.84	309.74	0.95	0.311	0.878	2.000	1.576	5.08	0.00	0.00
25.591	516.691	4.209	3219.4	3219.4	3219.4	396.197	0.814	1.43	1.43		Sand		7.1		480.22	0.90	436.84	443.66	0.95	0.312	0.874	2.000	1.572	5.04	0.00	0.00
25.755	479.203	2.884	3239.9	3239.9	3239.9	364.802	0.804	1.35	1.35		Sand		6.1		452.33	0.89	404.78	405.88	0.95	0.313	0.872	2.000	1.569	5.02	0.00	0.00
25.919	453.511	7.562	3260.4	3260.4	3260.4	344.082	1.878	1.72	1.72		Sand		11.9		428.65	0.89	382.44	435.08	0.95	0.314	0.870	2.000	1.566	5.00	0.00	0.00
26.083	335.629	4.928	3280.9	3280.9	3280.9	253.518	1.475	1.75	1.75		Sand		12.0		317.23	0.89	282.47	330.48	0.94	0.315	0.868	2.000	1.562	4.97	0.00	0.00
26.247	341.951	3.670	3301.4	3301.4	3301.4	257.506	1.078	1.64	1.64		Sand		10.1		323.21	0.89	287.42	315.78	0.94	0.315	0.867	2.000	1.559	4.95	0.00	0.00
26.411	502.535	2.513	3321.9	3321.9	3321.9	377.841	0.502	1.28	1.28		Sand		5.3		474.59	0.89	421.70	421.89	0.94	0.316	0.863	2.000	1.556	4.93	0.00	0.00
26.575	502.535	4.441	3342.4	3342.4	3342.4	430.466	0.776	1.39	1.39		Sand		6.8		542.58	0.89	480.93	485.66	0.94	0.317	0.861	2.000	1.552	4.89	0.00	0.00
26.739	548.195	5.676	3362.9	3362.9	3362.9	406.746	1.020	1.50	1.50		Sand		8.0		518.14	0.88	458.53	471.17	0.94	0.317	0.861	2.000	1.549	4.88	0.00	0.00
26.903	548.195	5.676	3383.4	3383.4	3383.4	448.773	0.986	1.47	1.47		Sand		7.8		566.81	0.88	491.18	494.23	0.94	0.318	0.857	2.000	1.546	4.87	0.00	0.00
27.067	592.108	4.984	3403.9	3403.9	3403.9	437.748	0.797	1.39	1.39		Sand		6.8		509.91	0.88	459.10	457.41	0.94	0.319	0.856	2.000	1.539	4.83	0.00	0.00
27.231	539.487	4.904	3424.4	3424.4	3424.4	398.570	0.912	1.47	1.47		Sand		7.6		459.37	0.88	403.94	410.43	0.94	0.320	0.852	2.000	1.533	4.79	0.00	0.00
27.395	485.013	3.923	3444.9	3444.9	3444.9	358.790	0.810	1.45	1.45		Sand		7.4		436.76	0.88	383.46	393.31	0.94	0.321	0.850	2.000	1.530	4.77	0.00	0.00
27.559	485.013	3.923	3465.4	3465.4	3465.4	340.006	0.864	1.49	1.49		Sand		7.9		436.76	0.88	383.46	393.31	0.94	0.322	0.848	2.000	1.528	4.75	0.00	0.00
27.723	462.084	3.978	3485.9	3485.9	3485.9	257.755	1.167	1.67	1.67		Sand		10.8		331.92	0.88	290.97	324.32	0.94	0.323	0.847	2.000	1.526	4.73	0.00	0.00
27.887	351.175	4.079	3506.4	3506.4	3506.4	257.755	0.943	1.60	1.60		Sand		9.4		333.46	0.88	291.85	314.20	0.94	0.324	0.846	2.000	1.523	4.71	0.00	0.00
28.051	352.803	3.309	3526.9	3526.9	3526.9	264.210	1.215	1.67	1.67		Sand		9.7		342.77	0.87	299.55	334.55	0.94	0.325	0.845	2.000	1.520	4.71	0.00	0.00
28.215	352.803	4.385	3547.4	3547.4	3547.4	254.407	1.015	1.62	1.62		Sand		9.9		331.08	0.87	288.89	314.55	0.94	0.326	0.843	2.000	1.517	4.69	0.00	0.00
28.379	350.280	3.537	3567.9	3567.9	3567.9	222.999	1.031	1.57	1.57		Sand		10.8		291.25	0.87	253.75	283.81	0.93	0.327	0.842	2.000	1.514	4.68	0.00	0.00
28.543	308.146	3.159	3588.4	3588.4	3588.4	199.138	1.827	1.89	1.89		Sand		14.8		261.02	0.87	227.07	286.44	0.94	0.328	0.840	2.000	1.511	4.68	0.00	0.00
28.707	276.160	5.013	3608.9	3608.9	3608.9	208.480	1.312	1.76	1.76		Sand		12.3		273.97	0.87	227.98	286.44	0.94	0.329	0.838	2.000	1.508	4.64	0.00	0.00
28.871	289.861	3.779	3629.4	3629.4	3629.4	212.396	1.593	1.82	1.82		Sand		13.4		279.97	0.87	242.74	297.45	0.94	0.330	0.836	2.000	1.506	4.62	0.00	0.00
29.035	415.338	6.051	3649.9	3649.9	3649.9	297.593	1.466	1.71	1.71		Sand		11.2		362.57	0.87	339.98	365.99	0.94	0.331	0.835	2.000	1.502	4.61	0.00	0.00
29.199	405.874	2.917	3670.5	3670.5	3670.5	250.674	0.720	1.47	1.47		Sand		7.7		384.57	0.86	404.89	412.41	0.93	0.332	0.833	2.000	1.499	4.59	0.00	0.00
29.364	405.874	4.089	3691.0	3691.0	3691.0	353.716	0.827	1.46	1.46		Sand		7.5		468.91	0.86	404.89	412.41	0.93	0.333	0.832	2.000	1.496	4.57	0.00	0.00
29.528	496.105	4.089	3711.5	3711.5	3711.5	381.561	0.984	1.33	1.33		Sand		5.8		507.09	0.86	437.80	437.89	0.93	0.334	0.830	2.000	1.493	4.55	0.00	0.00
29.692	535.502	3.123	3732.0	3732.0	3732.0	331.566	0.876	1.38	1.38		Sand		6.4		508.50	0.86	437.80	437.89	0.93	0.335	0.828	2.000	1.490	4.54	0.00	0.00
29.856	537.994	3.624	3752.4	3752.4	3752.4	332.647	0.939	1.52	1.52		Sand															

Depth (ft)	Q _s (tsf)	f _s (tsf)	C _v (tsf)	Inst. (tsf)	Q (tsf)	F (%)	I _c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q _{all near} Intermix (tsf/layer)	Thin Layer Factor (K _u)	Interpreted Q _{max}	C _N	Q _{IN}	Q _{INCS}	Stress Reduction Coeff. f _d	C _{SR}	K _o for Sand	CRR _{7.5} 0.16 - 1.0m	CRR	Factor of Safety (CRR/C _{SR})	Vertical Strain E _y	Settlement (inches)
33.136	721.016	6.904	4126.1	3930.6	488.587	0.919	1.41		Sand	6.9			881.49	0.65	578.77	583.57	0.92	0.338	0.814	2.000	1.685	4.34	0.00	0.00
33.301	611.789	5.919	4126.1	3940.1	422.332	0.971	1.47		Sand	7.7			581.25	0.85	480.78	500.71	0.92	0.338	0.813	2.000	1.683	4.34	0.00	0.00
33.466	565.982	7.614	4185.5	3949.6	383.201	1.375	1.62		Sand	9.8			526.50	0.85	445.73	481.63	0.92	0.339	0.813	2.000	1.682	4.32	0.00	0.00
33.629	489.187	5.474	4185.5	3959.0	336.582	1.124	1.58		Sand	9.2			462.37	0.85	391.93	416.26	0.92	0.339	0.812	2.000	1.681	4.31	0.00	0.00
33.793	445.182	4.727	4205.2	3968.5	305.803	1.067	1.59		Sand	9.3			420.78	0.85	356.45	380.28	0.92	0.340	0.811	2.000	1.680	4.30	0.00	0.00
33.957	429.527	4.594	4224.8	3977.9	294.641	1.086	1.61		Sand	9.7			405.98	0.85	343.70	370.41	0.92	0.340	0.810	2.000	1.679	4.29	0.00	0.00
34.121	404.866	4.573	4244.5	3986.8	277.305	1.135	1.64		Sand	10.1			382.67	0.85	323.76	354.28	0.92	0.340	0.810	2.000	1.678	4.28	0.00	0.00
34.285	401.178	4.370	4264.4	3996.8	260.820	0.973	1.56		Sand	8.8			426.44	0.85	390.57	378.87	0.92	0.341	0.809	2.000	1.677	4.27	0.00	0.00
34.449	525.650	3.894	4283.9	4006.3	359.605	0.744	1.42		Sand	7.0			496.83	0.85	419.83	424.18	0.92	0.341	0.809	2.000	1.676	4.26	0.00	0.00
34.613	533.735	5.362	4303.6	4016.7	364.722	1.009	1.52		Sand	8.4			504.48	0.84	426.02	414.59	0.92	0.342	0.808	2.000	1.675	4.25	0.00	0.00
34.777	475.951	5.949	4323.2	4025.2	325.373	1.263	1.63		Sand	10.0			450.80	0.84	390.48	400.88	0.92	0.342	0.807	2.000	1.674	4.24	0.00	0.00
35.105	457.553	4.102	4342.9	4034.6	333.620	0.864	1.49		Sand	8.0			462.73	0.84	380.28	395.56	0.92	0.343	0.806	2.000	1.673	4.24	0.00	0.00
35.269	383.813	3.828	4362.6	4044.0	311.337	0.901	1.53		Sand	8.4			432.47	0.84	354.54	378.77	0.92	0.343	0.805	2.000	1.672	4.23	0.00	0.00
35.433	391.708	4.589	4382.3	4053.3	260.610	1.003	1.61		Sand	9.7			370.23	0.84	311.69	345.00	0.91	0.344	0.804	2.000	1.671	4.21	0.00	0.00
35.597	348.997	4.131	4402.0	4062.9	265.685	1.178	1.66		Sand	10.5			327.97	0.84	275.95	314.00	0.91	0.344	0.804	2.000	1.670	4.20	0.00	0.00
35.761	368.945	3.149	4421.6	4072.4	234.908	1.188	1.70		Sand	11.1			348.72	0.84	283.22	311.48	0.91	0.344	0.803	2.000	1.669	4.19	0.00	0.00
35.925	363.085	3.579	4441.3	4081.8	245.585	0.858	1.58		Sand	9.1			343.18	0.84	288.39	314.50	0.91	0.345	0.802	2.000	1.668	4.18	0.00	0.00
36.089	408.122	4.535	4460.7	4100.7	275.572	1.117	1.63		Sand	9.9			385.75	0.84	332.56	355.81	0.91	0.345	0.802	2.000	1.667	4.18	0.00	0.00
36.253	419.137	4.303	4500.4	4110.2	282.722	1.032	1.60		Sand	9.5			396.16	0.84	342.08	362.64	0.91	0.346	0.801	2.000	1.666	4.17	0.00	0.00
36.417	435.050	3.639	4520.0	4119.6	295.880	0.879	1.53		Sand	8.5			414.38	0.84	346.08	365.81	0.91	0.346	0.800	2.000	1.665	4.15	0.00	0.00
36.581	432.674	4.032	4539.7	4129.1	291.221	0.937	1.56		Sand	8.9			408.95	0.84	342.08	365.81	0.91	0.346	0.799	2.000	1.664	4.15	0.00	0.00
36.745	398.979	4.565	4559.4	4138.5	268.109	1.156	1.65		Sand	10.3			377.11	0.84	315.94	345.71	0.91	0.347	0.798	2.000	1.663	4.14	0.00	0.00
36.909	411.404	5.084	4579.1	4148.0	276.185	1.243	1.67		Sand	10.6			398.85	0.84	335.45	363.39	0.91	0.347	0.797	2.000	1.662	4.14	0.00	0.00
37.073	424.129	4.267	4598.8	4157.4	282.222	1.012	1.59		Sand	9.4			400.88	0.84	335.45	363.39	0.91	0.347	0.797	2.000	1.661	4.13	0.00	0.00
37.238	381.627	6.066	4618.8	4166.9	252.222	1.558	1.72		Sand	12.2			370.16	0.84	299.56	362.97	0.91	0.348	0.797	2.000	1.660	4.12	0.00	0.00
37.402	393.264	4.277	4638.2	4176.4	236.109	1.219	1.71		Sand	11.2			333.90	0.84	279.07	318.22	0.91	0.348	0.796	2.000	1.659	4.11	0.00	0.00
37.566	389.809	3.547	4657.9	4185.8	260.385	0.915	1.58		Sand	9.3			368.44	0.84	304.74	329.72	0.91	0.348	0.795	2.000	1.658	4.11	0.00	0.00
37.730	357.578	3.454	4677.6	4195.2	238.944	0.972	1.63		Sand	10.0			337.98	0.83	282.14	308.11	0.91	0.349	0.794	2.000	1.657	4.10	0.00	0.00
37.894	345.288	3.686	4697.3	4204.7	229.944	1.075	1.68		Sand	10.8			326.36	0.83	287.71	329.95	0.91	0.349	0.793	2.000	1.656	4.09	0.00	0.00
38.058	385.086	4.253	4717.0	4214.1	242.926	1.173	1.68		Sand	10.9			366.70	0.83	304.74	329.95	0.91	0.350	0.793	2.000	1.655	4.08	0.00	0.00
38.222	395.966	3.819	4736.6	4223.6	257.296	0.993	1.61		Sand	9.7			381.72	0.83	301.25	325.65	0.90	0.350	0.792	2.000	1.654	4.07	0.00	0.00
38.386	382.701	3.713	4756.3	4233.0	254.155	0.978	1.55		Sand	8.7			397.83	0.83	331.12	325.65	0.90	0.350	0.791	2.000	1.653	4.06	0.00	0.00
38.550	420.901	3.533	4776.0	4242.0	279.364	0.868	1.51		Sand	9.2			453.34	0.83	337.11	382.53	0.90	0.351	0.790	2.000	1.652	4.05	0.00	0.00
38.714	479.637	3.329	4795.7	4251.9	318.211	0.712	1.44		Sand	7.8			423.03	0.83	331.69	358.95	0.90	0.351	0.789	2.000	1.651	4.05	0.00	0.00
38.878	447.569	3.329	4815.4	4261.4	296.463	0.746	1.46		Sand	7.3			362.36	0.83	301.08	308.25	0.90	0.351	0.788	2.000	1.650	4.04	0.00	0.00
39.042	383.379	2.523	4835.0	4270.8	253.453	0.692	1.49		Sand	7.8			374.75	0.83	311.19	326.72	0.90	0.351	0.788	2.000	1.649	4.04	0.00	0.00
39.206	398.483	3.271	4854.7	4280.3	261.875	0.830	1.55		Sand	8.8			355.38	0.83	284.94	307.83	0.90	0.352	0.787	2.000	1.648	4.03	0.00	0.00
39.370	375.989	2.801	4874.4	4289.7	247.982	0.750	1.53		Sand	8.5			289.23	0.83	239.89	270.04	0.90	0.352	0.787	2.000	1.647	4.02	0.00	0.00
39.534	305.003	2.919	4894.1	4299.2	201.269	0.962	1.68		Sand	10.7			240.81	0.81	185.24	227.16	0.90	0.352	0.787	2.000	1.646	4.01	0.00	0.00
39.698	254.781	2.310	4913.8	4308.6	167.133	0.915	1.72		Sand	11.4			216.58	0.80	173.35	213.41	0.90	0.353	0.786	2.000	1.645	4.01	0.00	0.00
39.862	225.143	2.434	4933.4	4318.1	149.380	1.074	1.80		Sand	12.9			220.00	0.80	176.17	214.96	0.90	0.353	0.785	2.000	1.644	4.00	0.00	0.00
40.026	198.757	1.704	4953.1	4327.5	129.727	0.868	1.78		Sand	12.6			220.00	0.80	176.17	214.96	0.90	0.353	0.785	2.000	1.643	4.00	0.00	0.00
40.190	158.180	1.954	4972.8	4336.9	101.476	1.271	1.97		Sand	16.4			114.83	0.73	84.27	133.80	0.90	0.353	0.785	2.000	1.642	4.00	0.00	0.00
40.354	121.558	2.256	4992.5	4346.4	78.546	1.854	2.17		Sand	21.1			118.45	0.74	85.68	137.29	0.90	0.354	0.784	2.000	1.641	4.00	0.00	0.00
40.518	104.940	2.997	5031.8	4365.3	67.401	2.929	2.35		Sand	22.2			99.19	0.72	71.47	122.21	0.90	0.354	0.784	2.000	1.640	4.00	0.00	0.00
40.682	78.190	2.546	5051.5	4374.7	50.397	3.321	2.48		Sand	25.9			74.85	0.69	51.88	98.27	0.90	0.354	0.784	2.000	1.639	4.00	0.00	0.00
40.846	70.322	1.872	5071.3	4384.2	44.511	2.762	2.47		Sand	29.2			66.47	0.69	49.27	92.82	0.89	0.355	0.783	2.000	1.638	4.00	0.00	0.00
41.011	76.911	1.485	5091.0	4393.7	44.123	2.024	2.35		Sand	25.8			71.75	0.69	49.27	92.82	0.89	0.355	0.783	2.000	1.637	4.00	0.00	0.00
41.175	80.658	1.255	5110.7	4403.1	51.175	1.607	2.27		Sand	23.5			81.42	0.69	55.48	100.23	0.89	0.355	0.783	2.000	1.636	4.00	0.00	0.00
41.339	86.139	1.390	5130.4	4412.6	54.701	1.663	2.25		Sand	23.1			81.42	0.69	55.48	100.23	0.89	0.355	0.783	2.000	1.635	4.00	0.00	0.00
41.503	79.085	1.364	5150.0	4422.0	50.024	1.763	2.30		Sand	23.1			70.82	0.68	48.15	91.33								



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CPT No.

TRC-1

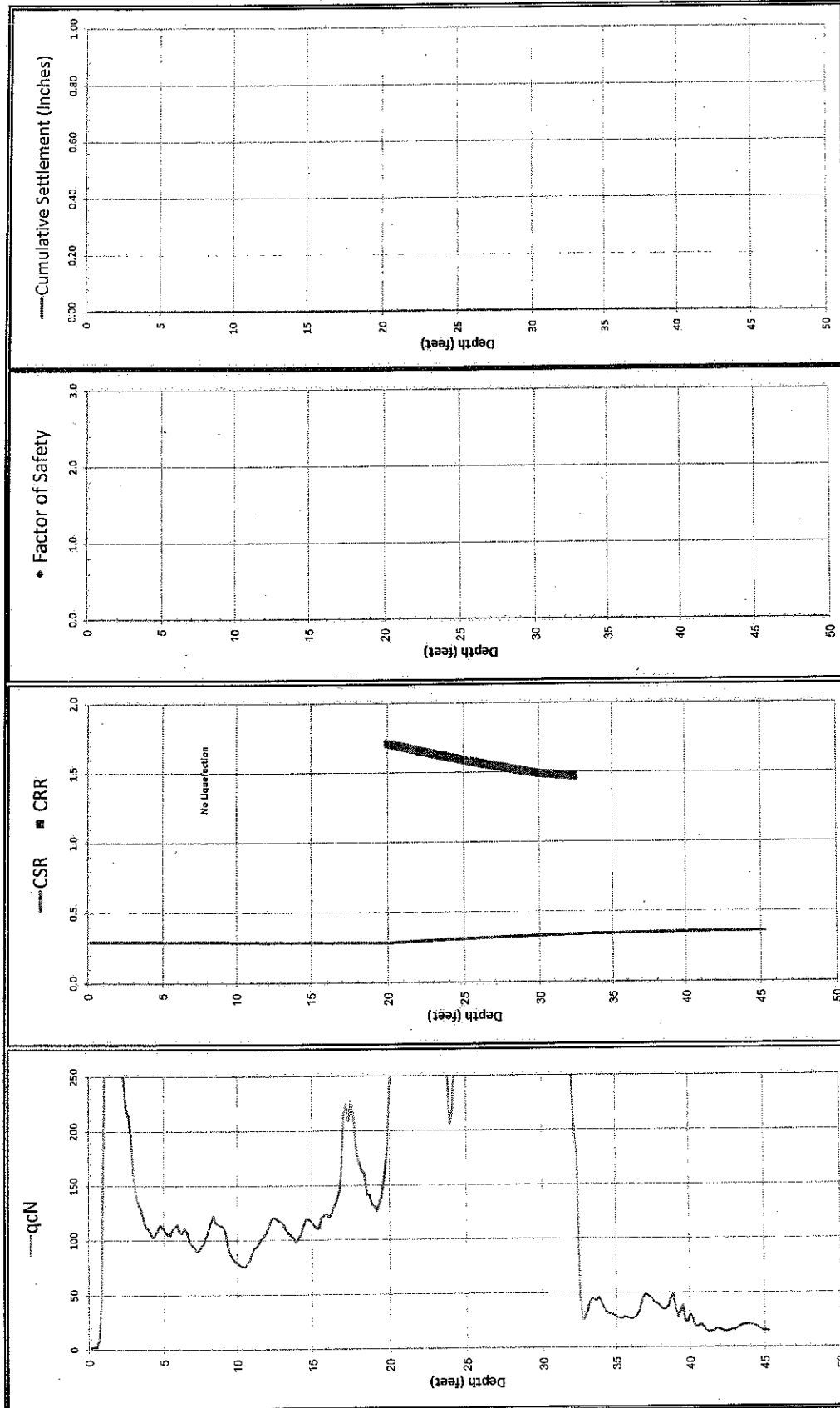
PGA (A_{max})

0.45

Total Settlement:

1.16 (Inches)

Depth (ft)	q_c (tsf)	f_c (tsf)	σ'_{vc} (tsf)	Insitu σ'_{vc} (tsf)	Q	F (%)	f_c	Layer "Plastic" $PI > 7$	Flag Soil Type	Fines (%)	q_{cl} near interfaces (soil layer)	Thin Layer Factor (K_{lf})	Interpreted q_{cl}	C_{ln}	$q_{p,n}$	$q_{p,cs}$	Stress Reduction Coeff. (α)	CSR	K_f for Sand	CRW-7.5 $(\sigma'_{vc} = 1 \text{ tsf})$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ϵ_v	Settlement (Inches)
44.127	311.918	2.155	5445.2	4563.7	198.997	0.997	1.58		Sand	9.2			294.82	0.82	240.71	257.28	0.88	0.359	0.769	2.000	1.384	3.86	0.00	0.00
44.291	385.589	3.784	5464.9	4573.2	246.887	0.986	1.62		Sand	9.9			365.49	0.82	289.25	324.38	0.88	0.359	0.769	2.000	1.383	3.85	0.00	0.00
44.455	529.638	4.693	5464.6	4582.6	338.408	0.991	1.50		Sand	8.0			500.60	0.82	408.28	420.09	0.88	0.359	0.768	2.000	1.382	3.85	0.00	0.00
44.619	481.916	4.943	5504.3	4592.1	307.435	1.032	1.58		Sand	9.1			455.50	0.82	371.29	393.59	0.88	0.359	0.768	2.000	1.381	3.84	0.00	0.00
44.783	427.981	3.370	5524.0	4601.5	272.543	0.783	1.52		Sand	8.4			404.52	0.81	329.66	342.21	0.88	0.360	0.767	2.000	1.380	3.84	0.00	0.00
44.948	301.228	2.607	5543.6	4611.0	191.097	0.873	1.65		Sand	10.5			284.71	0.81	231.83	259.14	0.88	0.360	0.768	2.000	1.379	3.83	0.00	0.00
45.112	180.851	2.072	5563.4	4620.5	113.899	1.669	2.02		Sand	17.4			170.54	0.76	129.79	183.21	0.88	0.360	0.629	0.593	0.442	1.23	0.00	0.01



Liquefaction Analysis Summary		Project Number	157-7-1
Creekside Way Campbell, California		Figure Number	Figure D-2
		8/27/2012	CPT No. TRC-2



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OPT No. TRC-2

PGA (A_{max}) 0.45

Total Settlement: 0.00 (Inches)

Depth (ft)	q _t (tsf)	f _c (tsf)	In situ σ _v (psf)	Q	E (%)	γ _{ic}	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Get near interfaces (cont layer)	Thin Layer Factor (K _u)	Interpreted q _{tn}	C _u	q _{tn}	q _{tn} -ics	Stress Reduction Coeff. (a)	CSR	K _r for Sand	CRRA/7.5 σ _v * 1/σ _{vm}	Factor of Safety (CRRC/CSR)	Vertical Strain Ev	Settlement (Inches)
0.164	2.000	0.087	20.5	48,300	4.372	2.58		Unsaturated	32.9			1.89	1.70	3.21	33.78	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.328	2.360	0.088	41.0	34,958	3.761	2.63		Unsaturated	34.7			2.23	1.70	3.79	34.80	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.492	2.089	0.215	61.5	66,935	10.446	2.78		Unsaturated	39.9			1.97	1.70	3.36	34.63	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.656	10.283	0.288	82.0	49,178	2.812	2.44		Unsaturated	28.4			9.72	1.70	16.52	50.57	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.820	44.365	1.495	102.5	190,390	3.372	2.11		Unsaturated	19.6			41.95	1.70	71.32	114.82	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.984	204.264	2.950	123.0	800,536	1.249	1.43		Unsaturated	7.1			193.07	1.70	328.21	332.34	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.148	395.072	3.163	143.5	143.5	0.801	1.17		Unsaturated	4.2			373.41	1.70	634.80	634.81	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.312	597.437	3.537	164.0	2028.088	0.982	1.01		Unsaturated	2.8			564.69	1.70	949.89	949.90	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.476	520.928	7.472	184.5	184.5	1.435	1.40		Unsaturated	6.7			492.37	1.70	837.03	842.29	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.640	445.317	7.156	205.0	1351.982	1.907	1.47		Unsaturated	7.8			420.90	1.70	715.54	728.11	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.804	334.544	7.078	225.5	968.291	2.116	1.52		Unsaturated	10.4			316.20	1.70	537.55	579.01	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.968	342.466	7.851	246.1	946.758	2.293	1.56		Unsaturated	12.1			323.69	1.70	560.28	603.03	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.133	285.941	8.080	266.6	786.049	2.737	1.75		Unsaturated	13.4			279.15	1.70	474.56	548.30	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.297	233.104	7.935	287.1	664.090	3.066	1.83		Unsaturated	15.1			244.76	1.70	414.57	493.06	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.461	205.376	6.071	308.1	577.463	3.368	1.89		Unsaturated	16.8			220.33	1.66	366.46	454.51	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.625	170.480	5.944	369.1	477.830	3.491	1.97		Unsaturated	14.2			194.12	1.61	312.38	386.75	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.789	152.418	5.920	389.6	335.297	3.889	2.04		Unsaturated	16.4			161.12	1.59	265.39	334.05	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.953	141.783	5.427	410.1	303.955	3.833	2.06		Unsaturated	18.2			144.06	1.56	225.13	304.36	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.117	126.092	4.817	430.6	285.072	3.626	2.05		Unsaturated	18.1			128.51	1.52	196.04	268.51	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.281	119.346	4.729	471.5	238.464	3.970	2.12		Unsaturated	19.9			112.80	1.52	170.98	242.42	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
3.445	116.932	4.558	492.1	228.693	3.905	2.13		Unsaturated	20.2			110.82	1.51	166.93	237.50	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
3.609	112.455	4.394	512.6	215.457	3.916	2.14		Unsaturated	18.7			108.29	1.51	160.82	230.34	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
3.773	108.521	3.775	533.1	203.847	3.487	2.11		Unsaturated	19.5			105.47	1.52	155.43	221.86	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
3.937	111.587	3.632	553.6	205.683	3.443	2.10		Unsaturated	19.4			109.06	1.47	150.12	227.67	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.101	115.355	4.046	574.1	203.851	3.518	2.11		Unsaturated	20.0			111.27	1.44	164.78	233.42	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.265	121.028	4.332	615.1	205.826	3.692	2.13		Unsaturated	20.3			109.26	1.43	166.32	224.90	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.429	117.719	4.332	635.6	198.811	3.731	2.14		Unsaturated	19.8			105.94	1.43	150.96	216.14	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.593	115.602	4.301	655.6	188.619	3.471	2.13		Unsaturated	20.2			110.93	1.39	155.57	218.79	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
4.757	114.452	3.857	685.1	184.392	3.510	2.14		Unsaturated	19.5			104.57	1.42	148.89	210.25	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
4.921	110.638	3.871	709.3	179.744	2.903	2.08		Unsaturated	18.7			107.88	1.36	150.30	213.61	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.085	105.048	3.242	733.3	172.525	2.853	2.08		Unsaturated	18.8			110.33	1.35	145.90	207.75	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.249	103.979	2.988	758.8	166.819	3.091	2.12		Unsaturated	19.8			99.29	1.36	129.84	190.50	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.413	116.315	3.460	779.3	161.512	2.895	2.05		Unsaturated	18.4			95.44	1.36	127.06	186.30	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.577	118.478	3.888	807.1	151.128	2.933	2.06		Unsaturated	18.1			93.67	1.36	127.06	186.30	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.741	121.300	3.452	838.3	140.587	2.920	2.09		Unsaturated	19.0			90.39	1.35	122.42	177.57	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
5.905	114.789	3.341	861.3	136.764	2.778	2.13		Unsaturated	20.0			90.75	1.35	122.42	177.57	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.069	112.837	3.310	883.3	140.903	2.129	2.04		Unsaturated	18.6			94.52	1.33	126.17	179.80	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.233	117.312	3.394	909.3	137.225	2.853	2.08		Unsaturated	17.8			96.98	1.32	128.40	180.26	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.397	115.056	3.242	920.3	129.525	3.091	2.12		Unsaturated	17.0			103.57	1.30	135.09	187.10	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.561	105.048	3.140	940.8	126.819	2.973	2.03		Unsaturated	16.6			109.34	1.28	140.34	195.80	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.725	103.979	2.988	961.3	118.984	2.778	2.13		Unsaturated	17.2			116.78	1.27	147.81	208.40	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
6.889	109.107	2.988	981.3	114.467	2.895	2.12		Unsaturated	18.8			118.03	1.25	153.41	208.40	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.053	107.807	2.845	1002.3	110.587	2.920	2.09		Unsaturated	19.0			116.78	1.25	153.41	208.40	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.217	106.814	2.223	1023.3	104.564	2.326	2.07		Unsaturated	20.0			116.03	1.25	148.21	201.71	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.381	105.003	2.119	1043.3	104.564	2.129	2.04		Unsaturated	18.6			116.03	1.25	148.21	201.71	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.545	103.907	1.988	1063.3	98.433	1.956	2.00		Unsaturated	17.8			114.24	1.25	142.30	199.53	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.709	102.807	1.988	1083.3	98.433	1.941	1.98		Unsaturated	17.0			113.14	1.24	140.35	197.51	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
7.873	115.680	2.518	1104.8	100.484	2.142	2.01		Unsaturated	17.7			113.14	1.24	140.35	197.51	1.00	0.290	1.100	n.a.	n.a.	0.00	0.00
8.037	121.552	2.636	1125.3	105.484	2.227	2.01		Unsaturated	17.7			112.47	1.23	138.84	196.14	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
8.201	122.765	2.722	1146.3	105.484	2.342	2.03		Unsaturated	17.7			112.47	1.23	138.84	196.14	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
8.365	126.856	2.818	1167.3	110.733	2.307	2.03		Unsaturated	18.7			106.24	1.23	131.16	188.83	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
8.529	116.698	2.749	1187.3	105.330	2.326	2.08		Unsaturated	20.4			93.80	1.24	116.54	174.20	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
8.693	112.401	2.735	1148.3	114.483	2.446	2.15		Unsaturated	21.6			88.78	1.24	107.96	165.20	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
8.857	112.401	2.735	1168.3	115.000	2.884	2.19		Unsaturated	22.3			83.44	1.24	103.56	160.54	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
9.021	98.243	2.670	1189.3	109.500	3.001	2.22		Unsaturated	23.3			80.39	1.24	99.47	158.54	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
9.185	98.243	2.670	1209.8	104.564	3.240	2.25		Unsaturated	23.3			79.57	1.23	97.93	156.12	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
9.349	84.594	2.892	1250.9	102.722	3.377	2.28		Unsaturated	24.6			77.39	1.23	94.80	151.81	1.00	0.289	1.100	n.a.	n.a.	0.00	0.00
9.513	81.879	2.892	1271.4	95.086	3.514	2.30		Unsaturated	24.6			75.19	1.22	93.00								

Depth (ft)	Q _a (tsf)	f _s (tsf)	σ _{vc} (tsf)	In situ σ _{vc} (psf)	Q _i	F (%)	Is	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q _{eq} near Interface (tsf)	Thin Layer Factor (K _u)	Interpreted Q _{eq}	C _w	Q _{eq}	Q _{eq} cs	Stress Reduction Coeff. (s)	CSR	K _s for Sand	CRRA/7.5 e/c = 1cm	OCR	Factor of Safety (CRRC/CSR)	Vertical Strain ε _v	Settlement (inches)
11.15	98.022	3.024	1384.4	1384.4	113.320	3.160	2.23		Unsaturated	22.6			92.69	1.17	103.39	167.15	0.99	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
11.31	98.754	3.136	1414.9	1414.9	113.330	3.198	2.23		Unsaturated	22.6			93.34	1.16	103.57	167.15	0.99	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
11.48	103.421	3.221	1455.9	1455.9	113.340	3.266	2.21		Unsaturated	22.1			97.75	1.15	112.78	172.31	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
11.64	107.063	3.279	1485.4	1485.4	113.350	3.303	2.20		Unsaturated	21.8			101.21	1.15	115.93	175.86	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
11.81	109.305	3.382	1476.4	1476.4	113.360	3.398	2.20		Unsaturated	21.7			103.38	1.14	118.21	178.66	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
11.97	113.350	3.361	1496.9	1496.9	113.370	3.385	2.18		Unsaturated	21.2			107.14	1.13	121.14	181.59	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.13	120.621	3.541	1517.4	1517.4	113.380	3.354	2.18		Unsaturated	20.7			114.01	1.12	127.83	189.31	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.30	125.778	3.630	1537.9	1537.9	113.390	3.359	2.14		Unsaturated	20.3			118.88	1.11	132.38	194.37	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.46	127.678	3.789	1558.4	1558.4	113.400	3.364	2.15		Unsaturated	20.6			120.69	1.11	133.87	196.41	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.63	128.889	3.817	1578.9	1578.9	113.410	3.327	2.16		Unsaturated	20.7			119.93	1.10	129.60	191.57	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.79	124.637	3.671	1559.4	1559.4	113.420	3.264	2.15		Unsaturated	20.7			117.03	1.10	128.28	189.84	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
12.95	123.833	3.604	1619.9	1619.9	113.430	2.930	2.16		Unsaturated	20.7			117.03	1.10	128.28	189.84	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.12	121.924	3.454	1640.4	1640.4	113.440	2.852	2.18		Unsaturated	20.6			115.24	1.09	125.91	186.54	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.28	116.308	3.437	1680.9	1680.9	113.450	2.978	2.18		Unsaturated	21.3			109.93	1.09	119.88	180.22	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.45	112.665	3.315	1681.4	1681.4	113.460	2.975	2.20		Unsaturated	21.7			106.11	1.08	115.39	174.94	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.61	110.665	3.226	1701.9	1701.9	113.470	2.938	2.20		Unsaturated	21.7			104.60	1.08	113.34	172.34	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.78	108.467	3.157	1722.5	1722.5	113.480	2.934	2.20		Unsaturated	22.2			102.52	1.08	110.70	169.21	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
13.94	104.045	3.028	1743.0	1743.0	113.490	2.935	2.22		Unsaturated	22.2			98.34	1.08	105.90	163.51	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.10	107.152	3.101	1763.5	1763.5	113.500	2.917	2.21		Unsaturated	22.0			101.32	1.07	108.52	166.57	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.27	112.455	3.297	1784.0	1784.0	113.510	2.965	2.20		Unsaturated	21.8			106.28	1.06	113.19	172.32	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.43	119.428	3.569	1804.5	1804.5	113.520	3.011	2.19		Unsaturated	21.6			112.88	1.06	119.48	180.10	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.60	125.424	3.805	1825.0	1825.0	113.530	3.057	2.19		Unsaturated	21.4			118.55	1.05	124.81	186.68	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.76	125.839	4.027	1845.5	1845.5	113.540	3.221	2.20		Unsaturated	21.8			119.03	1.05	124.81	187.50	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
14.92	123.633	3.860	1866.0	1866.0	113.550	3.227	2.21		Unsaturated	22.0			116.86	1.05	122.13	184.32	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
15.09	120.621	3.730	1886.5	1886.5	113.560	3.117	2.21		Unsaturated	21.9			114.01	1.04	118.78	179.84	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
15.26	117.936	3.353	1907.0	1907.0	113.570	2.892	2.19		Unsaturated	21.5			111.47	1.04	115.77	175.20	0.98	0.283	1.078	n.a.	n.a.	n.a.	0.00	0.00
15.43	116.633	3.342	1927.5	1927.5	113.580	2.889	2.19		Unsaturated	21.6			110.24	1.03	114.08	173.19	0.97	0.285	1.018	n.a.	n.a.	n.a.	0.00	0.00
15.60	127.288	3.234	1948.0	1948.0	113.590	2.561	2.13		Unsaturated	20.0			120.29	1.03	123.69	182.76	0.97	0.285	1.018	n.a.	n.a.	n.a.	0.00	0.00
15.78	129.486	3.603	1968.5	1968.5	113.600	2.804	2.16		Unsaturated	20.2			124.52	1.02	125.49	186.25	0.97	0.285	1.016	n.a.	n.a.	n.a.	0.00	0.00
15.95	131.745	3.506	1989.0	1989.0	113.610	2.691	2.14		Unsaturated	19.8			124.52	1.02	123.09	181.26	0.97	0.285	1.014	n.a.	n.a.	n.a.	0.00	0.00
16.12	127.865	3.125	2009.5	2009.5	113.620	2.463	2.12		Unsaturated	19.2			124.52	1.01	122.07	183.93	0.97	0.285	1.011	n.a.	n.a.	n.a.	0.00	0.00
16.29	131.094	3.052	2030.0	2030.0	113.630	2.338	2.10		Unsaturated	18.0			131.55	1.01	132.98	188.98	0.97	0.284	1.009	n.a.	n.a.	n.a.	0.00	0.00
16.46	140.068	2.870	2050.5	2050.5	113.640	2.077	2.04		Unsaturated	17.0			138.19	1.01	137.19	191.11	0.97	0.284	1.005	n.a.	n.a.	n.a.	0.00	0.00
16.63	142.890	2.862	2071.0	2071.0	113.650	1.875	2.00		Unsaturated	16.2			144.32	1.00	144.83	197.36	0.97	0.284	1.001	n.a.	n.a.	n.a.	0.00	0.00
16.80	145.690	2.840	2091.5	2091.5	113.660	1.746	1.96		Unsaturated	15.0			168.22	1.00	168.31	220.48	0.97	0.284	1.001	n.a.	n.a.	n.a.	0.00	0.00
16.97	148.497	3.027	2112.0	2112.0	113.670	1.554	1.81		Unsaturated	13.2			215.56	1.00	215.11	263.01	0.97	0.284	0.998	n.a.	n.a.	n.a.	0.00	0.00
17.14	151.301	3.081	2132.5	2132.5	113.680	1.302	1.74		Unsaturated	11.9			224.58	1.00	223.66	263.01	0.97	0.284	0.995	n.a.	n.a.	n.a.	0.00	0.00
17.31	154.105	3.257	2153.0	2153.0	113.690	1.483	1.61		Unsaturated	13.1			208.65	0.99	207.19	253.97	0.97	0.284	0.992	n.a.	n.a.	n.a.	0.00	0.00
17.48	156.909	3.253	2173.5	2173.5	113.700	0.983	1.65		Unsaturated	10.3			209.97	0.99	207.14	226.35	0.97	0.284	0.989	n.a.	n.a.	n.a.	0.00	0.00
17.65	159.713	3.253	2194.0	2194.0	113.710	0.787	1.61		Unsaturated	9.7			209.97	0.99	207.14	226.35	0.97	0.283	0.986	n.a.	n.a.	n.a.	0.00	0.00
17.82	162.517	3.253	2214.5	2214.5	113.720	0.619	1.59		Unsaturated	8.4			180.50	0.98	177.26	191.55	0.97	0.283	0.987	n.a.	n.a.	n.a.	0.00	0.00
17.99	165.321	3.253	2235.0	2235.0	113.730	0.679	1.64		Unsaturated	10.1			169.73	0.98	165.98	184.92	0.97	0.283	0.986	n.a.	n.a.	n.a.	0.00	0.00
18.16	168.125	3.253	2255.5	2255.5	113.740	0.821	1.71		Unsaturated	11.3			162.96	0.97	158.86	185.41	0.97	0.283	0.984	n.a.	n.a.	n.a.	0.00	0.00
18.33	170.929	3.253	2276.0	2276.0	113.750	0.725	1.68		Unsaturated	10.8			159.78	0.97	155.14	178.04	0.97	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.50	173.733	3.253	2296.5	2296.5	113.760	0.929	1.79		Unsaturated	12.8			141.40	0.97	136.71	170.35	0.97	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.67	176.537	3.253	2317.0	2317.0	113.770	0.617	1.64		Unsaturated	10.1			141.22	0.96	135.71	162.25	0.97	0.283	0.984	n.a.	n.a.	n.a.	0.00	0.00
18.84	179.341	3.253	2337.5	2337.5	113.780	0.406	1.63		Unsaturated	9.6			132.65	0.96	126.74	139.55	0.97	0.283	0.984	n.a.	n.a.	n.a.	0.00	0.00
19.01	182.145	3.253	2358.0	2358.0	113.790	0.294	1.57		Unsaturated	8.4			130.81	0.95	124.39	130.78	0.97	0.283	0.984	n.a.	n.a.	n.a.	0.00	0.00
19.18	184.949	3.253	2378.5	2378.5	113.800	0.294	1.52		Unsaturated	9.1			128.42	0.95	119.63	129.20	0.97	0.282	0.983	n.a.	n.a.	n.a.	0.00	0.00
19.35	187.753	3.253	2399.0	2399.0	113.810	0.312	1.57		Unsaturated	9.3			133.63	0.94	126.23	137.49	0.96	0.282	0.981	n.a.	n.a.	n.a.	0.00	0.00
19.52	190.557	3.253	2419.5	2419.5	113.820	0.221	1.46		Unsaturated	7.9			143.24	0.94	134.85	138.14	0.96	0.282	0.979	n.a.	n.a.	n.a.	0.00	0.00
19.69	193.361	3.253	2440.0	2440.0	113.830	0.221	1.46		Unsaturated	7.4			160.04	0.94	150.73	153.82	0.95	0.282	0.975	n.a.	n.a.	n.a.	0.00	0.00
19.86	196.165	3.253	2460.5	2460.5	113.840	0.259	1.45		Unsaturated	8.1			183.50											



CORNERSTONE
EARTH GROUP

CPT No. TRC-2

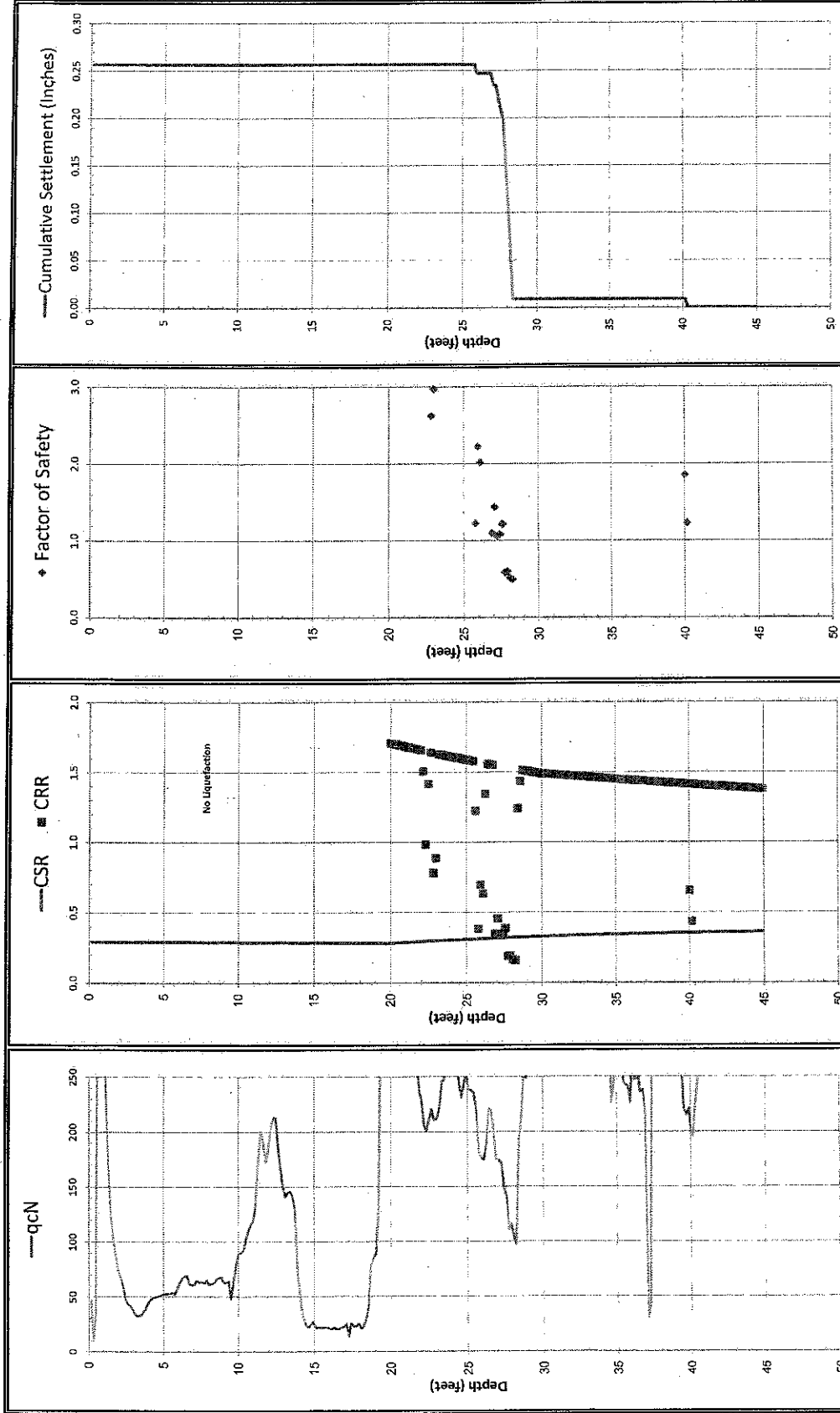
PGA (A_{max}) 0.45

Total Settlement: 0.00 (Inches)

Depth (ft)	Q _p (tsf)	f _s (tsf)	σ _{av} (psf)	In situ σ' (psf)	Q _i	F (%)	I _e	Layer "Plastic" PI > 7	Flag Soil Type	Fract. (%)	Q _{at} near Interface (tsf)	Thin Layer Factor (K _u)	Interpreted Q _{at}	Cu	Q _p IN	Q _{at} IN	Stress Reduction Coeff. I _r	CSR	K _o for Sand	CR _{max} / s = v _s / a _{max}	Factor of Safety (CR/CSR)	Vertical Strain ε _v	Settlement (Inches)	
22.146	351.702	2.548	2768.3	2768.3	297.762	0.707	1.46		Sand	7.5	341.87		341.87	0.93	318.46	324.48	0.96	0.254	0.919	2.000	1.634	5.62	0.00	0.00
22.310	375.674	4.025	2788.8	2788.8	308.151	1.075	1.59		Sand	8.4	355.05		355.05	0.93	330.14	352.66	0.96	0.285	0.917	2.000	1.650	5.59	0.00	0.00
22.474	410.156	2.755	2809.3	2809.3	320.488	0.874	1.41		Sand	6.9	387.67		387.67	0.93	359.74	362.89	0.96	0.288	0.915	2.000	1.646	5.68	0.00	0.00
22.638	378.848	2.654	2829.8	2829.8	308.468	0.703	1.45		Sand	7.3	358.08		358.08	0.93	331.65	335.90	0.96	0.297	0.913	2.000	1.642	5.63	0.00	0.00
22.802	376.922	2.570	2850.3	2850.3	305.800	0.684	1.44		Sand	7.3	356.26		356.26	0.92	329.33	334.13	0.96	0.298	0.911	2.000	1.638	5.50	0.00	0.00
22.966	331.071	3.103	2870.8	2870.8	287.491	0.941	1.59		Sand	9.3	312.92		312.92	0.92	288.72	308.21	0.95	0.299	0.908	2.000	1.634	5.47	0.00	0.00
23.130	319.052	2.119	2891.3	2891.3	286.793	0.657	1.49		Sand	7.9	301.54		301.54	0.92	277.70	287.63	0.95	0.299	0.906	2.000	1.630	5.45	0.00	0.00
23.294	326.052	1.912	2911.8	2911.8	281.540	0.689	1.45		Sand	7.3	308.18		308.18	0.92	285.29	287.66	0.95	0.300	0.904	2.000	1.627	5.42	0.00	0.00
23.458	305.824	0.988	2932.3	2932.3	246.783	0.312	1.29		Sand	5.6	293.89		293.89	0.82	267.82	268.00	0.95	0.302	0.902	2.000	1.623	5.38	0.00	0.00
23.622	277.842	0.817	2952.8	2952.8	221.128	0.296	1.32		Sand	5.8	262.61		262.61	0.81	239.19	238.54	0.95	0.303	0.898	2.000	1.619	5.36	0.00	0.00
23.786	264.846	2.211	2973.3	2973.3	209.993	0.840	1.62		Sand	9.8	250.33		250.33	0.81	228.45	248.50	0.85	0.304	0.896	2.000	1.612	5.31	0.00	0.00
23.950	217.667	2.570	2993.8	2993.8	171.775	1.189	1.79		Sand	12.7	205.73		205.73	0.80	185.64	228.23	0.85	0.304	0.896	2.000	1.612	5.31	0.00	0.00
24.114	232.290	2.783	3014.3	3014.3	182.762	1.206	1.78		Sand	12.5	219.56		219.56	0.81	198.81	238.39	0.86	0.304	0.894	2.000	1.608	5.28	0.00	0.00
24.278	300.875	4.575	3034.8	3034.8	236.266	1.528	1.78		Sand	12.6	284.38		284.38	0.91	258.57	308.68	0.96	0.305	0.892	2.000	1.604	5.26	0.00	0.00
24.442	303.507	3.278	3055.3	3055.3	237.534	1.086	1.67		Sand	10.5	285.87		285.87	0.91	260.37	290.75	0.95	0.305	0.890	2.000	1.601	5.23	0.00	0.00
24.606	319.758	4.138	3075.8	3075.8	249.473	1.300	1.71		Sand	11.3	302.23		302.23	0.91	273.83	313.60	0.95	0.307	0.888	2.000	1.597	5.21	0.00	0.00
24.770	309.232	2.618	3096.3	3096.3	240.414	0.851	1.58		Sand	9.3	292.28		292.28	0.90	264.36	282.39	0.95	0.307	0.886	2.000	1.593	5.18	0.00	0.00
24.934	385.771	3.167	3116.8	3116.8	283.646	0.870	1.54		Sand	8.6	345.72		345.72	0.90	312.14	326.59	0.95	0.308	0.884	2.000	1.590	5.16	0.00	0.00
25.098	365.380	2.301	3137.3	3137.3	274.644	0.929	1.46		Sand	7.5	335.90		335.90	0.90	302.75	308.39	0.95	0.309	0.882	2.000	1.586	5.13	0.00	0.00
25.262	388.219	3.865	3157.8	3157.8	306.888	0.929	1.54		Sand	8.6	376.39		376.39	0.90	338.66	384.03	0.95	0.310	0.880	2.000	1.583	5.11	0.00	0.00
25.427	414.362	3.698	3178.4	3178.4	318.332	0.896	1.52		Sand	8.3	391.65		391.65	0.89	351.79	394.55	0.95	0.310	0.878	2.000	1.579	5.09	0.00	0.00
25.591	476.598	4.729	3198.9	3198.9	365.145	0.942	1.50		Sand	8.0	450.47		450.47	0.89	403.94	445.51	0.95	0.311	0.876	2.000	1.576	5.08	0.00	0.00
25.755	524.049	0.457	3219.4	3219.4	443.41	0.993	0.89		Sand	2.1	495.32		495.32	0.90	443.41	443.41	0.95	0.312	0.874	2.000	1.572	5.04	0.00	0.00
25.919	645.455	2.383	3239.9	3239.9	416.408	0.920	1.20		Sand	4.5	615.55		615.55	0.89	480.75	480.75	0.95	0.313	0.872	2.000	1.569	5.02	0.00	0.00
26.083	583.695	6.103	3260.4	3260.4	443.138	1.049	1.49		Sand	7.9	551.61		551.61	0.89	482.15	504.22	0.95	0.313	0.870	2.000	1.566	5.00	0.00	0.00
26.247	666.375	7.817	3280.9	3280.9	504.575	0.946	1.42		Sand	7.0	629.84		629.84	0.89	561.02	566.33	0.94	0.314	0.868	2.000	1.562	4.97	0.00	0.00
26.411	668.550	7.817	3301.4	3301.4	492.346	1.553	1.37		Sand	10.6	479.14		479.14	0.89	426.09	471.36	0.94	0.315	0.867	2.000	1.559	4.95	0.00	0.00
26.575	595.786	4.452	3321.9	3321.9	443.680	0.757	1.37		Sand	6.4	557.45		557.45	0.89	494.92	495.96	0.94	0.315	0.865	2.000	1.556	4.93	0.00	0.00
26.739	545.238	4.950	3342.4	3342.4	408.737	0.839	1.43		Sand	7.1	515.35		515.35	0.89	456.79	461.65	0.94	0.316	0.863	2.000	1.552	4.91	0.00	0.00
26.903	637.074	3.156	3362.9	3362.9	476.396	1.441	1.59		Sand	9.3	602.15		602.15	0.88	532.87	566.27	0.94	0.317	0.861	2.000	1.549	4.89	0.00	0.00
27.067	665.968	3.777	3383.4	3383.4	496.530	0.969	1.24		Sand	4.9	629.46		629.46	0.88	556.15	556.21	0.94	0.317	0.859	2.000	1.546	4.87	0.00	0.00
27.231	680.615	8.635	3403.9	3403.9	452.285	1.598	1.63		Sand	10.0	575.25		575.25	0.88	507.44	507.44	0.94	0.318	0.857	2.000	1.542	4.85	0.00	0.00
27.395	466.478	1.197	3424.4	3424.4	355.717	1.085	1.56		Sand	8.8	454.14		454.14	0.88	389.97	415.90	0.94	0.319	0.856	2.000	1.539	4.83	0.00	0.00
27.559	435.252	3.207	3444.9	3444.9	321.147	0.740	1.45		Sand	7.4	411.39		411.39	0.88	361.78	367.76	0.94	0.319	0.854	2.000	1.536	4.81	0.00	0.00
27.723	330.529	4.203	3465.4	3465.4	242.842	1.278	1.71		Sand	11.4	312.41		312.41	0.88	274.29	314.39	0.94	0.320	0.852	2.000	1.533	4.79	0.00	0.00
27.887	417.732	1.758	3485.9	3485.9	346.506	1.038	1.55		Sand	8.7	446.52		446.52	0.88	391.42	405.51	0.94	0.321	0.850	2.000	1.530	4.77	0.00	0.00
28.051	511.380	4.153	3506.4	3506.4	324.818	1.074	1.58		Sand	7.3	483.35		483.35	0.88	423.05	423.05	0.94	0.322	0.848	2.000	1.528	4.75	0.00	0.00
28.215	382.495	1.940	3526.9	3526.9	285.059	1.264	1.67		Sand	10.6	370.98		370.98	0.87	324.20	360.20	0.94	0.322	0.847	2.000	1.520	4.73	0.00	0.00
28.379	385.065	4.273	3547.4	3547.4	280.520	1.112	1.53		Sand	9.9	364.90		364.90	0.87	318.40	346.65	0.94	0.323	0.845	2.000	1.520	4.71	0.00	0.00
28.543	404.893	3.744	3567.9	3567.9	294.346	0.813	1.51		Sand	8.8	382.70		382.70	0.87	333.42	350.39	0.94	0.323	0.843	2.000	1.514	4.68	0.00	0.00
28.707	407.335	3.286	3588.4	3588.4	290.235	0.720	1.47		Sand	7.6	385.00		385.00	0.87	334.83	346.01	0.94	0.324	0.842	2.000	1.511	4.66	0.00	0.00
28.871	415.257	2.975	3608.9	3608.9	284.147	0.928	1.48		Sand	8.2	392.49		392.49	0.87	340.93	347.61	0.94	0.324	0.840	2.000	1.508	4.64	0.00	0.00
29.035	447.732	1.758	3629.4	3629.4	324.818	1.074	1.58		Sand	9.2	423.19		423.19	0.87	367.04	389.40	0.94	0.325	0.838	2.000	1.505	4.62	0.00	0.00
29.199	465.285	3.116	3649.9	3649.9	353.366	1.162	1.62		Sand	8.0	465.81		465.81	0.87	403.40	428.19	0.94	0.326	0.836	2.000	1.502	4.61	0.00	0.00
29.363	482.262	2.018	3670.5	3670.5	332.582	0.857	1.50		Sand	8.0	439.78		439.78	0.86	380.30	390.92	0.94	0.326	0.835	2.000	1.502	4.61	0.00	0.00
29.527	498.972	6.717	3691.0	3691.0	312.868	1.337	1.71		Sand	11.3	414.88		414.88	0.86	359.24	407.17	0.93	0.327	0.833	2.000	1.499	4.59	0.00	0.00
29.691	511.380	7.099	3711.5	3711.5	361.947	1.400	1.64		Sand	10.2	481.11		481.11	0.86	414.83	453.23	0.93	0.327	0.831	2.000	1.496	4.57	0.00	0.00
29.855	535.972	3.152	3732.0	3732.0	389.579	1.205	1.57		Sand	9.1	519.14		519.14	0.86	446.97	471.64	0.93	0.328	0.830	2.000	1.493	4.55	0.00	0.00
30.019	541.223	7.840	3752.4	3752.4	355.959	1.375	1.63		Sand	10.0	511.55		511.55	0.86	439.84	477.97	0.93	0.328	0.828	2.000	1.490	4.54		

Depth (ft)	q _e (tsf)	f _s (tsf)	σ _{vc} (psf)	In situ σ _{vc} (psf)	Q	F (%)	I _s	Layer "Plastic" Fl > 7	Flag Soil Type	Flies (%)	Q _{net} (tsf)	Thin Layer Factor (K _u)	Interpreted Q _{net}	C _n	Q _{net}	Q _{net} (tsf)	Stress Reduction Coeff. (r _e)	CSR	CR _{RA} (7.5 ft)	Factor of Safety (CR/CSR)	Vertical Strain (inches)	Settlement (inches)
33.36	43.951	1.031	4176.3	3950.6	21.314	2.461	2.58		Clay	36.3	41.54	0.85	44.18	0.85	n.a.	n.a.	0.92	0.338	n.a.	n.a.	0.00	0.00
33.301	46.746	1.126	4146.1	3940.1	22.676	2.518	2.68		Clay	36.8	44.18	0.85	46.746	0.85	n.a.	n.a.	0.92	0.338	n.a.	n.a.	0.00	0.00
33.465	48.203	1.166	4165.8	3949.6	22.342	2.643	2.70		Clay	36.4	43.67	0.85	46.746	0.85	n.a.	n.a.	0.92	0.338	n.a.	n.a.	0.00	0.00
33.629	45.281	1.184	4185.5	3959.0	21.818	2.741	2.70		Clay	37.0	42.80	0.85	46.746	0.85	n.a.	n.a.	0.92	0.338	n.a.	n.a.	0.00	0.00
33.783	48.726	1.151	4205.2	3968.5	23.497	2.469	2.65		Clay	36.2	42.05	0.85	46.746	0.85	n.a.	n.a.	0.92	0.340	n.a.	n.a.	0.00	0.00
33.957	44.494	1.154	4224.8	3977.9	21.308	2.723	2.71		Clay	37.3	42.05	0.85	46.746	0.85	n.a.	n.a.	0.92	0.340	n.a.	n.a.	0.00	0.00
34.121	38.661	1.108	4244.5	3987.4	18.327	3.028	2.79		Clay	40.2	36.54	0.85	46.746	0.85	n.a.	n.a.	0.92	0.340	n.a.	n.a.	0.00	0.00
34.285	36.134	1.019	4264.2	3996.8	16.514	3.089	2.83		Clay	41.8	33.21	0.85	46.746	0.85	n.a.	n.a.	0.92	0.341	n.a.	n.a.	0.00	0.00
34.449	32.529	0.983	4283.6	4006.3	15.373	3.192	2.86		Clay	43.1	31.13	0.85	46.746	0.85	n.a.	n.a.	0.92	0.341	n.a.	n.a.	0.00	0.00
34.613	32.529	0.983	4283.6	4006.3	15.373	3.192	2.86		Clay	43.1	31.13	0.85	46.746	0.85	n.a.	n.a.	0.92	0.341	n.a.	n.a.	0.00	0.00
34.777	31.797	0.980	4323.2	4025.2	14.725	3.341	2.89		Clay	44.1	30.05	0.84	46.746	0.84	n.a.	n.a.	0.92	0.342	n.a.	n.a.	0.00	0.00
34.941	30.413	0.997	4342.9	4034.6	14.000	3.630	2.92		Clay	45.4	28.75	0.84	46.746	0.84	n.a.	n.a.	0.92	0.343	n.a.	n.a.	0.00	0.00
35.105	29.111	0.964	4362.5	4044.0	13.318	3.560	2.94		Clay	46.3	27.52	0.84	46.746	0.84	n.a.	n.a.	0.92	0.343	n.a.	n.a.	0.00	0.00
35.269	28.053	0.920	4382.3	4053.5	12.760	3.557	2.95		Clay	46.8	26.52	0.84	46.746	0.84	n.a.	n.a.	0.92	0.344	n.a.	n.a.	0.00	0.00
35.433	26.161	0.935	4402.0	4062.9	12.779	3.602	2.96		Clay	46.9	26.52	0.84	46.746	0.84	n.a.	n.a.	0.91	0.344	n.a.	n.a.	0.00	0.00
35.597	29.328	0.977	4421.6	4072.4	13.318	3.603	2.94		Clay	46.3	27.72	0.84	46.746	0.84	n.a.	n.a.	0.91	0.344	n.a.	n.a.	0.00	0.00
35.761	28.867	0.958	4441.3	4081.8	13.056	3.971	2.97		Clay	47.2	25.87	0.84	46.746	0.84	n.a.	n.a.	0.91	0.345	n.a.	n.a.	0.00	0.00
35.925	27.375	0.881	4461.0	4091.3	12.292	3.504	2.96		Clay	48.2	25.13	0.84	46.746	0.84	n.a.	n.a.	0.91	0.346	n.a.	n.a.	0.00	0.00
36.089	27.646	0.980	4480.7	4100.7	12.391	3.897	2.99		Clay	47.2	25.13	0.84	46.746	0.84	n.a.	n.a.	0.91	0.346	n.a.	n.a.	0.00	0.00
36.253	29.111	1.027	4500.4	4110.2	13.070	3.823	2.98		Clay	45.4	26.10	0.84	46.746	0.84	n.a.	n.a.	0.91	0.346	n.a.	n.a.	0.00	0.00
36.417	30.793	0.999	4520.0	4119.6	13.852	3.466	2.92		Clay	44.2	33.72	0.84	46.746	0.84	n.a.	n.a.	0.91	0.347	n.a.	n.a.	0.00	0.00
36.581	35.677	1.145	4539.7	4129.1	16.181	3.128	2.84		Clay	37.9	41.89	0.84	46.746	0.84	n.a.	n.a.	0.91	0.347	n.a.	n.a.	0.00	0.00
36.745	44.304	1.143	4559.4	4138.5	20.309	2.793	2.69		Clay	36.5	47.44	0.84	46.746	0.84	n.a.	n.a.	0.91	0.347	n.a.	n.a.	0.00	0.00
36.909	50.191	1.338	4579.1	4148.0	23.953	2.814	2.68		Clay	37.8	48.23	0.84	46.746	0.84	n.a.	n.a.	0.91	0.348	n.a.	n.a.	0.00	0.00
37.073	52.892	1.463	4598.8	4157.4	26.618	3.105	2.72		Clay	38.2	48.23	0.84	46.746	0.84	n.a.	n.a.	0.91	0.348	n.a.	n.a.	0.00	0.00
37.237	49.432	1.363	4618.5	4166.9	23.953	2.814	2.68		Clay	37.8	48.23	0.84	46.746	0.84	n.a.	n.a.	0.91	0.348	n.a.	n.a.	0.00	0.00
37.402	47.367	1.376	4638.2	4176.4	21.678	3.042	2.73		Clay	38.1	44.98	0.84	46.746	0.84	n.a.	n.a.	0.91	0.348	n.a.	n.a.	0.00	0.00
37.566	44.005	1.279	4657.9	4185.8	19.913	3.302	2.78		Clay	40.0	41.59	0.84	46.746	0.84	n.a.	n.a.	0.91	0.349	n.a.	n.a.	0.00	0.00
37.730	42.002	1.299	4677.6	4195.2	19.204	3.225	2.76		Clay	40.2	38.70	0.83	46.746	0.83	n.a.	n.a.	0.91	0.349	n.a.	n.a.	0.00	0.00
37.894	40.940	1.062	4697.3	4204.7	18.356	2.752	2.76		Clay	39.2	35.59	0.83	46.746	0.83	n.a.	n.a.	0.91	0.349	n.a.	n.a.	0.00	0.00
38.058	37.857	1.152	4717.0	4214.1	16.752	3.254	2.84		Clay	43.4	34.62	0.83	46.746	0.83	n.a.	n.a.	0.91	0.350	n.a.	n.a.	0.00	0.00
38.222	36.626	1.211	4736.8	4223.6	16.222	3.335	2.87		Clay	43.0	34.59	0.83	46.746	0.83	n.a.	n.a.	0.90	0.350	n.a.	n.a.	0.00	0.00
38.386	36.999	1.314	4756.5	4233.0	17.823	3.462	2.88		Clay	42.0	38.00	0.83	46.746	0.83	n.a.	n.a.	0.90	0.350	n.a.	n.a.	0.00	0.00
38.550	40.207	1.317	4776.0	4242.5	17.823	3.267	2.76		Clay	38.1	44.80	0.83	46.746	0.83	n.a.	n.a.	0.90	0.351	n.a.	n.a.	0.00	0.00
38.714	47.397	1.470	4795.7	4251.9	21.169	2.897	2.76		Clay	36.9	48.34	0.83	46.746	0.83	n.a.	n.a.	0.90	0.351	n.a.	n.a.	0.00	0.00
38.878	51.141	1.396	4815.4	4261.4	22.572	3.334	2.86		Clay	43.0	48.34	0.83	46.746	0.83	n.a.	n.a.	0.90	0.351	n.a.	n.a.	0.00	0.00
39.042	36.518	1.137	4835.0	4270.8	15.895	3.669	2.97		Clay	43.0	34.52	0.83	46.746	0.83	n.a.	n.a.	0.90	0.351	n.a.	n.a.	0.00	0.00
39.206	29.139	0.990	4854.7	4280.3	12.461	3.749	2.83		Clay	47.4	27.54	0.83	46.746	0.83	n.a.	n.a.	0.90	0.351	n.a.	n.a.	0.00	0.00
39.370	34.891	0.894	4874.4	4289.7	14.561	3.749	2.74		Clay	41.9	32.69	0.83	46.746	0.83	n.a.	n.a.	0.90	0.352	n.a.	n.a.	0.00	0.00
39.534	40.126	0.915	4894.1	4299.2	17.529	2.428	2.74		Clay	38.7	37.93	0.83	46.746	0.83	n.a.	n.a.	0.90	0.352	n.a.	n.a.	0.00	0.00
39.698	24.960	0.866	4913.8	4308.7	10.448	3.864	3.04		Clay	50.5	23.23	0.83	46.746	0.83	n.a.	n.a.	0.90	0.352	n.a.	n.a.	0.00	0.00
39.862	24.580	0.801	4933.4	4318.1	10.242	3.822	3.04		Clay	50.2	30.16	0.83	46.746	0.83	n.a.	n.a.	0.90	0.353	n.a.	n.a.	0.00	0.00
40.026	31.905	0.665	4953.1	4327.5	13.601	2.939	2.88		Clay	43.9	26.41	0.83	46.746	0.83	n.a.	n.a.	0.90	0.353	n.a.	n.a.	0.00	0.00
40.190	27.944	0.819	4972.8	4336.9	11.740	3.217	2.98		Clay	46.9	19.38	0.83	46.746	0.83	n.a.	n.a.	0.90	0.353	n.a.	n.a.	0.00	0.00
40.354	20.463	0.712	4992.5	4346.8	8.217	3.958	3.13		Clay	54.5	15.00	0.83	46.746	0.83	n.a.	n.a.	0.90	0.354	n.a.	n.a.	0.00	0.00
40.518	20.185	0.694	5012.2	4356.8	8.754	3.056	3.05		Clay	50.8	20.44	0.83	46.746	0.83	n.a.	n.a.	0.90	0.354	n.a.	n.a.	0.00	0.00
40.682	21.823	0.564	5031.5	4367.3	8.433	3.258	3.08		Clay	52.1	19.82	0.83	46.746	0.83	n.a.	n.a.	0.90	0.354	n.a.	n.a.	0.00	0.00
40.846	20.972	0.601	5051.3	4374.7	7.197	3.372	3.14		Clay	56.0	17.31	0.83	46.746	0.83	n.a.	n.a.	0.90	0.355	n.a.	n.a.	0.00	0.00
41.011	16.313	0.582	5071.3	4384.2	7.566	3.646	3.24		Clay	58.3	14.57	0.82	46.746	0.82	n.a.	n.a.	0.89	0.355	n.a.	n.a.	0.00	0.00
41.175	15.410	0.469	5091.0	4393.7	5.856	3.176	3.22		Clay	58.3	14.23	0.82	46.746	0.82	n.a.	n.a.	0.89	0.355	n.a.	n.a.	0.00	0.00
41.339	15.057	0.396	5110.4	4403.1	5.679	3.303	3.20		Clay	57.6	14.46	0.82	46.746	0.82	n.a.	n.a.	0.89	0.355	n.a.	n.a.	0.00	0.00
41.503	15.362	0.396	5130.4	4412.6	5.940	3.183	3.20		Clay	57.6	14.46	0.82	46.746	0.82	n.a.	n.a.	0.89	0.355	n.a.	n.a.	0.00	0.00
41.667	15.708	0.418	5150.0	4422.0	5.940	3.183	3.20		Clay	57.6	14.46	0.82	46.746	0.82	n.a.	n.a.	0.89	0.355	n.a.	n.a.	0.00	0.00
41.831	17.823	0.435	5169.7	4431.5	6.878	2.854	3.12		Clay	54.0	16.85	0.82	46.746	0.82	n.a.	n.a.	0.89	0.356	n.a.	n.a.	0.00	0.00
41.995	17.526	0.435	5189.4	4440.9	6.724	2.974	3.14		Clay	54.8	16.57	0.82	46.746	0.82	n.a.	n.a.	0.89	0.356	n.a.	n.a.	0.00	0.00
42.159	16.251	0.450	5209.1	4450.4	6.133	3.299	3.20		Clay	57.4	15.36	0.82	46.746	0.82	n.a.	n.a.	0.89	0.356	n.a.	n.a.	0.00	0.00
42.323	16.139	0.450	5228.8	4459.8	5.617	3.114	3.22		Clay	58.3	14.31	0.82	46.746	0.82	n.a.	n.a.	0.89	0.356				

Depth (ft)	q _c (tsf)	f _s (tsf)	σ _{vc} (psf)	In situ σ _{vc} (psf)	Q _c	F (%)	I _c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q _{cl} near interfaces (soft layer)	Thin Layer Factor (K _{cl})	Interpreted q _{cl}	Cu	q _{cl} N	q _{cl} -cs	Stress Reduction Coeff. (r _c)	CSR	K _{cl} for Said	CRR _{MS7.5} σ _{vc} = 1/3 σ _{vc}	Factor of Safety (CRR/CSR)	Vertical Strain ε _v	Settlement (inches)
44.127	21,352	0.643	5445.2	4563.7	8,164	3,462	3.10		Clay	53.2			20.18	0.82	n.a.	n.a.	0.88	0.359	n.a.	n.a.	n.a.	0.00	0.00
44.291	21,080	0.630	5464.9	4573.2	8,024	3,434	3.11		Clay	53.4			19.92	0.82	n.a.	n.a.	0.88	0.359	n.a.	n.a.	n.a.	0.00	0.00
44.455	19,914	0.664	5484.6	4582.6	7,494	3,867	3.16		Clay	55.9			18.82	0.82	n.a.	n.a.	0.88	0.359	n.a.	n.a.	n.a.	0.00	0.00
44.619	18,747	0.687	5504.3	4592.1	6,996	4,170	3.21		Clay	59.0			17.72	0.81	n.a.	n.a.	0.88	0.359	n.a.	n.a.	n.a.	0.00	0.00
44.783	17,173	0.570	5524.0	4601.5	6,264	3,955	3.23		Clay	59.1			16.23	0.81	n.a.	n.a.	0.88	0.360	n.a.	n.a.	n.a.	0.00	0.00
44.948	15,899	0.540	5543.8	4611.0	5,694	4,114	3.28		Clay	61.3			15.03	0.81	n.a.	n.a.	0.88	0.360	n.a.	n.a.	n.a.	0.00	0.00
45.112	16,197	0.020	5563.4	4620.5	5,807	0,149	2.73		Clay	38.3			15.31	0.81	n.a.	n.a.	0.88	0.360	n.a.	n.a.	n.a.	0.00	0.00
45.276	15,800	0.020	5583.1	4629.9	5,533	0,156	2.76		Clay	39.2			14.74	0.81	n.a.	n.a.	0.88	0.360	n.a.	n.a.	n.a.	0.00	0.00



Liquefaction Analysis Summary		Project Number	157-7-1
 CORNERSTONE EARTH GROUP		Figure Number	Figure D-3
		8/27/2012	CPT No. TRC-3

Creekside Way
Campbell, California



CORNERSTONE
EARTH GROUP

CPT No. TRC-3

PGA (A_{max}) 0.45

Total Settlement: 0.26 (Inches)

Depth (ft)	q _p (tsf)	f _s (tsf)	G _e (pcf)	In situ G _e (pcf)	Q	F _v (%)	I _e	Layer Plasticity PI > 7	Flag Soil Type	Fines (%)	Q _p near Interferences (tsf/layer)	Thin Layer Factor (F _{TL})	Interpreted Q _p	CN	Q _p N	Q _{max}	Stress Reduction Coeff. (tsf)	COR	CRRA/2.5 (in/ft)	K _s for Sand	COR	Factor of Safety (CRCSR)	Vertical Strain (in/in)	Settlement (Inches)	
0.164	48.255	0.878	20.5	20.5	473.278	1.781	1.67		Unsaturated	10.7			48.59	1.70	75.21	94.22	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.328	10.581	0.977	41.0	41.0	157.801	9.251	2.53		Unsaturated	31.3			10.00	1.70	17.00	51.96	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.492	36.526	1.170	61.5	61.5	202.869	3.197	2.08		Unsaturated	18.8			34.52	1.70	56.86	97.62	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.656	435.008	1.822	82.0	82.0	2088.438	0.373	0.81		Unsaturated	1.6			411.16	1.70	696.97	698.87	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	421.698	1.662	102.5	102.5	1810.701	0.394	0.84		Unsaturated	1.8			398.57	1.70	677.57	677.57	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.984	341.191	1.847	123.0	123.0	1337.331	0.541	1.01		Unsaturated	2.9			322.49	1.70	548.23	548.23	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.148	248.045	2.539	143.5	143.5	852.759	1.032	1.34		Unsaturated	6.0			232.56	1.70	395.35	395.35	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.312	183.320	3.447	184.0	184.0	622.108	1.881	1.64		Unsaturated	10.1			173.27	1.70	294.56	323.41	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.476	133.352	3.773	184.5	184.5	427.833	2.823	1.87		Unsaturated	14.2			126.42	1.70	214.91	271.33	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	110.927	3.763	205.0	205.0	339.232	3.399	1.99		Unsaturated	16.7			104.75	1.70	178.08	240.61	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.804	94.142	3.004	225.5	225.5	272.245	3.195	2.01		Unsaturated	17.2			88.88	1.70	151.27	209.32	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.969	79.736	2.472	246.1	246.1	220.637	3.109	2.05		Unsaturated	18.1			75.38	1.70	128.12	168.45	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.133	71.895	1.981	266.6	266.6	191.080	2.953	2.07		Unsaturated	18.5			67.85	1.70	115.52	153.36	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.297	62.698	1.687	287.1	287.1	150.507	3.167	2.14		Unsaturated	20.1			59.26	1.70	100.74	131.15	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.461	50.327	1.428	307.6	307.6	124.375	3.352	2.22		Unsaturated	22.3			47.57	1.70	73.45	121.87	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.625	45.714	1.268	328.1	328.1	103.330	3.135	2.23		Unsaturated	22.7			41.82	1.70	71.10	114.90	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.789	44.249	0.927	348.6	348.6	102.632	2.103	2.12		Unsaturated	19.8			37.80	1.70	64.26	107.97	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.953	39.890	0.866	369.1	369.1	77.915	2.174	2.22		Unsaturated	21.1			33.62	1.70	57.15	100.15	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.117	35.588	0.769	389.6	389.6	73.065	2.110	2.23		Unsaturated	22.2			32.36	1.70	55.01	97.67	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.281	34.238	0.718	410.1	410.1	72.650	2.100	2.23		Unsaturated	22.5			32.98	1.70	55.06	99.04	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.445	36.707	0.796	451.1	451.1	68.993	1.855	2.13		Unsaturated	22.2			34.69	1.70	58.98	102.51	1.00	0.293	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.609	38.350	0.848	492.1	492.1	64.400	1.931	2.17		Unsaturated	20.9			38.69	1.70	66.78	109.74	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.773	45.784	0.933	512.6	512.6	55.105	1.884	2.11		Unsaturated	19.6			43.44	1.70	73.85	116.51	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.937	51.276	1.088	533.1	533.1	56.052	2.153	2.15		Unsaturated	20.5			47.05	1.70	79.99	125.77	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.101	52.978	1.265	553.6	553.6	56.844	2.409	2.18		Unsaturated	21.3			49.70	1.70	84.48	134.49	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.265	52.978	1.371	574.1	574.1	55.427	2.607	2.21		Unsaturated	22.1			49.88	1.70	84.96	136.15	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.429	53.877	1.520	594.6	594.6	54.958	2.654	2.24		Unsaturated	22.9			50.62	1.70	86.05	136.57	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.593	53.935	1.684	615.1	615.1	55.913	3.041	2.26		Unsaturated	23.4			52.00	1.68	87.26	140.69	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.757	55.020	1.861	635.5	635.5	55.600	2.996	2.26		Unsaturated	23.0			52.70	1.66	87.24	140.55	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.921	55.183	1.861	656.1	656.1	53.201	2.854	2.25		Unsaturated	23.3			52.21	1.64	85.69	138.27	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.085	55.237	1.967	676.6	676.6	53.201	2.854	2.25		Unsaturated	23.0			52.82	1.62	85.70	137.56	1.00	0.292	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.249	55.388	1.474	697.1	697.1	52.083	2.345	2.19		Unsaturated	22.4			52.18	1.61	85.46	135.97	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.413	56.258	1.312	717.8	717.8	50.881	2.354	2.20		Unsaturated	21.8			52.15	1.59	83.18	133.47	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.577	56.183	1.296	738.3	738.3	55.830	1.810	2.10		Unsaturated	19.2			53.72	1.52	88.93	136.78	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.741	60.256	1.323	758.8	758.8	105.817	1.988	2.10		Unsaturated	19.2			56.95	1.57	89.17	135.78	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.905	60.256	1.323	779.3	779.3	105.817	1.988	2.11		Unsaturated	19.5			56.83	1.49	89.82	150.93	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	60.256	1.323	799.8	799.8	105.817	2.139	2.11		Unsaturated	18.8			58.85	1.47	101.37	153.51	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.234	60.256	1.323	820.3	820.3	109.953	2.258	2.12		Unsaturated	19.1			60.85	1.46	100.71	151.22	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.398	60.256	1.323	840.8	840.8	96.637	1.927	2.11		Unsaturated	19.4			61.31	1.48	90.47	139.23	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.562	60.256	1.323	861.3	861.3	84.341	1.825	2.11		Unsaturated	19.6			60.85	1.45	88.31	136.98	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.726	64.109	1.153	881.8	881.8	93.619	1.935	2.13		Unsaturated	19.9			60.85	1.43	86.03	134.93	1.00	0.291	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.890	64.109	1.258	902.3	902.3	98.426	2.012	2.12		Unsaturated	19.8			62.75	1.42	88.03	139.16	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.054	68.460	1.398	922.8	922.8	94.361	2.140	2.15		Unsaturated	20.6			63.31	1.41	88.31	136.80	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.218	68.460	1.491	943.3	943.3	91.239	1.752	2.11		Unsaturated	19.1			62.03	1.40	86.58	134.49	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.382	68.460	1.594	963.8	963.8	84.744	1.751	2.09		Unsaturated	19.5			65.08	1.38	90.08	137.58	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.546	68.460	1.697	984.3	984.3	84.744	1.751	2.09		Unsaturated	19.1			60.88	1.36	84.23	132.28	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.710	68.460	1.799	1004.8	1004.8	87.804	1.895	2.14		Unsaturated	20.2			61.44	1.37	84.16	132.11	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.874	68.460	1.902	1025.3	1025.3	87.804	1.895	2.14		Unsaturated	20.1			61.44	1.37	84.16	132.11	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.038	68.460	2.005	1045.8	1045.8	88.189	1.691	2.10		Unsaturated	19.3			62.49	1.36	84.31	131.61	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.202	68.460	2.108	1066.3	1066.3	82.707	1.845	2.09		Unsaturated	16.3			66.31	1.34	89.01	134.66	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.366	68.460	2.211	1086.8	1086.8	93.057	1.631	2.08		Unsaturated	15.7			67.21	1.33	89.35	135.87	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.530	70.156	1.976	1107.3	1107.3	92.892	1.624	2.07		Unsaturated	16.7			67.70	1.32	89.30	135.77	1.00	0.290	n.a.	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.694	71.624	1.758	1127.8	1127.8	85.397	1.710	2.12		Unsaturated	15.7			62.88	1.32	82.65	129.62									



CORNERSTONE
EARTH GROUP

CPT No. TRC-3

PGA (A_{max}) 0.45

Total Settlement: 0.26 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	σ_v (psf)	Instu σ_v (psf)	Q	F (%)	β	Layer Plastic PI > 7	Flag Soil Type	Pinnes (%)	Q _{near} Interf. (tsf)	Thin Layer Factor (K_p)	Interpreted Q _N	Q _N	Q _{max}	Stress Reduction Coeff. T_d	CSP	K _s for Sand	CR _{max} / σ_v (1 in)	CRR	Factor of Safety (CRR/CSP)	Vertical Strain Ev	Settlement (inches)	
11.155	137.659	1.151	1394.4	1394.4	159.471	0.840	1.71	Unsat	Unsat	11.3	130.11	130.11	130.11	151.29	177.01	0.98	0.289	1.086	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.319	181.475	1.310	1414.9	1414.9	208.946	0.725	1.58	Unsat	Unsat	9.2	171.53	171.53	171.53	184.85	208.75	0.98	0.288	1.100	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.483	212.946	1.322	1435.4	1435.4	243.553	0.623	1.45	Unsat	Unsat	7.8	201.27	201.27	201.27	225.24	231.39	0.98	0.288	1.100	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.647	201.877	1.324	1455.9	1455.9	229.207	0.957	1.64	Unsat	Unsat	10.1	190.81	190.81	190.81	212.38	234.30	0.98	0.288	1.100	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.811	182.516	1.235	1476.4	1476.4	205.464	0.880	1.56	Unsat	Unsat	9.0	172.32	172.32	172.32	193.49	205.81	0.98	0.288	1.100	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.975	198.125	1.208	1496.9	1496.9	219.559	0.362	1.37	Unsat	Unsat	6.4	185.37	185.37	185.37	207.02	220.73	0.98	0.288	1.100	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.139	217.341	1.143	1517.4	1517.4	241.740	0.528	1.44	Unsat	Unsat	7.2	205.43	205.43	205.43	226.37	239.73	0.98	0.287	1.098	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.303	225.941	1.098	1537.9	1537.9	249.647	0.488	1.41	Unsat	Unsat	6.8	213.55	213.55	213.55	233.56	235.76	0.98	0.287	1.098	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.467	226.317	1.215	1558.4	1558.4	274.301	0.541	1.44	Unsat	Unsat	7.2	212.97	212.97	212.97	233.35	235.76	0.98	0.287	1.098	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.631	198.945	0.922	1578.9	1578.9	159.94	0.465	1.44	Unsat	Unsat	7.2	188.04	188.04	188.04	206.33	209.45	0.98	0.287	1.086	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.795	177.939	0.859	1599.4	1599.4	192.472	0.485	1.49	Unsat	Unsat	7.9	168.09	168.09	168.09	184.97	190.84	0.98	0.287	1.066	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.959	159.200	1.029	1619.9	1619.9	171.104	0.650	1.61	Unsat	Unsat	9.7	150.47	150.47	150.47	165.46	181.27	0.98	0.287	1.045	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.123	149.244	0.535	1640.4	1640.4	162.358	0.381	1.49	Unsat	Unsat	7.9	141.06	141.06	141.06	155.64	160.58	0.98	0.287	1.045	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.287	153.015	1.084	1660.9	1660.9	162.358	0.712	1.65	Unsat	Unsat	10.4	144.63	144.63	144.63	157.81	177.91	0.98	0.287	1.045	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.451	148.484	1.124	1681.4	1681.4	155.594	0.931	1.75	Unsat	Unsat	10.5	145.85	145.85	145.85	158.37	179.48	0.98	0.287	1.048	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.615	136.764	0.886	1701.9	1701.9	155.594	0.931	1.75	Unsat	Unsat	10.5	140.34	140.34	140.34	151.61	181.87	0.98	0.286	1.048	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	79.492	1.011	1722.5	1722.5	142.371	0.652	1.62	Unsat	Unsat	10.7	129.27	129.27	129.27	139.95	150.73	0.98	0.286	1.036	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.944	148.484	0.967	1743.0	1743.0	81.877	1.286	2.05	Unsat	Unsat	18.0	75.13	75.13	75.13	81.94	125.05	0.98	0.286	1.025	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.108	54.451	0.967	1763.5	1763.5	55.463	1.805	2.27	Unsat	Unsat	23.6	51.47	51.47	51.47	55.30	100.50	0.98	0.286	1.019	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.272	33.987	0.911	1784.0	1784.0	34.047	2.754	2.55	Unsat	Unsat	34.7	24.08	24.08	24.08	28.44	65.23	0.98	0.286	1.015	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.436	25.725	0.692	1804.5	1804.5	27.235	2.918	2.63	Unsat	Unsat	34.7	21.87	21.87	21.87	23.90	61.79	0.98	0.286	1.012	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	23.142	0.536	1825.0	1825.0	24.361	2.411	2.63	Unsat	Unsat	34.7	23.69	23.69	23.69	25.58	64.23	0.98	0.286	1.012	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.764	24.360	0.730	1845.5	1845.5	28.059	3.037	2.67	Unsat	Unsat	35.9	23.69	23.69	23.69	25.58	64.23	0.98	0.286	1.011	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.928	26.480	0.619	1866.0	1866.0	29.504	3.193	2.84	Unsat	Unsat	35.0	26.90	26.90	26.90	28.93	68.91	0.98	0.286	1.010	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.092	22.972	0.906	1886.5	1886.5	22.930	4.189	2.80	Unsat	Unsat	40.7	21.33	21.33	21.33	22.86	60.98	0.98	0.285	1.009	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.256	22.142	0.907	1907.0	1907.0	22.371	4.088	2.79	Unsat	Unsat	40.3	21.87	21.87	21.87	22.86	61.52	0.98	0.285	1.008	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	22.945	0.890	1927.5	1927.5	22.385	4.124	2.80	Unsat	Unsat	40.9	21.31	21.31	21.31	22.54	60.96	0.97	0.285	1.007	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.584	22.960	0.915	1948.0	1948.0	22.426	4.194	2.81	Unsat	Unsat	41.0	21.54	21.54	21.54	22.64	60.70	0.97	0.285	1.006	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.748	23.980	0.881	1968.5	1968.5	22.426	3.991	2.79	Unsat	Unsat	40.5	21.80	21.80	21.80	22.76	60.94	0.97	0.285	1.006	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.912	22.599	0.845	1989.0	1989.0	21.724	3.911	2.80	Unsat	Unsat	40.7	21.38	21.38	21.38	22.17	60.05	0.97	0.285	1.005	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.076	21.216	0.895	2009.5	2009.5	20.116	4.428	2.86	Unsat	Unsat	43.0	20.62	20.62	20.62	20.69	58.16	0.97	0.285	1.004	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	22.871	0.928	2030.0	2030.0	21.533	4.426	2.83	Unsat	Unsat	41.7	21.82	21.82	21.82	22.17	60.08	0.97	0.285	1.002	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.404	21.433	0.988	2050.5	2050.5	19.905	4.464	2.89	Unsat	Unsat	44.1	20.26	20.26	20.26	20.32	57.69	0.97	0.284	1.002	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.568	21.216	0.985	2071.0	2071.0	19.489	4.762	2.89	Unsat	Unsat	41.3	20.59	20.59	20.59	20.32	57.69	0.97	0.284	1.001	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.732	22.780	0.878	2091.5	2091.5	20.793	4.036	2.82	Unsat	Unsat	41.3	21.50	21.50	21.50	21.69	59.45	0.97	0.284	1.001	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.896	23.169	0.958	2112.0	2112.0	20.940	4.103	2.86	Unsat	Unsat	35.1	24.92	24.92	24.92	24.81	59.22	0.97	0.284	1.001	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	26.370	0.898	2132.5	2132.5	22.872	3.535	2.75	Unsat	Unsat	38.6	24.92	24.92	24.92	24.81	59.22	0.97	0.284	1.001	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.224	14.379	0.878	2153.0	2153.0	12.847	4.372	2.78	Unsat	Unsat	55.9	13.99	13.99	13.99	14.44	46.45	0.97	0.284	0.999	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.388	26.842	1.040	2173.5	2173.5	22.872	4.372	2.78	Unsat	Unsat	40.1	25.18	25.18	25.18	24.78	63.54	0.97	0.284	0.998	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.552	23.739	1.071	2194.0	2194.0	21.926	3.643	2.80	Unsat	Unsat	43.4	26.48	26.48	26.48	26.18	63.54	0.97	0.284	0.998	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.717	24.390	0.973	2214.6	2214.6	22.426	3.991	2.79	Unsat	Unsat	40.5	21.80	21.80	21.80	22.17	60.05	0.97	0.284	0.997	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.881	26.370	0.920	2235.1	2235.1	21.926	3.643	2.77	Unsat	Unsat	44.9	23.05	23.05	23.05	22.43	60.39	0.97	0.283	0.996	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.045	21.490	0.942	2255.6	2255.6	20.026	4.094	2.84	Unsat	Unsat	42.2	22.62	22.62	22.62	21.64	59.40	0.97	0.283	0.994	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.209	23.929	0.933	2276.1	2276.1	20.026	4.094	2.84	Unsat	Unsat	36.1	28.93	28.93	28.93	28.91	61.32	0.97	0.283	0.992	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.373	31.951	0.937	2296.6	2296.6	23.711	3.169	2.63	Unsat	Unsat	31.4	40.88	40.88	40.88	38.91	81.32	0.97	0.283	0.992	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.537	43.246	1.238	2317.1	2317.1	38.015	2.941	2.53	Unsat	Unsat	27.9	77.70	77.70	77.70	74.34	127.24	0.97	0.283	0.992	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.701	82.205	3.153	2337.6	2337.6	72.873	3.891	2.42	Unsat	Unsat	26.5	84.98	84.98	84.98	81.13	135.35	0.97	0.283	0.992	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.865	89.910	3.487	2358.1	2358.1	70.444	3.617	2.37	Unsat	Unsat	27.9	88.80	88.80	88.80	84.86	140.96	0.97	0.283	0.992	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.029	91.061	4.162	2378.6	2378.6	82.793	4.358	2.42	Unsat	Unsat	18.8	126.85	126.85	126.85	122.98	176.75	0.96	0.282	0.994	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.193	136.113	5.167	2399.1	2399.1	119.757	2.121	2.08	Unsat	Unsat	9.2	310.82	310.82	310.82	300.02	319.64	0.96	0.282	0.987	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.357	328.847	3.271	2419.6	2419.6	289.555	0.988	1.58	Unsat																



CORNERSTONE
EARTH GROUP

CPT No. TRC-3

PGA (A_{max}) 0.45

Total Settlement: 0.26 (Inches)

Depth (ft)	q _p (tsf)	f _s (tsf)	σ _{vc} (psf)	Instru. σ _{vc} (psf)	Q	F (%)	I _c	Layer "Plastic" PI > 7	Flag Soil Type	Fractures (%)	Q _u near Interfaces (tsf/layer)	Thin Layer Factor (F _{TL})	Interpreted Q _u	C _N	Q _u IN	Q _u MAX	Stress Reduction Coeff. f _c	CSR	K _s for Sand	CRMs/s σ _{vc} = 1 tsf	CRR	Factor of Safety (FOS/CSR)	Vertical Strain: ε _v	Settlement (Inches)	
22.146	218.019	1.604	2763.3	2763.3	179.018	0.740	1.53		Sand	10.0			206.07	0.92	188.22	209.25	0.96	0.264	0.921	1.818	1.505	5.12	0.00	0.00	
22.310	212.132	1.422	2788.8	2788.8	173.504	0.675	1.52		Sand	9.8			200.50	0.91	163.12	200.74	0.96	0.244	0.927	1.818	1.505	5.12	0.00	0.00	
22.474	223.228	1.454	2806.3	2806.3	181.893	0.665	1.59		Sand	9.4			210.99	0.91	192.77	208.20	0.96	0.268	0.916	1.716	1.417	4.73	0.00	0.00	
22.638	233.646	1.517	2826.8	2826.8	189.810	0.663	1.58		Sand	9.2			220.84	0.91	201.89	216.11	0.96	0.298	0.913	2.000	1.642	5.53	0.00	0.00	
22.802	222.658	0.933	2850.3	2850.3	180.169	0.422	1.48		Sand	7.8			210.45	0.90	196.44	185.59	0.96	0.298	0.921	1.989	0.886	2.87	0.00	0.00	
22.966	222.658	0.933	2850.3	2850.3	180.169	0.422	1.48		Sand	7.8			210.45	0.90	196.44	185.59	0.96	0.298	0.921	1.989	0.886	2.87	0.00	0.00	
23.130	233.755	1.339	2891.3	2891.3	189.343	0.576	1.55		Sand	8.7			220.94	0.91	200.26	211.08	0.95	0.299	0.908	2.000	1.630	5.45	0.00	0.00	
23.294	259.664	1.908	2911.8	2911.8	208.049	0.739	1.58		Sand	9.3			245.43	0.91	224.51	240.64	0.95	0.300	0.904	2.000	1.623	5.42	0.00	0.00	
23.458	261.726	1.865	2922.3	2922.3	208.868	0.717	1.57		Sand	9.1			247.38	0.91	226.66	240.78	0.95	0.301	0.902	2.000	1.619	5.39	0.00	0.00	
23.622	293.007	2.107	2952.9	2952.9	232.261	0.723	1.54		Sand	8.6			276.94	0.91	252.64	265.88	0.95	0.302	0.900	2.000	1.615	5.34	0.00	0.00	
23.786	337.040	2.935	2973.3	2973.3	267.558	0.875	1.56		Sand	8.9			318.56	0.91	281.22	307.38	0.95	0.303	0.898	2.000	1.612	5.31	0.00	0.00	
23.950	378.007	2.945	2993.8	2993.8	289.786	0.843	1.38		Sand	6.4			357.28	0.91	326.03	327.64	0.95	0.304	0.889	2.000	1.608	5.28	0.00	0.00	
24.114	357.551	3.416	3014.3	3014.3	281.859	0.859	1.58		Sand	9.1			337.65	0.91	307.83	326.97	0.95	0.305	0.892	2.000	1.604	5.28	0.00	0.00	
24.278	283.520	2.846	3034.8	3034.8	222.648	1.009	1.66		Sand	10.5			268.07	0.91	243.74	271.89	0.95	0.306	0.880	2.000	1.601	5.23	0.00	0.00	
24.442	256.370	2.417	3055.3	3055.3	200.850	0.847	1.67		Sand	10.6			242.79	0.91	219.76	242.42	0.95	0.307	0.888	2.000	1.597	5.21	0.00	0.00	
24.606	244.471	1.684	3075.8	3075.8	190.451	0.685	1.59		Sand	9.4			231.07	0.89	208.48	227.36	0.95	0.307	0.886	2.000	1.593	5.18	0.00	0.00	
24.770	258.796	1.761	3096.3	3096.3	201.005	0.685	1.57		Sand	9.1			244.61	0.90	219.28	233.76	0.95	0.308	0.884	2.000	1.590	5.16	0.00	0.00	
24.934	268.563	1.907	3116.8	3116.8	207.941	0.714	1.57		Sand	9.1			253.84	0.90	228.10	243.19	0.95	0.309	0.882	2.000	1.586	5.13	0.00	0.00	
25.098	251.769	1.394	3137.3	3137.3	194.216	0.557	1.53		Sand	8.4			237.97	0.89	211.18	220.44	0.95	0.310	0.880	2.000	1.583	5.11	0.00	0.00	
25.262	251.905	1.619	3157.8	3157.8	193.682	0.647	1.57		Sand	9.0			236.10	0.89	211.34	224.66	0.95	0.311	0.878	2.000	1.579	5.09	0.00	0.00	
25.426	248.134	1.740	3178.4	3178.4	190.136	0.617	1.59		Sand	9.5			234.53	0.89	207.77	224.65	0.95	0.312	0.875	2.000	1.572	5.09	0.00	0.00	
25.591	231.603	1.419	3198.9	3198.9	176.734	0.617	1.59		Sand	9.3			218.81	0.88	191.60	206.16	0.95	0.313	0.863	2.000	1.540	1.223	3.93	0.00	0.00
25.755	191.242	1.182	3219.4	3219.4	145.311	0.623	1.66		Sand	10.4			175.40	0.86	155.13	175.11	0.95	0.315	0.856	2.000	1.465	0.383	1.23	0.00	0.01
25.919	185.571	1.132	3239.9	3239.9	140.511	1.159	1.84		Sand	13.7			175.40	0.86	155.13	175.11	0.95	0.315	0.856	2.000	1.465	0.383	1.23	0.00	0.01
26.083	184.849	2.045	3260.4	3260.4	139.259	1.117	1.83		Sand	13.6			174.53	0.86	163.84	208.16	0.94	0.314	0.873	1.713	1.345	4.28	0.00	0.00	
26.247	199.354	2.483	3280.9	3280.9	150.077	1.266	1.85		Sand	13.8			188.43	0.86	194.79	228.39	0.94	0.315	0.865	2.000	1.555	4.83	0.00	0.00	
26.411	234.704	2.403	3301.4	3301.4	174.387	1.031	1.74		Sand	11.8			220.07	0.86	192.90	228.54	0.94	0.316	0.863	2.000	1.552	4.81	0.00	0.00	
26.575	232.932	2.484	3321.9	3321.9	174.387	1.075	1.75		Sand	12.1			203.09	0.87	176.22	214.73	0.94	0.317	0.860	2.000	1.548	4.81	0.00	0.01	
26.739	214.972	2.330	3342.4	3342.4	160.337	0.993	1.78		Sand	12.6			175.30	0.84	147.73	171.73	0.94	0.317	0.859	0.563	0.456	1.44	0.00	0.00	
26.903	195.463	1.247	3362.9	3362.9	137.790	0.679	1.70		Sand	11.1			174.09	0.85	147.38	181.64	0.94	0.317	0.859	0.563	0.456	1.44	0.00	0.00	
27.067	184.486	1.678	3383.4	3383.4	136.414	0.918	1.78		Sand	12.6			171.35	0.84	143.61	170.28	0.94	0.318	0.909	0.410	0.335	1.05	0.01	0.01	
27.231	181.285	1.298	3403.9	3403.9	133.829	0.723	1.72		Sand	11.5	150		150.00	0.84	125.55	171.50	0.94	0.319	0.906	0.423	0.345	1.08	0.01	0.01	
27.395	143.628	1.565	3424.4	3424.4	105.442	1.173	1.94		Sand	15.6			140.00	0.84	117.31	176.13	0.94	0.319	0.901	0.479	0.388	1.21	0.00	0.01	
27.559	116.352	1.761	3444.9	3444.9	84.922	2.010	2.17		Sand	20.9	140		111.01	0.81	90.01	137.22	0.94	0.320	0.929	0.223	0.187	0.58	0.02	0.05	
27.723	117.447	1.761	3465.5	3465.5	85.464	1.539	2.03		Sand	18.9			115.93	0.81	83.97	139.11	0.94	0.321	0.927	0.228	0.191	0.80	0.02	0.04	
27.887	122.006	1.503	3486.9	3486.9	89.081	1.330	2.08		Sand	16.9			103.32	0.80	82.64	127.76	0.94	0.321	0.933	0.197	0.186	0.52	0.02	0.05	
28.051	103.306	1.503	3506.4	3506.4	78.872	1.397	2.08		Sand	14.2			88.70	0.80	76.91	124.44	0.94	0.322	0.934	0.189	0.189	0.48	0.03	0.05	
28.215	102.308	1.801	3526.9	3526.9	73.610	1.791	2.18		Sand	12.2			190.00	0.85	161.03	207.12	0.94	0.323	0.932	0.852	1.619	1.241	3.85	0.00	0.00
28.379	180.289	2.072	3547.4	3547.4	161.309	1.161	1.87		Sand	14.2			179.61	0.85	179.61	209.92	0.94	0.323	0.945	1.887	1.435	4.44	0.00	0.00	
28.543	224.285	1.976	3567.9	3567.9	181.899	0.888	1.72		Sand	11.5			211.81	0.85	218.75	253.23	0.94	0.324	0.942	2.000	1.514	4.68	0.00	0.00	
28.707	265.176	2.774	3588.4	3588.4	191.891	1.048	1.76		Sand	11.4			218.75	0.87	218.75	257.24	0.94	0.324	0.940	2.000	1.511	4.68	0.00	0.00	
28.871	342.672	3.127	3608.9	3608.9	199.236	1.196	1.63		Sand	12.2			248.84	0.87	218.15	257.24	0.94	0.325	0.938	2.000	1.508	4.64	0.00	0.00	
29.035	375.026	3.346	3629.4	3629.4	244.555	0.987	1.63		Sand	9.9			322.00	0.87	279.28	304.66	0.94	0.326	0.936	2.000	1.505	4.62	0.00	0.00	
29.199	375.026	4.384	3649.9	3649.9	269.301	1.172	1.66		Sand	10.4			355.41	0.86	307.80	340.55	0.94	0.326	0.935	2.000	1.502	4.81	0.00	0.00	
29.363	375.026	4.384	3670.5	3670.5	290.277	1.035	1.60		Sand	9.8			370.86	0.86	320.71	375.25	0.93	0.327	0.933	2.000	1.499	4.59	0.00	0.00	
29.527	381.946	5.596	3691.0	3691.0	346.957	1.635	1.80		Sand	12.8			370.86	0.86	320.71	375.25	0.93	0.327	0.933	2.000	1.499	4.59	0.00	0.00	
29.691	381.946	5.596	3711.5	3711.5	371.255	0.847	1.55		Sand	8.7			381.00	0.86	311.26	375.25	0.93	0.327	0.933	2.000	1.499	4.59	0.00	0.00	
29.855	381.946	5.596	3732.0	3732.0	371.909	1.782	1.75		Sand	11.9			450.52	0.86	387.89	448.37	0.93	0.328	0.930	2.000	1.493	4.55	0.00	0.00	
30.019	606.987	4.560	3752.4	3752.4	429.581	0.754	1.48		Sand	6.5			504.24	0.86	433.28	495.61	0.93	0.328	0.928	2.000	1.490	4.54	0.00	0.00	
30.183	531.491	4.293	3772.1	3772.1	376.906	0.800	1.44		Sand	7.2			574.71	0.86	483.27	495.61	0.93	0.329	0.927	2.000	1.489	4.53	0.00	0.00	
30.347	531.491																								

Calculations (8/27/2012)



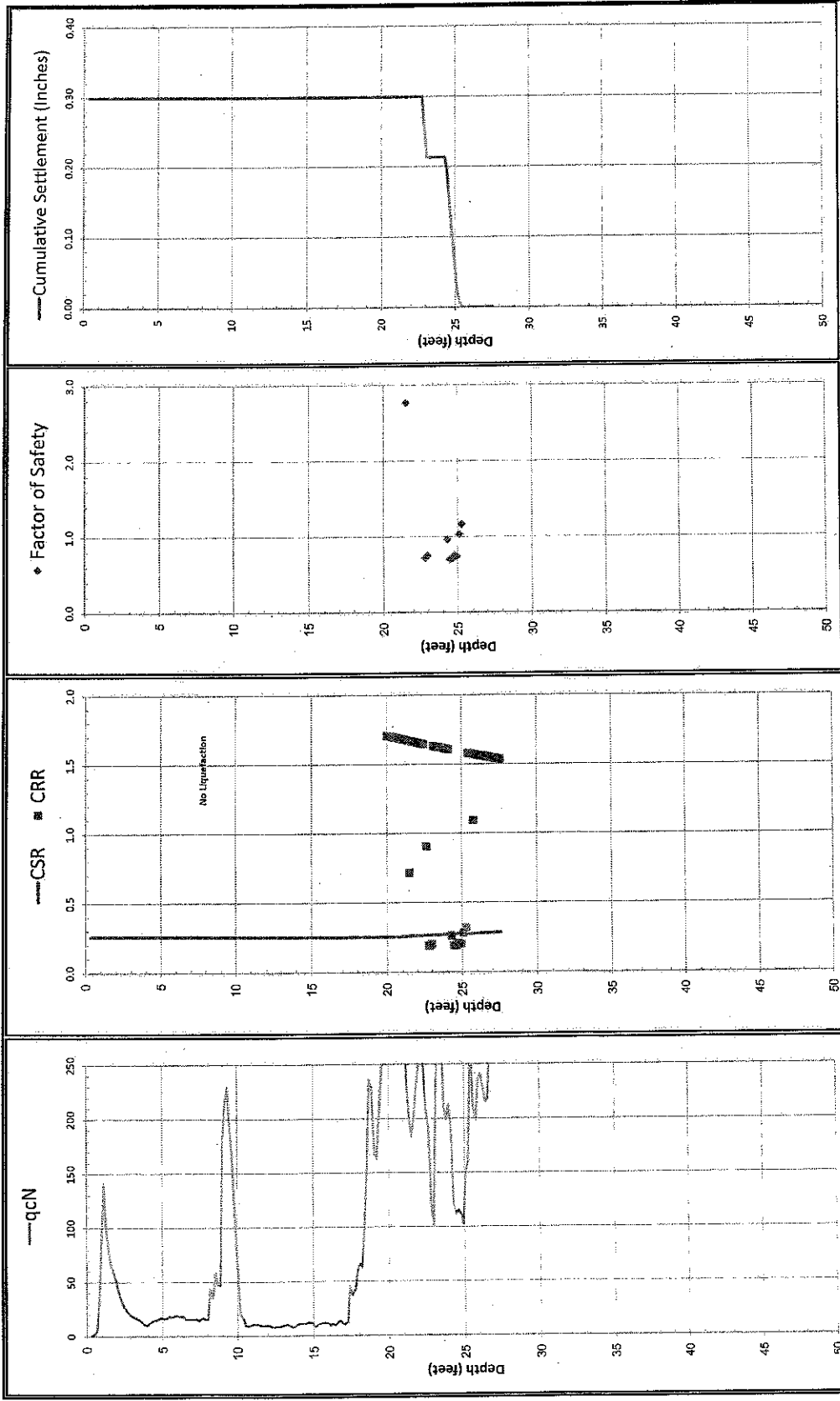
CORNERSTONE
EARTH GROUP

CPT No. TRC-3

PGA (A_{max}) 0.45

Total Settlement: 0.26 (Inches)

Depth (ft)	q_p (ksf)	f_p (ksf)	σ_{vc} (psf)	σ'_{vc} (psf)	I_{rathu}	Q_c	F (%)	I_c	Layer "Plastic" $PI > 7$	Flag Soil Type	Pinex (%)	Gap near interfaces (soft layer)	Thin Layer Factor (K_{tl})	Interpreted Q_{p10}	Q_{p10}	Q_{p10}/CSR	Stress Reduction Coeff. I_R	CSR	K_c for Sand	$CR_{RWR}/\sigma'_{vc} = 1 \text{ min}$	OCR	Factor of Safety (OCR/CSR)	Vertical Strain ϵ_v	Settlement (Inches)
44.127	350.096	4.281	5446.2	4563.7	242.876	1.137	1.57	1.57		Sand	10.7			359.26	293.32	328.23	0.88	0.359	0.769	2.000	1.384	3.85	0.00	0.00
44.291	340.702	5.249	5464.9	4573.2	217.291	1.553	1.81	1.81		Sand	13.1			322.02	262.78	318.32	0.88	0.359	0.769	2.000	1.383	3.85	0.00	0.00
44.455	349.846	4.654	5484.6	4582.6	222.933	1.341	1.75	1.75		Sand	12.1			330.67	269.68	316.35	0.88	0.359	0.768	2.000	1.382	3.85	0.00	0.00
44.619	327.219	3.715	5504.3	4592.1	208.180	1.146	1.72	1.72		Sand	11.5			309.28	252.10	290.97	0.88	0.359	0.768	2.000	1.381	3.84	0.00	0.00
44.783	331.597	4.112	5524.0	4601.5	210.760	1.251	1.75	1.75		Sand	11.9			313.41	255.33	296.66	0.88	0.360	0.767	2.000	1.380	3.84	0.00	0.00
44.948	338.886	3.572	5543.8	4611.0	215.209	1.083	1.69	1.69		Sand	10.9			320.31	260.81	294.87	0.88	0.360	0.766	2.000	1.379	3.83	0.00	0.00



 CORNERSTONE EARTH GROUP		Liquefaction Analysis Summary		Project Number 157-7-1	
		Creekside Way Campbell, California		Figure Number Figure D-4	
				8/27/2012	CPT No. 4



CORNERSTONE
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CPT No. 4

PGA (A_{max}) 0.40

Total Settlement: 0.30 (Inches)

Depth (ft)	q _c (tsf)	f _s (tsf)	σ _{vc} (psf)	Inst. σ _{vc} (psf)	Q	E (%)	Is	Layer Plasticity PI > 7	Flag Soil Type	Fines (%)	Q _{near} Intermittent (tsf)	Thin Layer Factor (K _u)	Interpreted Q _u	Q _u (N)	Q _u (N)	Q _u (N)	Stress Reduction Coeff. (tsf)	CSR	K _s to Sand	CR _u to 1 in	Factor of Safety (CRCSR)	Vertical Strain (inches)	Settlement (inches)	
0.30	1.100	0.300	41.3	41.3	52.333	27.794	3.19		Unsaturated	57.1			1.04	1.70	1.77	32.87	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.480	2.100	0.600	61.3	61.3	67.571	28.994	3.14		Unsaturated	55.0			1.38	1.70	3.37	34.98	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	5.100	1.300	82.5	82.5	122.636	25.698	2.97		Unsaturated	47.5			4.82	1.70	8.19	41.38	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	36.000	1.600	102.5	102.5	144.391	22.451	2.27		Unsaturated	23.5			34.03	1.70	57.84	102.33	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	92.700	2.600	122.5	122.5	383.912	2.807	1.90		Unsaturated	14.9			87.62	1.70	148.95	196.19	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	149.900	3.500	143.8	143.8	543.327	2.336	1.75		Unsaturated	12.0			141.68	1.70	240.86	283.26	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	103.800	4.200	163.8	163.8	351.721	4.057	2.05		Unsaturated	18.1			97.92	1.70	188.47	231.34	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	80.600	3.100	185.0	185.0	257.349	3.851	2.09		Unsaturated	19.1			76.18	1.70	128.51	187.81	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	67.700	2.500	205.0	205.0	205.270	3.898	2.13		Unsaturated	20.2			63.99	1.70	108.78	163.40	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	81.300	2.100	225.0	225.0	177.355	3.432	2.14		Unsaturated	20.2			57.84	1.70	98.50	150.63	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	51.000	1.800	246.3	246.3	140.963	3.145	2.17		Unsaturated	20.9			48.20	1.70	81.95	130.55	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	40.900	1.400	265.3	265.3	108.628	3.434	2.27		Unsaturated	23.5			38.68	1.70	65.72	112.67	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	33.400	1.200	287.5	287.5	85.276	3.608	2.35		Unsaturated	25.8			31.57	1.70	53.67	98.64	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	28.800	1.000	307.5	307.5	70.034	3.540	2.40		Unsaturated	27.3			23.84	1.70	45.63	88.92	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	26.000	0.900	327.5	327.5	59.670	3.624	2.46		Unsaturated	29.0			20.63	1.70	40.17	82.25	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.780	21.800	0.700	348.8	348.8	50.348	3.937	2.47		Unsaturated	29.5			18.53	1.70	35.03	75.57	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	18.900	0.600	368.8	368.8	43.569	3.905	2.55		Unsaturated	31.9			17.01	1.70	28.92	68.17	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	13.900	0.500	390.0	390.0	39.200	3.770	2.56		Unsaturated	31.7			16.35	1.70	27.80	66.92	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	17.300	0.600	410.0	410.0	35.707	2.925	2.54		Unsaturated	32.2			14.65	1.70	24.91	62.74	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.450	16.500	0.400	451.3	451.3	32.020	2.617	2.58		Unsaturated	33.1			13.33	1.70	22.66	59.48	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	14.100	0.400	451.3	451.3	33.681	2.883	2.52		Unsaturated	33.1			10.78	1.70	19.32	54.07	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	11.400	0.300	471.3	471.3	30.195	2.887	2.56		Unsaturated	33.7			10.02	1.70	17.03	52.93	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	10.900	0.400	492.5	492.5	27.151	3.893	2.72		Unsaturated	33.7			11.06	1.70	18.80	54.92	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	11.700	0.500	512.5	512.5	24.659	4.308	2.80		Unsaturated	35.2			13.42	1.70	22.82	60.96	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	14.200	0.600	533.8	533.8	34.537	4.306	2.88		Unsaturated	35.2			14.65	1.70	24.91	63.37	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	15.500	0.700	553.8	553.8	36.776	4.998	2.86		Unsaturated	36.3			14.56	1.70	24.74	62.86	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	15.400	0.800	573.8	573.8	32.662	5.283	2.87		Unsaturated	36.0			16.28	1.70	27.64	67.01	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	17.200	0.900	595.0	595.0	39.630	4.733	2.87		Unsaturated	35.6			16.73	1.70	28.44	68.06	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	17.700	0.800	615.0	615.0	39.041	4.733	2.86		Unsaturated	35.0			16.35	1.70	27.80	67.10	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	17.300	0.700	636.3	636.3	36.405	4.714	2.85		Unsaturated	35.6			18.15	1.70	30.85	71.32	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.260	17.300	0.800	656.3	656.3	38.405	5.345	2.85		Unsaturated	35.6			16.35	1.70	27.80	67.10	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	19.200	0.900	676.3	676.3	35.617	4.772	2.80		Unsaturated	33.9			17.39	1.70	29.57	69.25	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	18.400	0.900	697.5	697.5	31.760	4.966	2.80		Unsaturated	33.9			18.34	1.70	32.62	73.77	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	19.400	1.000	717.5	717.5	33.077	5.232	2.81		Unsaturated	33.9			18.15	1.70	30.85	71.32	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	20.300	1.000	738.8	738.8	39.350	5.017	2.88		Unsaturated	35.8			19.19	1.70	32.62	77.46	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	19.200	1.000	768.8	768.8	49.610	5.845	2.84		Unsaturated	35.8			18.05	1.70	30.85	71.32	1.00	0.260	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	19.100	1.000	788.8	788.8	46.053	5.345	2.84		Unsaturated	35.6			17.86	1.70	30.37	70.84	0.99	0.259	1.085	n.a.	n.a.	n.a.	0.00	0.00
6.400	18.900	1.000	800.0	800.0	46.250	5.405	2.86		Unsaturated	35.1			18.05	1.70	30.37	70.84	0.99	0.259	1.085	n.a.	n.a.	n.a.	0.00	0.00
6.560	16.300	1.000	820.0	820.0	38.796	6.283	2.78		Unsaturated	35.2			15.41	1.70	26.19	65.37	0.99	0.259	1.075	n.a.	n.a.	n.a.	0.00	0.00
6.730	16.800	1.000	841.3	841.3	36.465	6.161	2.78		Unsaturated	39.1			15.69	1.70	26.67	66.01	0.99	0.259	1.075	n.a.	n.a.	n.a.	0.00	0.00
6.890	16.300	0.900	861.3	861.3	36.852	5.971	2.78		Unsaturated	39.6			15.41	1.70	26.19	65.37	0.99	0.259	1.075	n.a.	n.a.	n.a.	0.00	0.00
7.050	16.100	0.900	881.3	881.3	35.539	5.747	2.78		Unsaturated	39.1			15.22	1.68	25.52	64.46	0.99	0.258	1.075	n.a.	n.a.	n.a.	0.00	0.00
7.220	15.600	0.800	901.3	901.3	35.787	5.854	2.71		Unsaturated	37.4			15.69	1.68	25.52	64.46	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
7.380	15.600	0.900	921.3	921.3	34.179	5.146	2.76		Unsaturated	39.2			15.69	1.61	25.28	64.15	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
7.550	15.900	0.900	941.3	941.3	31.773	5.350	2.69		Unsaturated	39.2			16.73	1.59	26.54	65.61	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
7.710	17.700	0.900	963.8	963.8	35.732	5.846	2.81		Unsaturated	38.7			16.50	1.58	24.47	62.45	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
7.870	16.400	0.900	983.8	983.8	32.342	5.146	2.89		Unsaturated	44.0			15.31	1.56	23.87	62.45	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
8.040	16.200	1.200	1005.0	1005.0	31.774	5.076	2.80		Unsaturated	27.1			43.48	1.41	61.45	109.71	0.99	0.258	1.085	n.a.	n.a.	n.a.	0.00	0.00
8.200	46.000	1.400	1025.0	1025.0	61.774	3.076	2.34		Unsaturated	31.7			48.79	1.35	79.35	130.19	0.99	0.257	1.075	n.a.	n.a.	n.a.	0.00	0.00
8.370	37.700	1.500	1046.3	1046.3	45.972	2.595	2.23		Unsaturated	23.2			55.79	1.37	64.32	105.74	0.99	0.257	1.075	n.a.	n.a.	n.a.	0.00	0.00
8.530	62.200	1.600	1066.3	1066.3	82.110	2.595	2.23		Unsaturated	22.4			48.79	1.37	64.32	105.74	0.99	0.257	1.075	n.a.	n.a.	n.a.	0.00	0.00
8.690	49.900	0.900	1086.3	1086.3	64.263	3.266	2.40		Unsaturated	27.3			48.98	1.36	63.72	112.81	0.99	0.257	1.075	n.a.	n.a.	n.a.	0.00	0.00
8.860	49.700	1.600	1107.5	1107.5	84.583	3.059	2.40		Unsaturated	20.4			48.98	1.36	63.72	112.81	0.99	0.257	1.075	n.a.	n.a.	n.a.	0.00	0.00
9.020	192.000	2.100	1127.5	1127.5	247.978	1.697	1.95		Unsaturated	10.3			181.47	1.19	216.19	241.46	0.99	0.257	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.190	228.500	3.800	1146.8	1146.8	247.978	1.697	1.78																	



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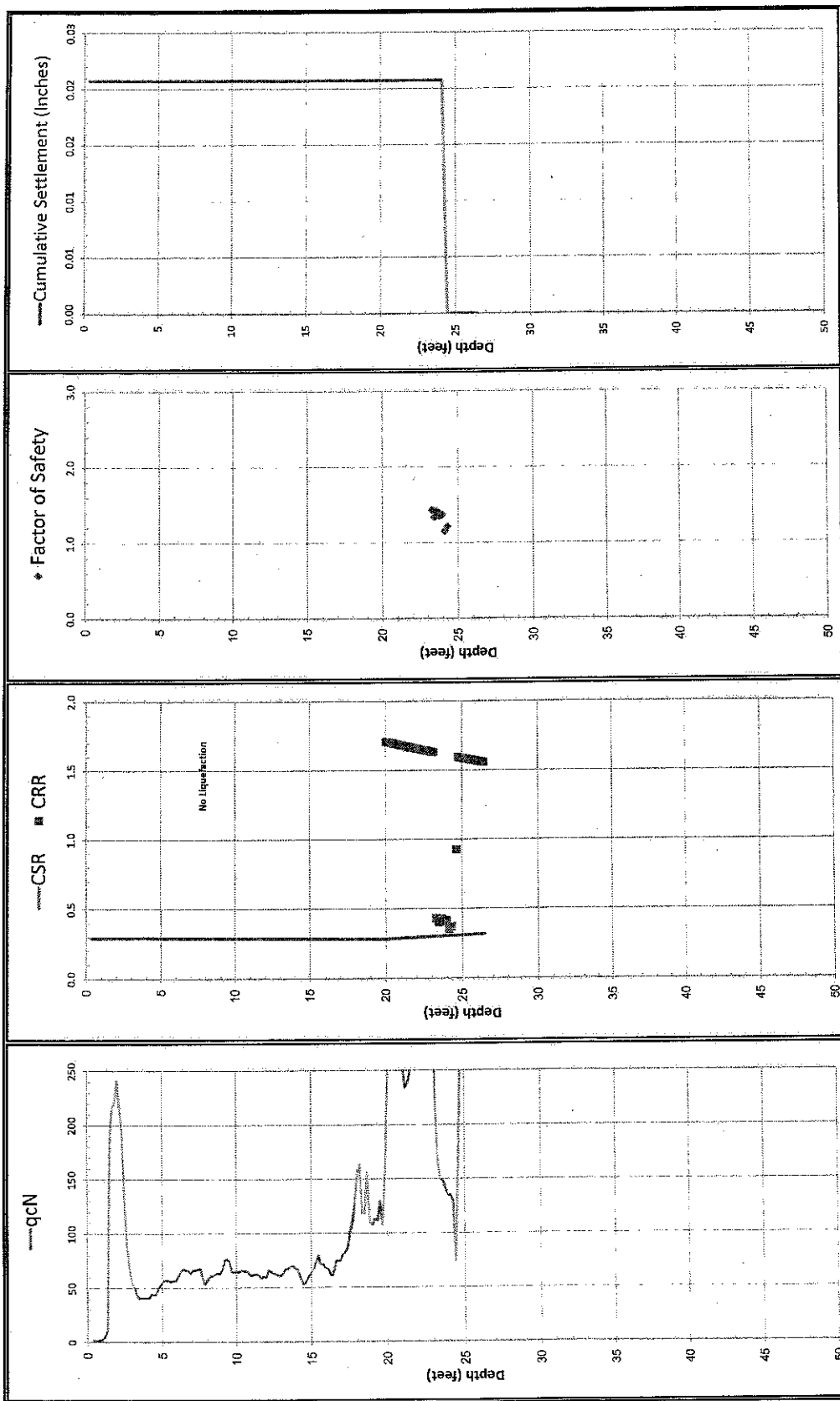
CPT No. 4

PGA (A_{max}) 0.40

Total Settlement 0.30 (inches)

Depth (ft)	Qc (ksf)	f _s (ksf)	Qc (pcf)	In situ σ' _{vs} (pcf)	Q	F (%)	I _s	Layer "plastic" PI > 7	Flag Soil Type	Fines (%)	Qc near interfaces (ksf)	Thin Layer Factor (K ₀)	Interpreted Qc	C _u	Q _u W	Q _u Wcs	Stress Reduction Coeff, R _s	CSR	K _s for Sand	CRR _{7/5} σ' _v = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain Ev	Settlement (Inches)
11.320	11,100	0.300	14150	14150	14,859	2.887	2.85	Unsat	Unsat	42.7	10.48	1.30	13.59	48.56	0.98	0.256	1.028	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.400	10,600	0.200	14350	14350	13,495	2.066	2.80	Unsat	Unsat	40.7	9.83	1.29	12.65	47.20	0.98	0.256	1.028	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.500	10,400	0.300	14580	14580	12,597	3.271	2.94	Unsat	Unsat	48.1	9.38	1.28	11.94	46.42	0.98	0.256	1.028	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.610	9,900	0.200	14763	14763	12,412	2.183	2.84	Unsat	Unsat	42.3	9.35	1.27	11.84	45.18	0.98	0.256	1.025	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.880	10,000	0.200	14975	14975	12,623	2.116	2.85	Unsat	Unsat	41.8	9.45	1.25	12.08	46.48	0.98	0.256	1.024	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	10,000	0.300	15175	15175	12,160	3.246	2.93	Unsat	Unsat	46.5	9.45	1.24	11.74	45.18	0.98	0.256	1.023	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	8,600	0.300	15375	15375	10,187	3.831	3.05	Unsat	Unsat	50.9	8.13	1.24	10.04	43.48	0.98	0.256	1.021	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.470	8,400	0.300	15588	15588	9,778	3.937	3.07	Unsat	Unsat	51.9	7.94	1.23	9.73	43.48	0.98	0.256	1.020	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.630	9,300	0.300	16000	16000	10,000	3.750	3.05	Unsat	Unsat	48.2	8.32	1.21	10.66	44.72	0.98	0.256	1.018	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.800	8,800	0.400	16200	16200	10,358	4.768	3.10	Unsat	Unsat	51.0	8.32	1.20	10.01	43.84	0.98	0.256	1.018	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.020	10,300	0.400	16400	16400	11,551	4.218	3.03	Unsat	Unsat	53.2	8.70	1.19	10.37	44.33	0.98	0.256	1.017	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.120	10,300	0.400	16613	16613	11,882	4.053	3.01	Unsat	Unsat	50.1	9.74	1.18	11.50	45.66	0.98	0.256	1.016	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	10,200	0.400	16813	16813	11,134	4.274	3.05	Unsat	Unsat	49.3	10.11	1.17	11.84	46.32	0.98	0.256	1.016	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	10,200	0.400	17025	17025	8,985	3.922	3.10	Unsat	Unsat	50.8	9.64	1.16	11.21	45.47	0.98	0.256	1.014	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	8,500	0.300	17225	17225	8,985	3.877	3.10	Unsat	Unsat	53.1	8.03	1.15	9.32	42.91	0.98	0.256	1.014	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	8,500	0.300	17425	17425	10,707	3.216	2.99	Unsat	Unsat	48.3	8.13	1.14	10.95	45.11	0.98	0.254	1.013	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	10,200	0.300	17638	17638	12,287	3.637	2.98	Unsat	Unsat	47.8	11.06	1.13	12.45	47.12	0.98	0.254	1.013	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.100	11,700	0.500	17838	17838	12,118	4.626	3.04	Unsat	Unsat	50.5	11.06	1.12	12.36	47.01	0.98	0.254	1.012	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	11,400	0.500	18059	18059	11,632	4.763	3.06	Unsat	Unsat	51.4	10.78	1.11	11.95	46.47	0.98	0.254	1.011	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	12,000	0.500	18250	18250	12,370	4.430	3.02	Unsat	Unsat	48.7	11.53	1.10	12.69	47.48	0.98	0.254	1.010	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	12,600	0.400	18450	18450	12,659	3.425	2.95	Unsat	Unsat	46.5	11.51	1.09	13.01	47.87	0.98	0.254	1.009	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	12,600	0.400	18653	18653	11,753	4.559	3.05	Unsat	Unsat	50.8	11.25	1.08	12.21	46.81	0.98	0.254	1.008	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	11,900	0.500	18863	18863	7,694	5.512	3.24	Unsat	Unsat	59.7	7.75	1.06	8.37	41.56	0.98	0.254	1.007	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	8,200	0.400	19075	19075	9,904	4.234	3.09	Unsat	Unsat	56.5	9.83	1.07	10.53	44.54	0.98	0.253	1.006	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	10,400	0.700	19275	19275	10,829	6.707	3.18	Unsat	Unsat	52.7	10.78	1.06	11.45	45.76	0.97	0.253	1.006	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.430	10,400	0.700	19475	19475	11,529	6.235	3.14	Unsat	Unsat	54.8	11.53	1.06	12.17	46.75	0.97	0.253	1.005	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.600	12,200	0.700	19688	19688	11,597	6.132	3.13	Unsat	Unsat	54.5	11.72	1.05	12.28	46.90	0.97	0.253	1.004	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	12,400	0.700	19888	19888	11,058	6.360	3.16	Unsat	Unsat	55.7	11.34	1.04	11.81	48.25	0.97	0.253	1.003	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	8,900	0.600	20100	20100	8,951	6.745	3.25	Unsat	Unsat	60.0	9.38	1.03	9.68	43.33	0.97	0.253	1.003	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	9,900	0.600	20300	20300	10,133	4.861	3.12	Unsat	Unsat	53.8	10.68	1.03	10.98	45.14	0.97	0.253	1.003	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	11,300	0.800	20500	20500	8,463	5.764	3.22	Unsat	Unsat	59.7	9.17	1.02	9.36	42.91	0.97	0.253	1.002	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	8,100	0.900	20713	20713	11,849	4.144	3.03	Unsat	Unsat	49.6	12.38	1.01	12.55	47.28	0.97	0.253	1.001	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	13,100	0.900	20913	20913	12,678	5.281	3.16	Unsat	Unsat	51.4	13.52	1.01	13.82	48.72	0.97	0.253	1.001	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	14,300	0.700	21125	21125	8,129	4.109	3.11	Unsat	Unsat	54.4	10.21	0.99	10.16	44.75	0.97	0.253	1.000	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	10,800	0.600	21338	21338	10,979	4.229	3.05	Unsat	Unsat	50.7	12.19	0.99	12.05	46.60	0.97	0.252	0.999	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	12,900	0.600	21538	21538	43,935	0.849	2.78	Unsat	Unsat	20.7	45.56	0.99	44.50	82.56	0.97	0.252	0.998	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.230	48,200	2.300	21838	21838	34,920	3.739	2.59	Unsat	Unsat	30.8	37.24	0.98	36.51	75.33	0.97	0.252	0.997	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	43,900	1.600	22150	22150	22,165	0.932	2.69	Unsat	Unsat	33.3	41.49	0.98	40.49	83.87	0.97	0.252	0.996	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.560	94,000	1.700	22350	22350	57,923	2.892	2.24	Unsat	Unsat	26.5	60.59	0.97	59.00	105.11	0.97	0.252	0.994	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	70,200	1.300	22583	22583	63,224	1.882	2.23	Unsat	Unsat	22.8	66.35	0.97	64.35	110.17	0.97	0.252	0.993	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	165,700	2.500	22763	22763	59,291	1.681	2.23	Unsat	Unsat	21.4	82.57	0.97	60.38	104.73	0.97	0.252	0.992	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.050	165,700	2.500	22963	22963	94,772	2.391	2.19	Unsat	Unsat	21.4	98.81	0.97	96.58	150.27	0.97	0.252	0.992	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	165,700	2.500	23175	23175	223,500	2.874	2.10	Unsat	Unsat	19.2	158.52	0.97	152.30	215.99	0.97	0.251	0.991	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	268,700	3.700	23375	23375	148,608	1.489	1.79	Unsat	Unsat	12.7	236.01	0.97	229.88	276.79	0.97	0.251	0.990	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.530	268,700	3.700	23588	23588	121,400	1.122	1.70	Unsat	Unsat	11.2	228.54	0.96	222.09	254.98	0.97	0.251	0.989	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.690	268,700	3.700	23788	23788	156,905	1.477	1.59	Unsat	Unsat	14.6	167.49	0.96	161.39	208.55	0.97	0.251	0.988	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.850	268,700	3.700	23988	23988	151,891	1.227	1.84	Unsat	Unsat	13.8	162.65	0.96	156.21	197.95	0.97	0.251	0.988	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.010	268,700	3.700	24200	24200	191,957	1.059	1.72	Unsat	Unsat	11.5	206.43	0.96	188.54	231.12	0.96	0.251	0.987	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.170	311,800	3.500	24400	24400	228,040	0.926	1.63	Unsat	Unsat	9.9	246.03	0.96	236.95	253.40	0.96	0.251	0.987	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.330	311,800	3.500	24613	24613	267,358	0.787	1.53	Unsat	Unsat	8.4	289.51	0.96	278.19	289.95	0.96	0.251	0.986	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.490	311,800	3.500	24813	24813	292,310	1.030	1.61	Unsat	Unsat	9.7	294.71	0.96	282.58	305.73	0.96	0.250	0.985	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.650	311,800	3.500	25013	25013	250,330	1.041	1.59	Unsat	Unsat	9.4	319.00	0.96	305.23	325.92	0.96	0.250	0.984	n.a.	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.810	311,800	3.500	25213	25213	286,381	1.396	1.62	Unsat	Unsat	9.8														

Depth (ft)	Q _p (tsf)	f _s (tsf)	Q _u (tsf)	Q _u (tsf)	F (%)	I _c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q _u near interface (soil layer)	Thin Layer Factor (K _u)	Interpreted Q _u	C _N	Q _u (N)	Quilts	Stress Reduction Coeff. f _u	CSR	K _s for Sand	CRMs ^{7/5} σ _{vc} = 1 atm	CR	Factor of Safety (FOS _{CR})	Vertical Strain (%)	Settlement (Inches)
22.310	293.200	2.400	2768.8	215.467	0.917	1.64		Sand	10.1			248.68	0.93	231.21	255.24	0.96	0.262	0.917	2.000	1.650	5.29	0.00	0.00
22.470	220.200	2.300	2808.8	179.496	1.051	1.74		Sand	11.8			208.13	0.92	191.34	225.61	0.96	0.263	0.915	2.000	1.646	5.28	0.00	0.00
22.630	203.000	1.800	2830.0	164.754	0.794	1.68		Sand	10.8			191.87	0.91	174.27	199.00	0.96	0.264	0.924	1.087	0.904	3.43	0.00	0.00
22.800	231.000	1.600	2850.0	105.610	0.617	1.76		Sand	12.3			123.91	0.88	109.10	135.80	0.96	0.265	0.958	0.219	0.189	0.71	0.02	0.05
22.970	106.400	2.300	2871.3	85.168	2.191	2.19		Sand	21.6			100.67	0.88	88.46	139.94	0.95	0.265	0.906	2.000	1.830	6.13	0.00	0.00
23.130	244.500	5.200	2891.3	186.774	2.137	1.95		Sand	16.8			231.38	0.92	213.09	278.90	0.95	0.266	0.906	2.000	1.626	8.09	0.00	0.00
23.300	324.500	6.100	2912.5	280.338	2.507	1.93		Sand	15.5			306.81	0.92	282.01	360.98	0.95	0.267	0.904	2.000	1.623	8.09	0.00	0.00
23.460	334.500	4.700	2932.5	285.25	1.411	1.72		Sand	11.5			316.16	0.92	290.08	333.42	0.95	0.268	0.902	2.000	1.619	8.03	0.00	0.00
23.620	221.500	3.900	2952.5	176.374	1.769	1.91		Sand	15.1			208.74	0.91	191.72	248.87	0.95	0.269	0.898	2.000	1.615	8.00	0.00	0.00
23.780	210.100	3.500	2973.8	166.327	1.678	1.91		Sand	15.1			198.66	0.91	180.18	234.83	0.95	0.270	0.898	2.000	1.612	8.00	0.00	0.00
23.950	226.400	5.100	2993.8	178.715	2.268	1.89		Sand	16.8			213.99	0.91	195.27	262.08	0.95	0.271	0.894	2.000	1.608	8.00	0.00	0.00
24.120	201.900	3.700	3015.0	158.596	1.847	1.95		Sand	16.0			190.74	0.90	172.01	229.76	0.95	0.271	0.894	2.000	1.608	8.00	0.00	0.00
24.280	129.100	2.300	3035.0	100.689	1.803	2.08		Sand	18.8			122.02	0.87	105.95	157.20	0.95	0.272	0.894	2.000	1.612	8.00	0.00	0.00
24.440	118.000	1.300	3055.0	91.620	1.116	1.97		Sand	16.3			111.53	0.86	95.41	137.10	0.95	0.272	0.894	2.000	1.612	8.00	0.00	0.00
24.610	122.200	1.200	3076.3	94.537	0.995	1.93		Sand	15.4			115.50	0.85	95.55	137.85	0.95	0.273	0.894	2.000	1.612	8.00	0.00	0.00
24.770	118.100	1.800	3096.3	91.070	1.544	2.07		Sand	16.5			111.63	0.85	95.31	142.69	0.95	0.273	0.894	2.000	1.612	8.00	0.00	0.00
24.940	108.900	3.300	3117.5	83.353	3.083	2.31		Sand	24.6			102.65	0.85	87.34	142.06	0.95	0.274	0.894	2.000	1.612	8.00	0.00	0.00
25.100	159.700	1.300	3137.5	122.743	0.822	1.79		Sand	12.7			150.95	0.86	126.73	161.76	0.95	0.275	0.894	2.000	1.612	8.00	0.00	0.00
25.260	170.700	1.900	3157.5	130.858	0.769	1.75		Sand	12.0			161.34	0.86	138.84	167.71	0.95	0.275	0.894	2.000	1.612	8.00	0.00	0.00
25.430	301.100	5.900	3178.8	230.970	1.970	1.85		Sand	14.4			284.59	0.90	265.62	320.61	0.95	0.276	0.878	2.000	1.579	5.72	0.00	0.00
25.590	223.100	4.100	3198.8	170.277	1.851	1.94		Sand	15.6			210.87	0.89	188.55	247.90	0.95	0.277	0.876	2.000	1.575	5.70	0.00	0.00
25.760	209.200	1.900	3220.0	150.056	0.915	1.73		Sand	11.7			172.56	0.87	172.56	203.93	0.95	0.277	0.884	1.374	1.093	3.94	0.00	0.00
25.920	251.700	4.500	3240.0	191.020	1.789	1.89		Sand	14.7			237.90	0.89	212.61	271.95	0.95	0.278	0.872	2.000	1.569	5.65	0.00	0.00
26.080	264.400	3.900	3260.0	192.462	1.540	1.84		Sand	13.7			240.93	0.89	214.96	267.24	0.94	0.278	0.870	2.000	1.566	5.62	0.00	0.00
26.250	221.700	3.800	3281.3	171.955	1.627	1.87		Sand	14.3			228.17	0.89	203.23	255.08	0.94	0.279	0.868	2.000	1.562	5.60	0.00	0.00
26.410	227.700	3.800	3301.3	172.988	1.283	1.81		Sand	13.2			215.22	0.89	189.44	234.02	0.94	0.280	0.865	2.000	1.559	5.57	0.00	0.00
26.580	231.900	3.800	3322.5	172.988	1.667	1.89		Sand	14.7			218.34	0.89	193.33	248.84	0.94	0.281	0.865	2.000	1.552	5.52	0.00	0.00
26.740	327.900	3.700	3342.5	244.658	1.137	1.67		Sand	10.7			309.07	0.89	273.95	305.74	0.94	0.282	0.861	2.000	1.548	5.48	0.00	0.00
26.900	340.800	4.200	3362.5	284.269	1.239	1.59		Sand	11.0			322.12	0.88	286.07	322.09	0.94	0.282	0.857	2.000	1.542	5.42	0.00	0.00
27.070	328.500	3.800	3383.8	285.376	0.995	1.59		Sand	9.3			362.48	0.88	320.25	341.39	0.94	0.283	0.857	2.000	1.542	5.42	0.00	0.00
27.230	328.000	3.900	3403.8	243.169	1.287	1.72		Sand	11.4			310.02	0.88	273.48	313.85	0.94	0.283	0.856	2.000	1.539	5.43	0.00	0.00
27.400	364.000	3.900	3425.0	280.151	1.076	1.63		Sand	9.9			344.05	0.88	303.00	330.28	0.94	0.284	0.854	2.000	1.536	5.41	0.00	0.00
27.560	318.700	6.200	3445.0	234.804	1.955	1.87		Sand	14.2			301.23	0.88	264.88	330.56	0.94	0.284	0.854	2.000	1.536	5.41	0.00	0.00



Liquefaction Analysis Summary		Project Number	157-7-1	
Creekside Way Campbell, California		Figure Number	Figure D-5	
		8/27/2012	CPT No. 5	



**CORNERSTONE
EARTH GROUP**



CERNERSTONE
EARTH GROUP

CPT No. 5

PGA (A_{max}) 0.45

Total Settlement: 0.02 (Inches)

Depth (ft)	q _c (tsf)	f _s (tsf)	σ _v (psf)	Initial σ _v (psf)	Q	F (%)	l _c	Layer "Plastic" P _t > 7	Flag Soil Type	Flies (%)	Q _h near interfaces (tsf)	Thin Layer Factor (K _h)	Interpreted Q _h	Q _h	Q _h n.d.s.	Stress Reduction Coeff. (α)	CSR	K _r for Sand	CRR _{7.5} σ _v = 1 atm	Factor of Safety (CR/CSS)	Vertical Strain ε _v	Settlement (Inches)	
0.330	3,200	0.500	41.3	41.3	105,667	22,942	2.96		Unsaturated	47.0			2.08	1.70	3.53	35.08	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.490	1,100	0.500	61.3	61.3	34,918	46,765	3.47		Unsaturated	71.3			1.04	1.70	1.77	32.47	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.660	1,100	0.300	92.5	92.5	25,667	28,335	3.37		Unsaturated	62.1			1.51	1.70	1.77	32.95	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.820	1,600	0.100	102.5	102.5	30,220	6,457	2.84		Unsaturated	46.3			1.04	1.70	2.57	33.97	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
0.980	2,800	0.400	122.5	122.5	44,714	14,805	3.00		Unsaturated	48.7			2.65	1.70	4.60	35.39	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.150	6,100	1,000	143.8	143.8	83,870	18,248	2.92		Unsaturated	45.8			6.77	1.70	9.80	43.52	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.310	11,000	1,600	163.8	163.8	133,351	14,655	2.74		Unsaturated	38.4			10.40	1.70	17.67	53.84	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.480	194,700	2,100	185.0	185.0	822,079	1,079	1.42		Unsaturated	7.0			184.03	1.70	312.84	316.29	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.640	230,300	2,300	205.0	205.0	674,746	1,246	1.46		Unsaturated	6.4			217.67	1.70	370.05	371.57	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.800	232,900	2,900	225.0	225.0	674,746	1,246	1.46		Unsaturated	7.5			220.13	1.70	374.22	381.21	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
1.970	255,500	3,800	246.3	246.3	707,564	1,485	1.52		Unsaturated	8.4			241.49	1.70	410.54	425.73	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.130	231,800	5,600	266.3	266.3	616,760	2,419	1.74		Unsaturated	11.9			218.90	1.70	372.14	429.61	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.300	205,000	6,800	287.5	287.5	527,602	3,305	1.89		Unsaturated	14.7			194.61	1.66	329.51	411.78	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.460	137,000	7,500	307.5	307.5	339,299	5,481	2.17		Unsaturated	21.0			129.49	1.66	215.39	302.92	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.620	95,300	5,500	327.5	327.5	228,566	5,781	2.27		Unsaturated	23.7			90.08	1.70	153.13	227.26	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.790	71,400	3,900	348.8	348.8	165,826	5,476	2.32		Unsaturated	25.1			67.48	1.70	114.73	178.56	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
2.960	56,500	3,300	368.8	368.8	133,168	5,611	2.38		Unsaturated	26.8			55.77	1.70	94.80	153.72	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.120	63,400	2,900	390.0	390.0	117,137	5,263	2.39		Unsaturated	27.1			50.47	1.70	88.80	141.98	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.280	46,400	2,300	410.0	410.0	99,182	4,979	2.42		Unsaturated	27.8			43.86	1.70	74.56	127.47	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.450	42,400	1,600	431.3	431.3	85,320	4,287	2.40		Unsaturated	27.2			40.08	1.70	68.13	118.59	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.610	43,100	1,600	451.3	451.3	87,753	3,732	2.35		Unsaturated	25.9			40.74	1.70	69.25	119.29	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.770	43,200	1,600	471.3	471.3	86,051	3,724	2.36		Unsaturated	28.1			40.83	1.70	69.41	119.60	1.00	0.293	1.100	n.a.	n.a.	0.00	0.00
3.940	43,900	2,200	512.5	512.5	82,991	5,147	2.46		Unsaturated	27.4			40.74	1.70	69.25	120.23	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.100	43,900	2,500	533.8	533.8	87,946	5,350	2.47		Unsaturated	29.7			44.42	1.70	75.52	129.60	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.270	47,900	2,500	553.8	553.8	94,479	5,468	2.49		Unsaturated	30.1			43.48	1.70	73.91	127.69	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.430	46,000	2,500	573.8	573.8	84,428	5,375	2.49		Unsaturated	28.9			44.23	1.70	75.20	128.33	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.590	46,000	2,500	595.0	595.0	94,474	4,717	2.41		Unsaturated	27.6			50.38	1.70	85.49	141.91	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
4.760	53,300	2,500	615.0	615.0	95,167	5,001	2.42		Unsaturated	27.9			53.21	1.68	88.33	145.85	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
5.080	60,200	2,900	636.3	636.3	103,218	4,843	2.40		Unsaturated	27.2			56.90	1.82	92.26	150.62	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
5.250	60,200	3,000	656.3	656.3	99,415	5,046	2.42		Unsaturated	27.7			58.98	1.80	91.30	149.64	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
5.410	59,800	3,000	676.3	676.3	101,616	5,011	2.41		Unsaturated	27.9			56.52	1.59	89.88	147.92	1.00	0.292	1.100	n.a.	n.a.	0.00	0.00
5.580	98,000	3,000	697.5	697.5	99,415	5,115	2.43		Unsaturated	28.3			58.43	1.58	87.98	145.54	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.740	59,900	3,000	717.5	717.5	96,320	5,056	2.43		Unsaturated	28.2			56.52	1.54	87.35	144.73	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
5.910	59,900	3,000	738.8	738.8	95,223	5,039	2.43		Unsaturated	28.3			60.96	1.51	92.11	150.51	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
6.070	64,900	3,000	758.8	758.8	101,289	4,835	2.43		Unsaturated	27.3			65.50	1.46	98.39	157.93	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
6.230	69,300	3,200	778.8	778.8	107,364	4,594	2.37		Unsaturated	26.5			67.30	1.46	98.39	157.93	1.00	0.291	1.100	n.a.	n.a.	0.00	0.00
6.400	71,200	3,200	800.0	800.0	108,833	4,594	2.36		Unsaturated	26.1			66.16	1.45	96.18	155.32	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
6.560	70,000	3,200	820.0	820.0	105,950	4,598	2.37		Unsaturated	26.5			65.50	1.44	94.75	153.80	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
6.730	69,500	3,300	841.3	841.3	104,574	4,591	2.39		Unsaturated	27.0			65.69	1.44	94.75	153.80	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
6.890	66,900	3,400	861.3	861.3	102,170	4,731	2.43		Unsaturated	28.1			63.23	1.44	90.94	148.43	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
7.050	70,200	3,300	881.3	881.3	102,170	4,731	2.39		Unsaturated	27.1			66.35	1.42	94.07	152.91	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
7.220	70,000	3,200	902.5	902.5	95,223	5,039	2.43		Unsaturated	26.9			66.16	1.41	93.10	151.51	0.99	0.291	1.100	n.a.	n.a.	0.00	0.00
7.380	70,800	3,000	922.5	922.5	100,580	4,834	2.40		Unsaturated	27.4			66.92	1.39	93.27	152.07	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
7.550	71,400	3,000	943.8	943.8	100,383	4,935	2.41		Unsaturated	27.6			67.49	1.38	93.20	152.13	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
7.710	61,900	3,000	963.8	963.8	86,017	5,373	2.48		Unsaturated	29.8			55.91	1.40	81.65	137.88	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
7.870	61,900	3,000	983.8	983.8	78,946	5,044	2.42		Unsaturated	30.0			52.93	1.40	74.22	128.08	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
8.040	60,200	2,800	1005.0	1005.0	81,874	4,355	2.49		Unsaturated	28.0			60.59	1.38	78.53	132.86	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
8.200	64,100	2,800	1025.0	1025.0	85,354	4,551	2.43		Unsaturated	28.1			60.59	1.36	82.36	137.97	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
8.370	64,100	2,800	1045.0	1045.0	85,354	4,551	2.43		Unsaturated	28.1			62.10	1.34	82.34	138.77	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
8.530	65,700	3,000	1066.3	1066.3	86,770	4,604	2.43		Unsaturated	27.9			63.33	1.32	83.84	139.90	0.99	0.290	1.100	n.a.	n.a.	0.00	0.00
8.690	67,000	2,900	1089.3	1089.3	87,569	4,394	2.41		Unsaturated	27.8			62.57	1.32	82.34	137.79	0.99	0.290	1.098	n.a.	n.a.	0.00	0.00
8.860	66,200	2,900	1107.5	1107.5	85,755	4,418	2.42		Unsaturated	27.4			67.49	1.30	87.50	144.45	0.99	0.289	1.096	n.a.	n.a.	0.00	0.00
9.020	71,400	3,200	1127.5	1127.5	91,721	4,517	2.41		Unsaturated	26.7			75.52	1.27	96.10	155.33	0.99	0.289	1.100	n.a.	n.a.	0.00	0.00
9.190	75,900	3,600	1168.8	1168.8	101,759	4,539	2.38		Unsaturated	27.1			76.37	1.26	96.46	156.10	0.99	0.289	1.100	n.a.	n.a.	0.00	0.00
9.350	80,800	3,800	1188.8	1188.8	102,016	4,737	2.39		Unsaturated	27.3			74.87	1.26	93.86	152.52	0.99	0.289	1.095	n.a.	n.a.	0.00	0.00
9.510	79,900	3,700	1210.0	1210.0	95,363	4,696	2.44		Unsaturated	28.4													



CORNERSTONE
EARTH GROUP

CPT No. 5

PGA (A_{max}) 0.45

Total Settlement 0.02 (Inches)

Depth (ft)	Q _p (ksf)	f _p (ksf)	σ _{vc} (psf)	Instn.	Q _c	F (%)	f _c	Layer	Flng Soil Type	Fines (%)	Q _u near interface (soff layer)	Thin Layer Factor (K _u)	Interpreted Q _u	C _N	Q _{uN}	Q _u (ksf)	Stress Reduction Coeff. (C _u)	CSR	K _o for Sand	CRR _{7.5} A _v = 1.0m	Factor of Safety (CRR/CSR)	Vertical Strain (inches)	Settlement (inches)
11.320	66,300	3,600	1415.0	1415.0	75,814	5.488	2.52	Unsat'd	Unsat'd	31.1	52.87	1.19	74.78	129.21	0.98	1.054	0.288	1.054	n.a.	n.a.	n.a.	0.00	0.00
11.480	65,300	3,500	1435.0	1435.0	73,780	5.448	2.53	Unsat'd	Unsat'd	31.2	51.44	1.19	72.99	128.87	0.98	1.051	0.288	1.051	n.a.	n.a.	n.a.	0.00	0.00
11.640	61,900	3,000	1456.3	1456.3	69,696	4.904	2.51	Unsat'd	Unsat'd	30.6	58.51	1.18	68.31	121.73	0.98	1.047	0.288	1.047	n.a.	n.a.	n.a.	0.00	0.00
11.810	63,900	3,000	1476.3	1476.3	71,474	4.980	2.49	Unsat'd	Unsat'd	30.1	60.40	1.18	71.01	123.79	0.98	1.046	0.288	1.046	n.a.	n.a.	n.a.	0.00	0.00
11.990	63,000	3,100	1497.5	1497.5	69,842	4.980	2.51	Unsat'd	Unsat'd	30.7	59.65	1.17	69.63	122.71	0.98	1.044	0.288	1.044	n.a.	n.a.	n.a.	0.00	0.00
12.140	69,700	3,500	1517.8	1517.8	76,946	5.077	2.48	Unsat'd	Unsat'd	30.1	58.88	1.16	76.17	120.71	0.98	1.045	0.287	1.045	n.a.	n.a.	n.a.	0.00	0.00
12.300	68,900	3,800	1537.5	1537.5	75,546	5.077	2.53	Unsat'd	Unsat'd	31.3	65.12	1.15	74.92	122.47	0.98	1.043	0.287	1.043	n.a.	n.a.	n.a.	0.00	0.00
12.470	68,800	3,800	1558.8	1558.8	72,705	5.066	2.56	Unsat'd	Unsat'd	32.0	63.14	1.15	72.33	126.22	0.98	1.040	0.287	1.040	n.a.	n.a.	n.a.	0.00	0.00
12.630	65,000	3,800	1568.8	1568.8	71,466	5.066	2.55	Unsat'd	Unsat'd	32.2	62.48	1.14	71.23	124.82	0.98	1.038	0.287	1.038	n.a.	n.a.	n.a.	0.00	0.00
12.800	65,000	3,800	1600.0	1600.0	69,783	5.019	2.57	Unsat'd	Unsat'd	32.6	61.44	1.13	69.70	122.88	0.98	1.036	0.287	1.036	n.a.	n.a.	n.a.	0.00	0.00
12.960	64,200	3,700	1620.0	1620.0	68,476	5.037	2.57	Unsat'd	Unsat'd	32.7	60.68	1.13	68.51	121.29	0.98	1.034	0.287	1.034	n.a.	n.a.	n.a.	0.00	0.00
13.120	67,000	3,800	1640.0	1640.0	71,052	5.042	2.56	Unsat'd	Unsat'd	32.1	63.33	1.12	70.99	124.47	0.98	1.033	0.287	1.033	n.a.	n.a.	n.a.	0.00	0.00
13.290	71,000	4,000	1661.3	1661.3	74,852	5.000	2.54	Unsat'd	Unsat'd	31.6	57.11	1.11	74.64	129.19	0.98	1.032	0.287	1.032	n.a.	n.a.	n.a.	0.00	0.00
13.450	71,200	4,000	1681.3	1681.3	74,507	5.085	2.54	Unsat'd	Unsat'd	31.6	57.30	1.11	74.46	128.96	0.98	1.031	0.287	1.031	n.a.	n.a.	n.a.	0.00	0.00
13.620	73,300	4,000	1702.5	1702.5	76,341	5.021	2.52	Unsat'd	Unsat'd	31.1	69.28	1.10	79.17	131.07	0.98	1.030	0.286	1.030	n.a.	n.a.	n.a.	0.00	0.00
13.780	74,400	3,900	1725.5	1725.5	77,039	5.303	2.51	Unsat'd	Unsat'd	30.6	70.32	1.09	78.90	131.86	0.98	1.028	0.286	1.028	n.a.	n.a.	n.a.	0.00	0.00
13.940	74,400	3,900	1742.5	1742.5	73,981	5.491	2.53	Unsat'd	Unsat'd	31.3	66.82	1.08	74.04	128.29	0.98	1.026	0.286	1.026	n.a.	n.a.	n.a.	0.00	0.00
14.110	70,700	3,600	1763.8	1763.8	72,281	5.156	2.52	Unsat'd	Unsat'd	30.8	66.82	1.08	72.47	126.03	0.98	1.024	0.286	1.024	n.a.	n.a.	n.a.	0.00	0.00
14.270	68,600	3,300	1783.8	1783.8	64,555	5.262	2.55	Unsat'd	Unsat'd	32.1	60.11	1.08	65.07	116.52	0.98	1.021	0.286	1.021	n.a.	n.a.	n.a.	0.00	0.00
14.440	58,000	2,900	1805.0	1805.0	56,385	5.263	2.59	Unsat'd	Unsat'd	33.3	52.93	1.08	57.17	105.25	0.98	1.018	0.286	1.018	n.a.	n.a.	n.a.	0.00	0.00
14.600	67,500	2,300	1825.0	1825.0	57,592	4.065	2.50	Unsat'd	Unsat'd	30.4	54.35	1.07	56.37	107.05	0.98	1.016	0.286	1.016	n.a.	n.a.	n.a.	0.00	0.00
14.760	62,300	2,700	1845.0	1845.0	62,127	4.399	2.51	Unsat'd	Unsat'd	30.5	58.89	1.07	62.81	113.01	0.98	1.015	0.286	1.015	n.a.	n.a.	n.a.	0.00	0.00
14.920	65,600	3,000	1866.3	1866.3	65,083	4.639	2.51	Unsat'd	Unsat'd	30.7	52.00	1.06	66.71	116.94	0.98	1.014	0.286	1.014	n.a.	n.a.	n.a.	0.00	0.00
15.090	65,600	3,000	1886.3	1886.3	68,732	4.661	2.50	Unsat'd	Unsat'd	30.2	55.78	1.05	69.31	121.58	0.98	1.014	0.285	1.014	n.a.	n.a.	n.a.	0.00	0.00
15.250	73,700	3,300	1907.5	1907.5	72,410	4.416	2.41	Unsat'd	Unsat'd	29.6	71.55	1.04	74.90	128.85	0.97	1.011	0.285	1.011	n.a.	n.a.	n.a.	0.00	0.00
15.420	84,100	3,800	1927.5	1927.5	82,331	4.210	2.41	Unsat'd	Unsat'd	30.4	79.49	1.04	82.69	138.11	0.97	1.010	0.285	1.010	n.a.	n.a.	n.a.	0.00	0.00
15.580	78,200	3,800	1947.5	1947.5	74,114	4.591	2.50	Unsat'd	Unsat'd	30.4	72.02	1.03	73.48	127.23	0.97	1.009	0.285	1.009	n.a.	n.a.	n.a.	0.00	0.00
15.750	71,900	3,900	1968.8	1968.8	72,821	4.978	2.52	Unsat'd	Unsat'd	31.1	66.82	1.03	68.89	122.68	0.97	1.008	0.285	1.008	n.a.	n.a.	n.a.	0.00	0.00
15.910	71,900	3,900	1988.8	1988.8	69,129	5.077	2.52	Unsat'd	Unsat'd	30.8	66.73	1.02	68.31	120.38	0.97	1.006	0.285	1.006	n.a.	n.a.	n.a.	0.00	0.00
16.080	70,600	3,300	2010.0	2010.0	67,462	4.412	2.51	Unsat'd	Unsat'd	31.0	61.34	1.02	62.26	112.84	0.97	1.004	0.284	1.004	n.a.	n.a.	n.a.	0.00	0.00
16.240	64,900	3,300	2030.0	2030.0	61,336	4.554	2.52	Unsat'd	Unsat'd	32.3	61.34	1.02	62.26	112.84	0.97	1.003	0.284	1.003	n.a.	n.a.	n.a.	0.00	0.00
16.400	64,900	3,300	2050.0	2050.0	61,336	4.571	2.47	Unsat'd	Unsat'd	32.3	73.35	1.01	74.04	127.60	0.97	1.002	0.284	1.002	n.a.	n.a.	n.a.	0.00	0.00
16.570	77,600	3,800	2071.3	2071.3	73,146	4.865	2.41	Unsat'd	Unsat'd	30.0	74.76	1.01	75.15	129.30	0.97	1.000	0.284	1.000	n.a.	n.a.	n.a.	0.00	0.00
16.730	79,100	3,800	2091.3	2091.3	74,211	4.865	2.49	Unsat'd	Unsat'd	30.0	74.76	1.00	74.76	129.30	0.97	0.999	0.284	0.999	n.a.	n.a.	n.a.	0.00	0.00
16.900	78,600	2,900	2112.5	2112.5	72,353	3.740	2.41	Unsat'd	Unsat'd	27.4	82.04	0.99	84.29	139.64	0.97	0.998	0.284	0.998	n.a.	n.a.	n.a.	0.00	0.00
17.060	84,300	3,500	2132.8	2132.8	80,311	3.353	2.35	Unsat'd	Unsat'd	25.7	85.26	0.99	84.29	139.64	0.97	0.998	0.284	0.998	n.a.	n.a.	n.a.	0.00	0.00
17.230	86,900	2,900	2153.8	2153.8	83,102	3.415	2.36	Unsat'd	Unsat'd	26.6	82.04	0.98	84.29	139.64	0.97	0.994	0.284	0.994	n.a.	n.a.	n.a.	0.00	0.00
17.390	90,200	3,400	2173.8	2173.8	86,822	3.415	2.36	Unsat'd	Unsat'd	28.2	99.62	0.98	98.21	154.32	0.97	0.994	0.284	0.994	n.a.	n.a.	n.a.	0.00	0.00
17.550	105,400	3,000	2193.8	2193.8	95,822	2.416	2.35	Unsat'd	Unsat'd	18.2	112.48	0.98	110.51	161.34	0.97	0.992	0.283	0.992	n.a.	n.a.	n.a.	0.00	0.00
17.720	119,000	2,100	2215.0	2215.0	108,971	1.781	2.05	Unsat'd	Unsat'd	18.9	131.38	0.98	128.90	186.40	0.97	0.988	0.283	0.988	n.a.	n.a.	n.a.	0.00	0.00
17.880	139,000	3,100	2235.0	2235.0	124,004	1.781	2.08	Unsat'd	Unsat'd	18.9	156.99	0.98	154.02	224.89	0.97	0.981	0.283	0.981	n.a.	n.a.	n.a.	0.00	0.00
18.050	196,100	5,900	2255.3	2255.3	158,860	2.205	2.19	Unsat'd	Unsat'd	17.4	163.71	0.98	160.13	220.89	0.97	0.978	0.283	0.978	n.a.	n.a.	n.a.	0.00	0.00
18.210	173,200	3,800	2276.3	2276.3	158,860	2.205	2.02	Unsat'd	Unsat'd	17.4	115.15	0.96	113.98	129.34	0.97	0.983	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.370	125,000	0.900	2296.3	2296.3	112,374	4.004	1.64	Unsat'd	Unsat'd	10.2	115.15	0.97	114.29	174.89	0.97	0.983	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.540	165,200	3,900	2317.5	2317.5	111,848	3.145	2.23	Unsat'd	Unsat'd	22.6	115.15	0.97	114.29	174.89	0.97	0.983	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.700	165,200	4,900	2337.5	2337.5	147,511	2.987	2.14	Unsat'd	Unsat'd	20.2	155.14	0.96	151.46	218.45	0.97	0.983	0.283	0.983	n.a.	n.a.	n.a.	0.00	0.00
18.870	116,300	4,200	2358.8	2358.8	103,059	3.645	2.30	Unsat'd	Unsat'd	24.5	109.52	0.96	105.50	165.79	0.97	0.980	0.282	0.980	n.a.	n.a.	n.a.	0.00	0.00
19.030	113,800	3,000	2378.8	2378.8	100,387	2.654	2.21	Unsat'd	Unsat'd	21.9	107.56	0.96	102.78	158.98	0.97	0.980	0.282	0.980	n.a.	n.a.	n.a.	0.00	0.00
19.190	119,500	2,300	2398.8	2398.8	109,019	1.944	2.09	Unsat'd	Unsat'd	19.1	112.93	0.95	107.59	159.88	0.97	0.978	0.282	0.978	n.a.	n.a.	n.a.	0.00	0.00
19.350	137,300	1,800	2419.0	2419.0	103,310	2.310	2.15	Unsat'd	Unsat'd	20.5	111.63	0.95	105.69	160.83	0.98	0.978	0.282	0.978	n.a.	n.a.	n.a.	0.00	0.00
19.520	116,100	2,100	2440.0	2440.0	119,776	1.323	1.93	Unsat'd	Unsat'd	15.5	129.77	0.95	123.02	187.98	0.96	0.973	0.282	0.973	n.a.	n.a.	n.a.	0.00	0.00
19.690	112,600	2,100	2461.3	2461.3	139,892	0.935	1.78	Unsat'd	Unsat'd	12.6	106.43	0.94	100.16	151.10	0.96								



CORNERSTONE
EARTH GROUP

CPT No. 5

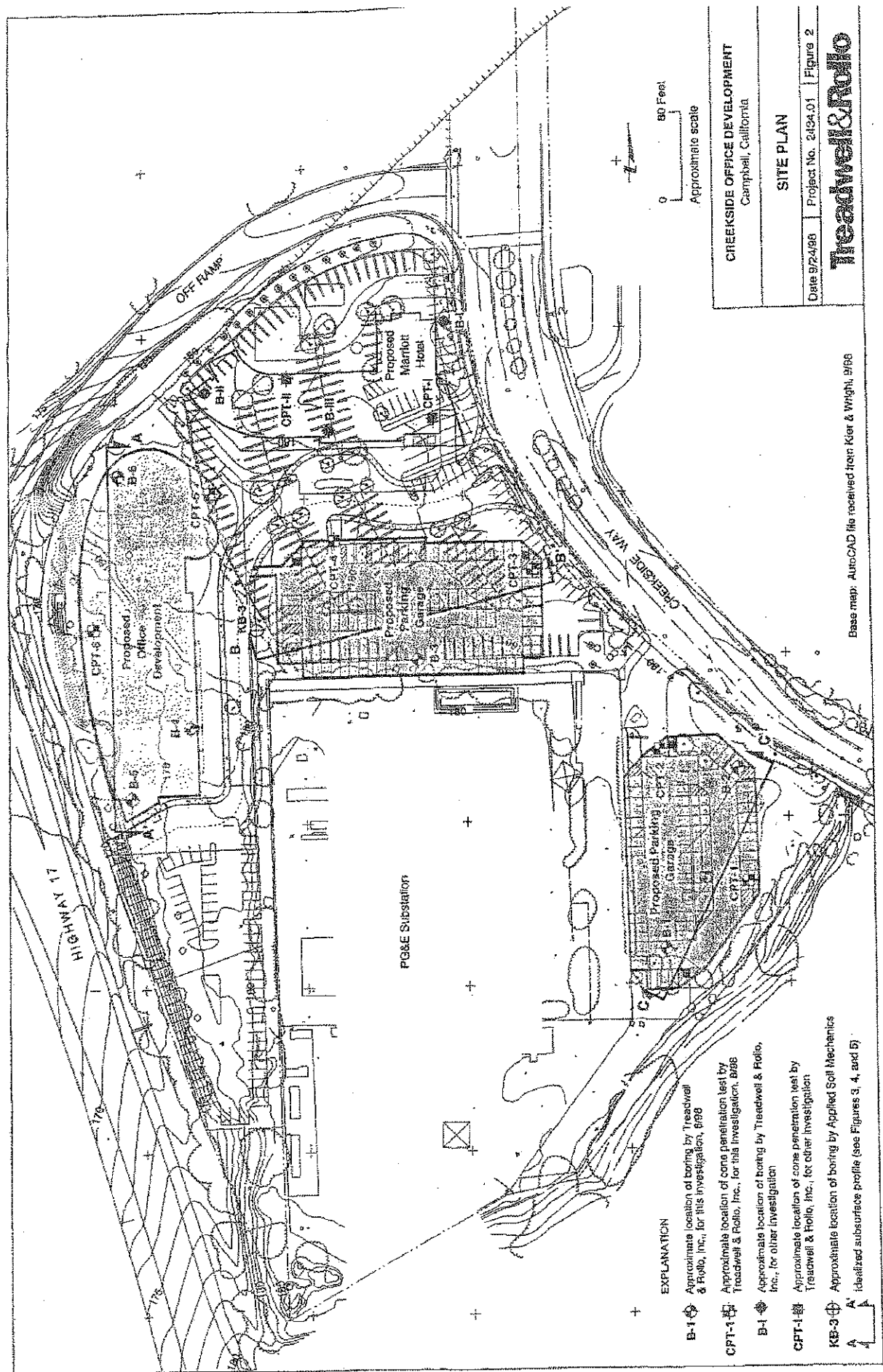
POA (A_{max}) 0.45

Total Settlement: 0.02 (inches)

Depth (ft)	q_c (tsf)	f_u (tsf)	σ'_{vc} (psf)	Inst. σ'_{vc} (psf)	Q	F (%)	I_p	Layer Plasticity $PI > 7$	Flag Soil Type	Fines (%)	Q _{near} Interlocks (soil layer)	Thin Layer Factor (K_u)	Interpreted Q _u	CN	Q _{uN}	Q _{uCSR}	Stress Reduction Coeff. T_d	CSR	K _o for Sand	CRR _{70/2.5} $\sigma'_{vc} = 1$ am	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ϵ_v	Settlement (inches)
22.310	475.500	6.500	2788.9	2788.9	383.715	1.359	1.61		Sand	9.7			453.31	0.93	421.47	453.41	0.88	0.295	0.917	2.000	1.950	5.69	0.00	0.00
22.470	474.500	3.500	2808.9	2808.9	382.119	0.740	1.40		Sand	8.7			448.49	0.93	416.20	419.16	0.86	0.295	0.915	2.000	1.946	5.66	0.00	0.00
22.640	423.300	5.600	2830.0	2830.0	344.805	1.327	1.63		Sand	10.1			400.09	0.92	370.55	404.05	0.88	0.297	0.913	2.000	1.942	5.63	0.00	0.00
22.800	343.200	7.700	2850.0	2850.0	278.349	2.253	1.88		Sand	14.4			324.39	0.92	299.88	373.81	0.96	0.299	0.911	2.000	1.938	5.50	0.00	0.00
22.970	375.300	5.100	2871.3	2871.3	303.355	1.364	1.86		Sand	10.7			354.73	0.92	327.28	365.78	0.85	0.299	0.908	2.000	1.934	5.47	0.00	0.00
23.130	239.500	3.800	2891.3	2891.3	192.085	1.500	1.85		Sand	13.9			225.80	0.92	205.04	261.02	0.89	0.299	0.906	2.000	1.930	5.45	0.00	0.00
23.300	178.500	1.400	2912.5	2912.5	142.955	0.789	1.73		Sand	11.6			169.09	0.89	150.75	178.51	0.89	0.300	0.933	0.912	0.430	1.43	0.00	0.00
23.480	133.500	1.300	2932.5	2932.5	105.008	0.985	1.89		Sand	14.8	150		150.00	0.89	133.25	176.06	0.89	0.301	0.934	0.910	0.411	1.33	0.00	0.00
23.620	109.500	1.000	2952.5	2952.5	86.756	0.922	1.94		Sand	15.6	148		140.00	0.88	123.80	177.03	0.85	0.302	0.931	0.910	0.411	1.36	0.00	0.00
23.790	97.400	1.100	2973.8	2973.8	76.471	1.147	2.04		Sand	17.8	140		135.00	0.88	119.12	177.60	0.85	0.304	0.931	0.910	0.411	1.37	0.00	0.00
23.950	78.300	1.000	2993.8	2993.8	61.030	1.302	2.15		Sand	20.5	135		135.00	0.88	118.41	177.60	0.85	0.304	0.931	0.910	0.411	1.37	0.00	0.00
24.120	87.900	0.900	3015.0	3015.0	58.408	1.042	2.05		Sand	18.1	135		130.00	0.88	113.88	173.29	0.85	0.305	0.929	0.910	0.411	1.35	0.01	0.01
24.280	81.000	1.300	3035.0	3035.0	52.728	1.636	2.20		Sand	21.8	130		130.00	0.91	n.a.	n.a.	0.95	0.305	n.a.	n.a.	0.370	1.21	0.01	0.01
24.440	77.400	2.700	3055.0	3055.0	59.583	3.559	2.45	plastic		28.8			73.16	0.91	n.a.	n.a.	0.95	0.306	n.a.	n.a.	0.370	n.a.	0.00	0.00
24.610	165.100	2.700	3076.3	3076.3	128.216	1.651	1.98		Sand	16.5	165		165.00	0.88	145.86	200.03	0.85	0.307	0.902	1.139	0.924	3.01	0.00	0.00
24.770	285.200	3.300	3096.3	3096.3	221.636	1.163	1.71		Sand	11.3			269.57	0.90	243.81	279.60	0.85	0.307	0.886	2.000	1.953	5.18	0.00	0.00
24.940	360.700	5.900	3117.5	3117.5	276.662	1.643	1.76		Sand	12.2			340.93	0.90	307.79	361.39	0.85	0.308	0.884	2.000	1.950	5.16	0.00	0.00
25.100	431.900	8.500	3137.5	3137.5	333.330	1.979	1.79		Sand	12.7			407.37	0.90	367.16	434.47	0.85	0.309	0.882	2.000	1.946	5.13	0.00	0.00
25.260	463.700	10.400	3157.5	3157.5	357.566	2.250	1.82		Sand	13.3			438.28	0.90	394.36	473.22	0.85	0.310	0.880	2.000	1.943	5.11	0.00	0.00
25.430	483.500	8.500	3178.8	3178.8	356.284	1.840	1.75		Sand	11.9			438.19	0.90	393.58	454.66	0.85	0.311	0.878	2.000	1.939	5.09	0.00	0.00
25.590	360.500	6.900	3198.8	3198.8	275.903	1.923	1.82		Sand	13.3			340.74	0.90	305.54	370.29	0.85	0.312	0.874	2.000	1.937	5.05	0.00	0.00
25.760	408.100	6.300	3220.0	3220.0	309.922	1.483	1.70		Sand	11.1			383.84	0.90	343.59	388.71	0.85	0.313	0.872	2.000	1.934	5.04	0.00	0.00
25.920	398.900	8.300	3240.0	3240.0	303.456	2.089	1.83		Sand	13.5			377.03	0.89	336.95	408.35	0.85	0.313	0.870	2.000	1.929	5.02	0.00	0.00
26.080	373.400	7.800	3260.0	3260.0	283.089	2.088	1.85		Sand	13.8			352.93	0.89	314.80	366.00	0.85	0.313	0.868	2.000	1.926	5.00	0.00	0.00
26.250	360.500	5.800	3281.3	3281.3	272.229	1.617	1.76		Sand	12.3			340.55	0.89	303.33	356.56	0.84	0.314	0.867	2.000	1.922	4.97	0.00	0.00
26.410	411.100	4.700	3301.3	3301.3	309.837	1.148	1.61		Sand	9.7			398.56	0.89	345.54	372.68	0.84	0.315	0.867	2.000	1.919	4.95	0.00	0.00

APPENDIX E: PREVIOUS FIELD AND LABORATORY PROGRAMS BY OTHERS

- Geotechnical Report titled, "Creekside Office Development," prepared by Treadwell & Rollo, dated October 6, 1998.
- Geotechnical Feasibility Investigation titled, "Creekside Development," prepared by TRC, dated March 14, 2008.

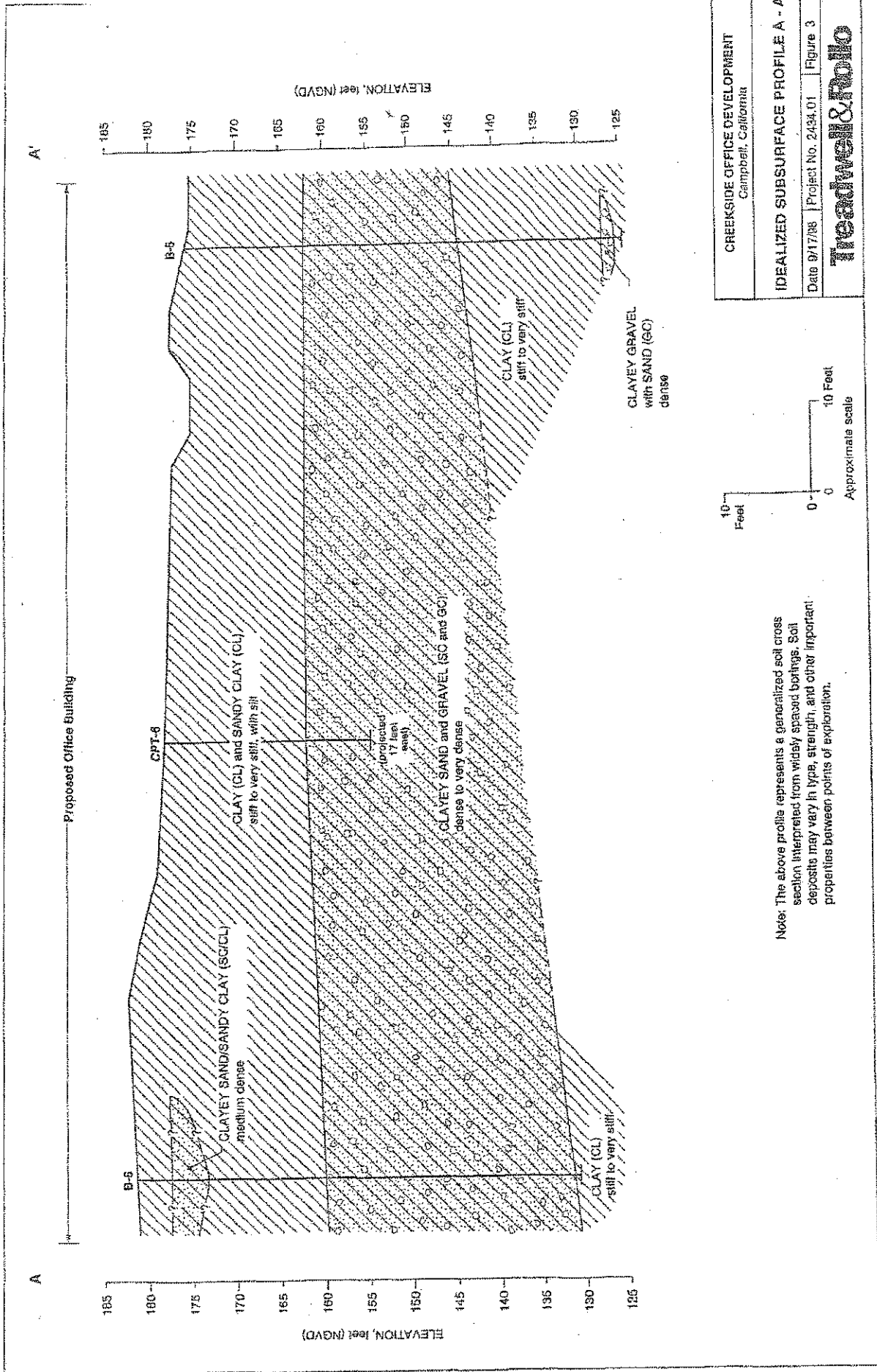


CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

SITE PLAN

Date 9/24/98 Project No. 2424.01 Figure 2

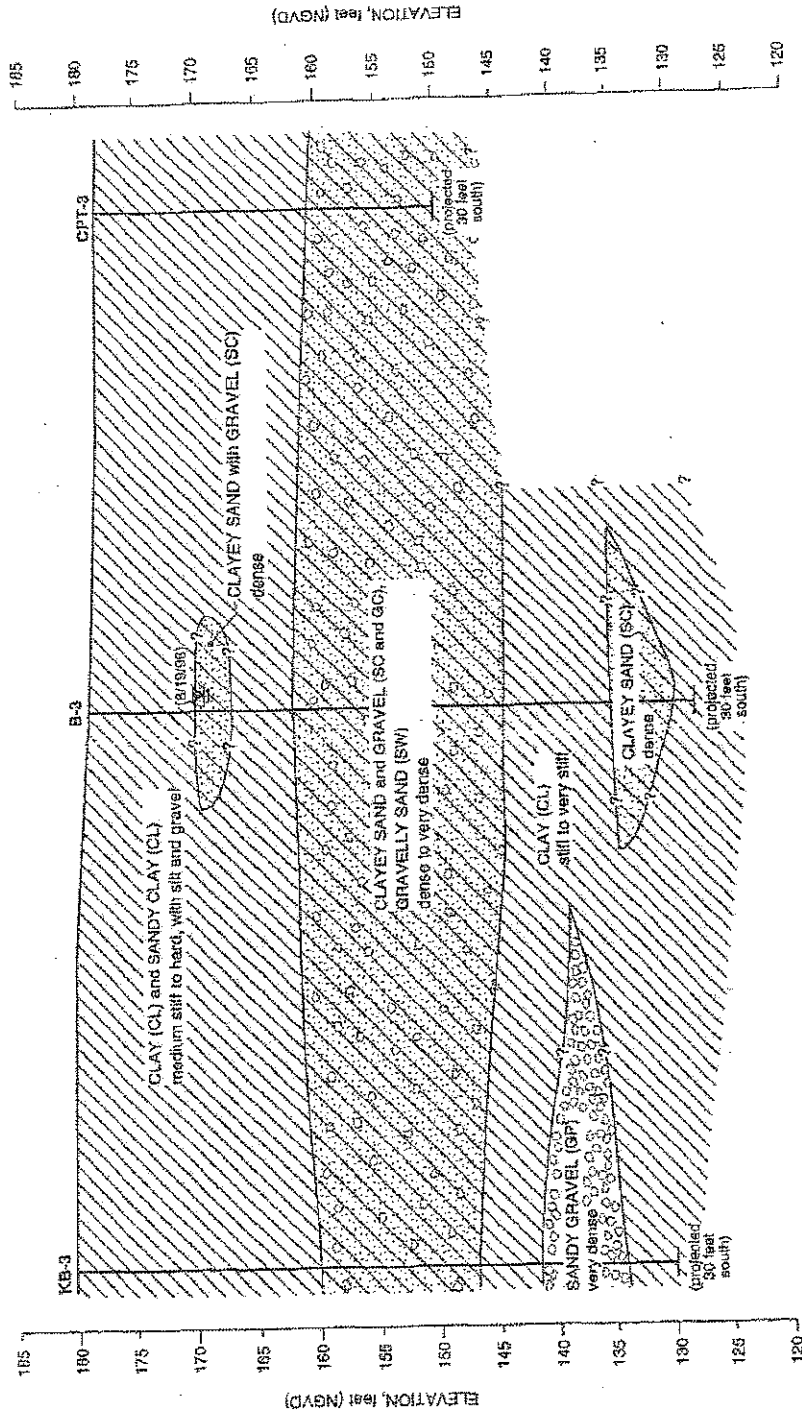
Treadwell & Hollis



B'

Proposed Parking Structure

B

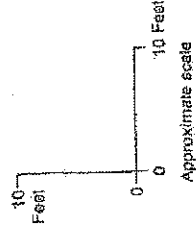


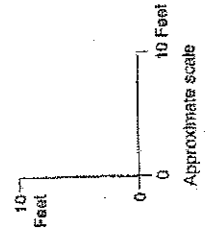
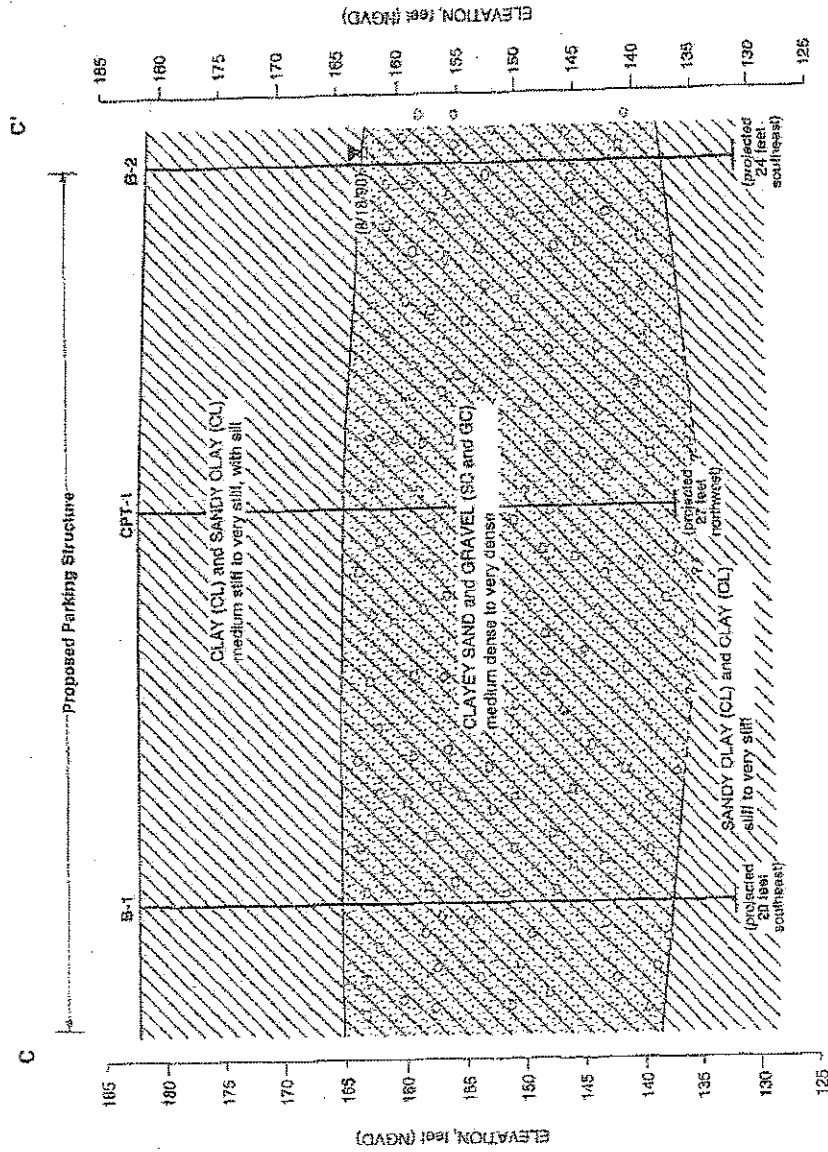
CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

IDEALIZED SUBSURFACE PROFILE B - B'

Date 9/24/88 Project No. 2434.01 Figure 4

Treadwell & Polo





Note: The above profile represents a generalized soil cross section interpreted from widely spaced borings. Soil deposits may vary in type, strength, and other important properties between points of exploration.

CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

IDEALIZED SUBSURFACE PROFILE C - C

Date 9/11/98 Project No. 2434.01 Figure 5

Treadwell & Hoyle

APPENDIX A
Logs of Borings and CPTs

PROJECT: CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Log of Boring B-1

PAGE 1 OF 2

Boring location: See Site Plan, Figure 2

Logged by: R. Andu

Date started: 8/17/98

Date finished: 8/17/98

Drilling method: Rotary wash

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ foot								
					Ground Surface Elevation: 182.0 feet, NGVD ²						
1					Pavement						
2	S&H		17		3 inches asphalt concrete over 8 inches aggregate base						
3				CL	CLAY (CL) dark brown, stiff to very stiff, moist, with silt and minor sand						
4					R-value = 14 See Figure B-7 for R-value Test						
5											
6	S&H		19							21.9	
7											
8				CL	SANDY CLAY (CL) olive-brown, medium stiff, wet, with gravel						
9											
10	SPT		6								
11											
12				CL	CLAY (CL) olive-brown, stiff, moist, with silt and sand						
13	ST										
14				CL							
15											
16											
17				SC	CLAYEY SAND with GRAVEL (SC) brown, medium dense, wet						
18											
19	S&H		13								
20											
21											
22				GC	CLAYEY GRAVEL with SAND (GC) brown, medium dense, wet						
23	SPT		15								
24											
25											
26											
27											
28	SPT		74		grades less sandy, very dense						
29											
30											

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31					GRAVEL with CLAY and SAND (GP - GC) brown, very dense, wet grades olive-brown						
32											
33											
34	SPT		88	GP- GC							
35			10*								
36											
37											
38											
39	SPT		86								
40											
41											
42				GC	CLAYEY GRAVEL with SAND (GC) olive-brown, dense, wet						
43											
44	SPT		34	CL	SANDY CLAY (CL) olive, very stiff, wet						
45											
46											
47											
48											
49											
50	S&H		27								
51					Boring terminated at a depth of 50.5 feet. Boring backfilled with cement/bentonite grout. Groundwater obscured by drilling method. ¹ S&H blow counts converted to SPT N-values using a factor of 0.6 ² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
52											
53											
54											
55											
56											
57											
58											
59											
60											

Treadwell&Rollo

Project No. 2434.01

Figure A-1b

PROJECT: CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Log of Boring B-2

PAGE 1 OF 2

Boring location: See Site Plan, Figure 2

Logged by: R. Andu

Date started: 8/17/98

Date finished: 8/18/98

Drilling method: Rotary wash

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ foot								
					Ground Surface Elevation: 180.5 feet, NGVD ²						
1					Pavement						
2					3 inches asphalt concrete over 10 inches aggregate base						
3	S&H		10		CLAY (CL)						
4					brown, stiff, moist, with silt and trace sand						
5					LL = 31; PI = 11						
6	S&H		22		grades very stiff						
7											
8											
9					grades stiff						
10				CL							
11	S&H		10								
12					See Figure B-5 for Consolidation Test						
13	ST				C _{ec} = 0.15; C _{er} = 0.015						
14										24.2	95
15											
16											
17											
18					▼ measured 7:15 A.M. on 8/18/98						
19	S&H		22		CLAYEY SAND with GRAVEL (SC)						
20				SC	brown, medium dense, wet						
21											
22											
23	SPT		52		CLAYEY GRAVEL with SAND (GC)						
24					brown, very dense, wet						
25											
26				GC							
27					grades olive-brown						
28	SPT		50								
29			4.5"								
30											

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31					CLAYEY GRAVEL with SAND (GC) (continued) olive-brown						
32											
33											
34	SPT		77								
35											
36											
37				GC							
38	SPT		60								
39											
40											
41					CLAY (CL) olive-brown, very stiff, wet, with sand and fine gravel grades stiff						
42											
43	SPT		29								
44											
45											
46											
47				CL							
48											
49	S&H		14								
50					Boring terminated at a depth of 49.5 feet. Boring backfilled with cement/bentonite grout. Groundwater measured at a depth of 18 feet after leaving boring open overnight. ¹ S&H blow counts converted to SPT N-values using a factor of 0.6 ² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											

PROJECT: CREEKSIDE OFFICE DEVELOPMENT Campbell, California					Log of Boring B-3					PAGE 1 OF 2	
Boring location: See Site Plan, Figure 2										Logged by: R. Andu	
Date started: 8/18/98					Date finished: 8/19/98						
Drilling method: Rotary wash											
Hammer weight/drop: 140 lbs./30 inches					Hammer type: Safety						
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)											
SAMPLES				LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
DEPTH (feet)	Sampler Type	Sample	Blows/ foot 1								
Ground Surface Elevation: 180.5 feet, NGVD ²											
Pavement 3 inches asphalt concrete over 8 inches aggregate base											
1											
2											
3	S&H		35								
4											
5				CL							
6	S&H		12								
7											
8											
9											
10	SPT		39	SC	CLAYEY SAND with GRAVEL (SC) brown, dense, wet measured 7:15 A.M. on 8/19/98						
11											
12											
13											
14				CL							
15											
16	S&H		28								
17											
18											
19											
20											
21	S&H		49								
22											
23											
24				GC							
25	SPT		51								
26											
27											
28											
29											
30											

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31	SPT		57	GC	CLAYEY GRAVEL with SAND (GC) (continued) brown						
32											
33											
34											
35	SPT		18	CL	CLAY (CL) yellow-brown, very stiff, wet						
36											
37											
38											
39											
40											
41	S&H		25	SC	CLAYEY SAND (SC) yellow-brown, dense, wet						
42											
43											
44											
45											
46	S&H		47								
47				CL	CLAY (CL) yellow-brown, very stiff, wet, with sand						
48											
49											
50											
51	S&H		26								
52					Boring terminated at a depth of 51.5 feet. Boring backfilled with cement/bentonite grout. Groundwater measured at a depth of 10 feet after leaving boring open overnight.						
53											
54											
55					¹ S&H blow counts converted to SPT N-values using a factor of 0.6						
56											
57					² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
58											
59											
60											

PROJECT: CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Log of Boring B-4

PAGE 1 OF 2

Boring location: See Site Plan, Figure 2

Logged by: R. Andu

Date started: 8/19/98

Date finished: 8/19/98

Drilling method: Rotary wash

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby tube (ST)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ foot 1								
					Ground Surface Elevation: 178.5 feet, NGVD ²						
1					CLAY (CL) dark brown, hard, moist, with silt and roots						
2											
3	S&H		32	CL	LL = 34; PI = 15					12.1	106
4											
5					SANDY CLAY (CL) dark brown, hard, moist, with silt						
6	S&H		30 6"	CL							
7											
8											
9					CLAY with SAND (CL) dark red-brown, stiff, moist to wet, with brick fragments						
10				CL							
11	S&H		12								
12											
13	ST				CLAY (CL) dark red-brown, medium stiff, wet, with silt and sand See Figure B-6 for Consolidation Test $C_{ec} = 0.16$; $C_{er} = 0.016$					21.7	97
14				CL							
15											
16											
17											
18											
19	SPT		60		CLAYEY GRAVEL with SAND (GC) olive-brown, very dense, wet						
20											
21											
22											
23											
24				GC							
25											
26											
27											
28											
29	SPT		73								
30											

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Figure A-4a

PROJECT: CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Log of Boring B-4

PAGE 2 OF 2

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31	SPT			GC	CLAYEY GRAVEL with SAND (GC) (continued)						
32											
33				CL	CLAY (CL) yellow-brown, very stiff to hard						
34											
35											
36											
37											
38											
39											
40	S&H		25								
41											
42											
43											
44											
45											
46											
47											
48											
49											
50	S&H		48								
51					Boring terminated at a depth of 50.5 feet. Boring backfilled with cement/bentonite grout. Groundwater obscured by drilling method. ¹ S&H blow counts converted to SPT N-values using a factor of 0.6 ² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
52											
53											
54											
55											
56											
57											
58											
59											
60											

PROJECT: CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Log of Boring B-5

PAGE 1 OF 2

Boring location: See Site Plan, Figure 2

Logged by: R. Andu

Date started: 8/21/98

Date finished: 8/21/98

Drilling method: Rotary wash

Hammer weight/drop: 140 lbs./30 inches

Hammer type: Safety

Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT)

LABORATORY TEST DATA

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample	Blows/ foot, 1'								
1											
2	S&H		28	CL	SANDY CLAY (CL) brown, very stiff, moist, with silt and roots See Figure B-8 for R-value Test R-value = 14						
3											
4											
5	S&H		26		CLAY (CL) dark olive-brown, very stiff, wet, with silt, sand, and fine gravel	TxUU	500	2,200		16.2	115
6											
7											
8											
9				CL							
10					grades olive-brown, stiff						
11	S&H		14								
12											
13											
14					CLAYEY GRAVEL with SAND (GC) olive-brown, dense, wet						
15											
16	S&H		30								
17											
18					grades gray-brown, very dense						
19											
20	SPT		72	GC							
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											

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Project No. 2434.01

Figure A-5a

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31	SPT		50	GC	CLAYEY GRAVEL with SAND (GC) (continued)						
32			6"								
33				CL	CLAY (CL) yellow-brown, very stiff, wet, with fine sand and silt						
34											
35											
36											
37											
38											
39											
40											
41	S&H		19								
42											
43											
44											
45											
46											
47											
48					grades stiff						
49				GC	CLAYEY GRAVEL with SAND (GC) olive-brown, dense, wet						
50											
51	S&H		34	CL	CLAY (CL) olive, very stiff, wet, with silt						
52											
53					Boring terminated at a depth of 51.5 feet. Boring backfilled with cement/bentonite grout. Groundwater obscured by drilling method.						
54											
55					¹ S&H blow counts converted to SPT N-values using a factor of 0.6						
56											
57					² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
58											
59											
60											

PROJECT: CREEKSIDE OFFICE DEVELOPMENT Campbell, California					Log of Boring B-6					PAGE 1 OF 2	
Boring location: See Site Plan, Figure 2								Logged by: R. Andu			
Date started: 8/21/98				Date finished: 8/21/98							
Drilling method: Rotary wash											
Hammer weight/drop: 140 lbs./30 inches				Hammer type: Safety				LABORATORY TEST DATA			
Sampler: Sprague & Henwood (S&H), Standard Penetration Test (SPT), Shelby tube (ST)											
DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content, %	Dry Density Lbs/Cu Ft
	Sampler Type	Sample Blows/ foot	LITHOLOGY								
Ground Surface Elevation: 181 feet, NGVD ²											
1				CL	SANDY CLAY (CL) dark olive-brown, very stiff, moist, with silt and roots	TxUU	500	820	12.8	106	
2	S&H	18									
3											
4				CL/ SC	SANDY CLAY/CLAYEY SAND (CL/SC) olive-brown, medium dense, wet, with fine gravel, roots	TxUU	500	820	12.8	106	
5											
6	S&H	10									
7				CL	SANDY CLAY (CL) olive-brown, very stiff, moist to wet, with silt, minor fine gravel, roots	TxUU	500	820	12.8	106	
8											
9											
10				CL	SANDY CLAY (CL) olive-brown, very stiff, moist to wet, with silt, minor fine gravel, roots	TxUU	500	820	12.8	106	
11	S&H	17									
12											
13	ST			CL	CLAY (CL) yellow-brown, stiff, moist to wet, with silt and sand	TxUU	500	820	12.8	106	
14											
15											
16				CL	CLAY (CL) yellow-brown, stiff, moist to wet, with silt and sand	TxUU	500	820	12.8	106	
17											
18											
19				CL	CLAY (CL) yellow-brown, stiff, moist to wet, with silt and sand	TxUU	500	820	12.8	106	
20	S&H	13									
21											
22				GC	CLAYEY GRAVEL with SAND (GC) olive-brown, very dense, wet	TxUU	500	820	12.8	106	
23											
24											
25				GC	CLAYEY GRAVEL with SAND (GC) olive-brown, very dense, wet	TxUU	500	820	12.8	106	
26											
27											
28				GC	CLAYEY GRAVEL with SAND (GC) olive-brown, very dense, wet	TxUU	500	820	12.8	106	
29	SPT	64									
30											

DEPTH (feet)	SAMPLES			LITHOLOGY	MATERIAL DESCRIPTION	LABORATORY TEST DATA					
	Sampler Type	Sample	Blows/foot ¹			Type of Strength Test	Confining Pressure Lbs/Sq Ft	Shear Strength Lbs/Sq Ft	Fines %	Natural Moisture Content %	Dry Density Lbs/Cu Ft
31	SPT				CLAYEY GRAVEL with SAND (GC) (continued)						
32											
33											
34											
35											
36											
37											
38											
39	SPT		50								
40			2"								
41											
42				GC							
43											
44											
45											
46					grades more clayey, brown						
47											
48											
49	SPT		29								
50				CL	CLAY (CL) olive-brown, very stiff, wet, gravel						
51					Boring terminated at a depth of 50.5 feet. Boring backfilled with cement/bentonite grout. Groundwater obscured by drilling method.						
52											
53											
54					¹ S&H blow counts converted to SPT N-values using a factor of 0.6						
55					² Elevation from topographic plan by Kier & Wright, dated 7/27/98.						
56											
57											
58											
59											
60											

UNIFIED SOIL CLASSIFICATION SYSTEM			
Major Divisions		Symbols	Typical Names
Coarse-Grained Soils (more than half of soil > no. 200 sieve size)	Gravels (More than half of coarse fraction > no. 4 sieve size)	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
Fine -Grained Soils (more than half of soil < no. 200 sieve size)	Silts and Clays LL = < 50	ML	Inorganic silts and clayey silts of low plasticity, sandy silts, gravelly silts
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL = > 50	MH	Inorganic silts of high plasticity
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic silts and clays of high plasticity
Highly Organic Soils		PT	Peat and other highly organic soils

GRAIN SIZE CHART		
Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel coarse fine	3" to No. 4	76.2 to 4.76
	3" to 3/4"	76.2 to 19.1
Sand coarse medium fine	3/4" to No. 4	19.1 to 4.76
	No. 4 to No. 200	4.76 to 0.074
	No. 4 to No. 10	4.76 to 2.00
	No. 10 to No. 40	2.00 to 0.420
Silt and Clay	No. 40 to No. 200	0.420 to 0.074
	Below No. 200	Below 0.074

SAMPLE DESIGNATIONS/SYMBOLS



Sample taken with split-barrel sampler other than Standard Penetration Test sampler. Darkened area indicates sample obtained



Classification sample taken with Standard Penetration Test sampler



Undisturbed sample taken with thin-walled tube



Disturbed sample



Sampling attempted with no recovery



Core sample



Groundwater level at the time and date indicated

SAMPLER TYPE

- C Core barrel
- CA California split-barrel sampler with 2.5-inch outside diameter and a 1.93-inch inside diameter
- D&M Dames & Moore piston sampler using 2.5-inch outside diameter, thin-walled tube
- O Osterberg piston sampler using 3.0-inch outside diameter, thin-walled Shelby tube

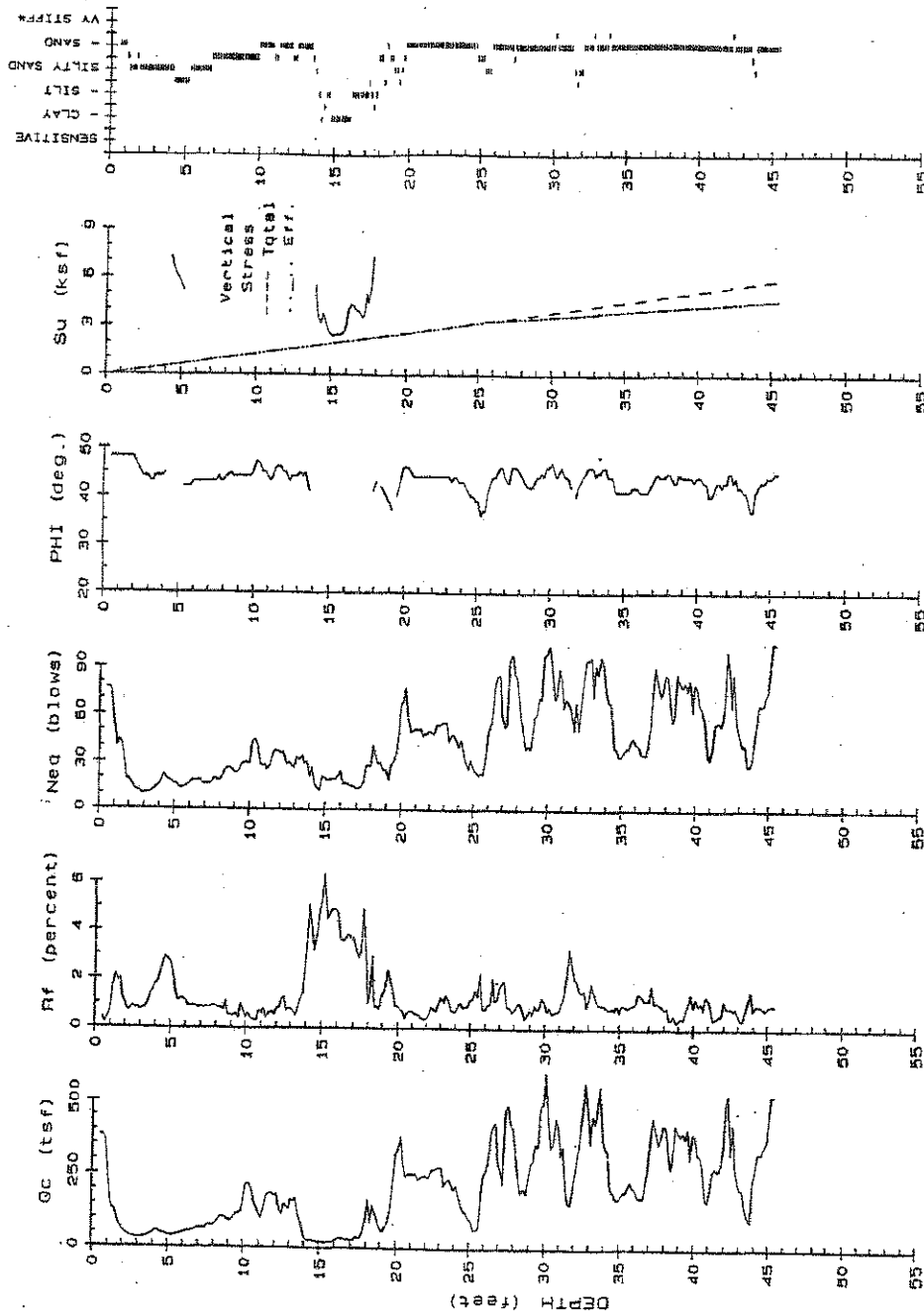
- PT Pitcher tube sampler using 3.0-inch outside diameter, thin-walled Shelby tube
- S&H Sprague & Henwood split-barrel sampler with a 3.0-inch outside diameter and a 2.43-inch inside diameter
- SPT Standard Penetration Test (SPT) split-barrel sampler with a 2.0-inch outside diameter and a 1.5-inch inside diameter
- ST Shelby tube (3.0-inch outside diameter, thin-walled tube) advanced with hydraulic pressure

CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Treadwell&Rollo

CLASSIFICATION CHART

Date 8/31/98 Project No. 2434.01 Figure A-7



CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

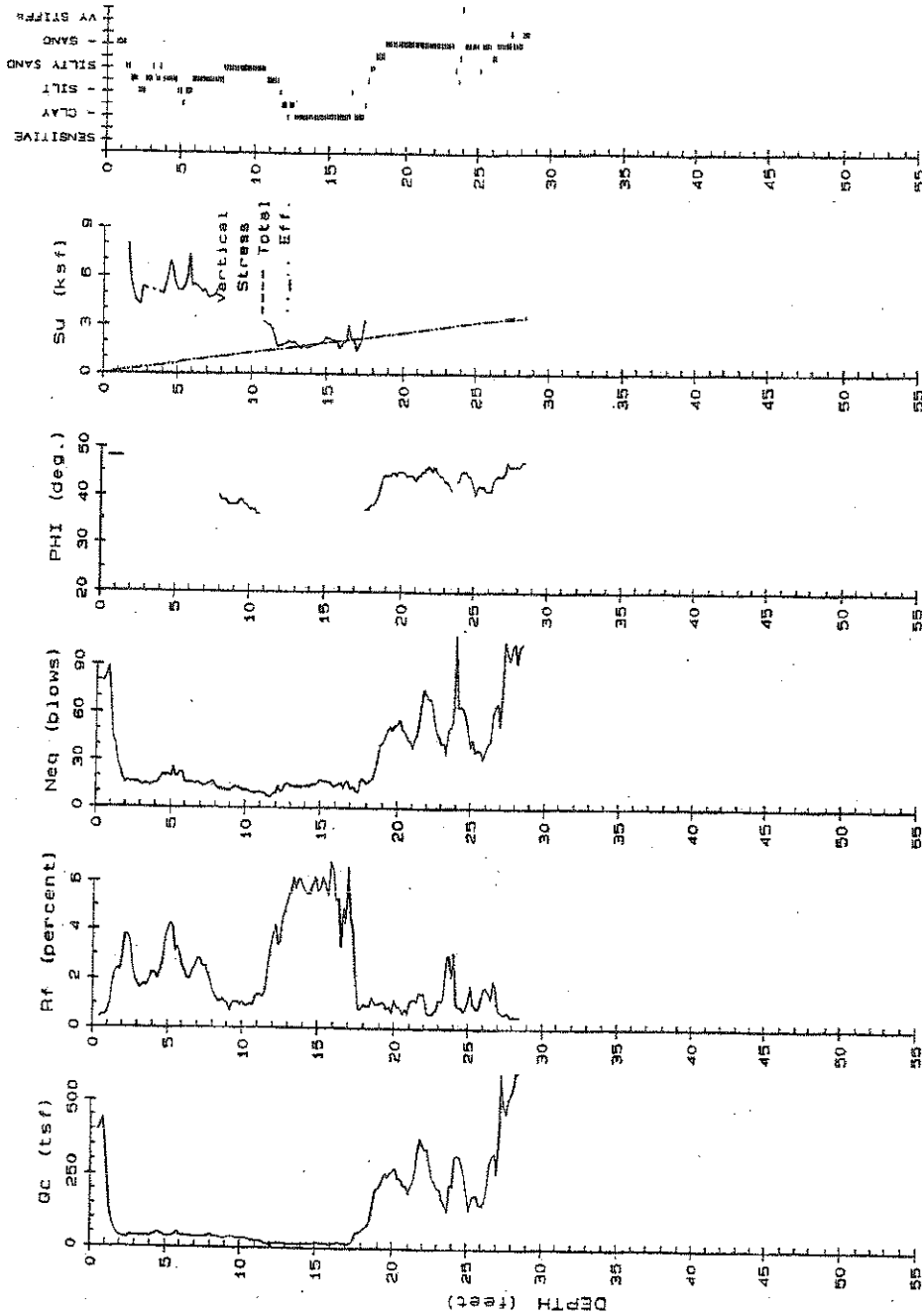
CONE PENETRATION TEST RESULTS
CPT-1

Date 9/1/98 Project No. 2434.01 Figure A-8

Treadwell & Rolio

Date performed: 14 August 1998

Elevation: 181.0 feet, NGVD



Terminated at 28.5 feet

CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

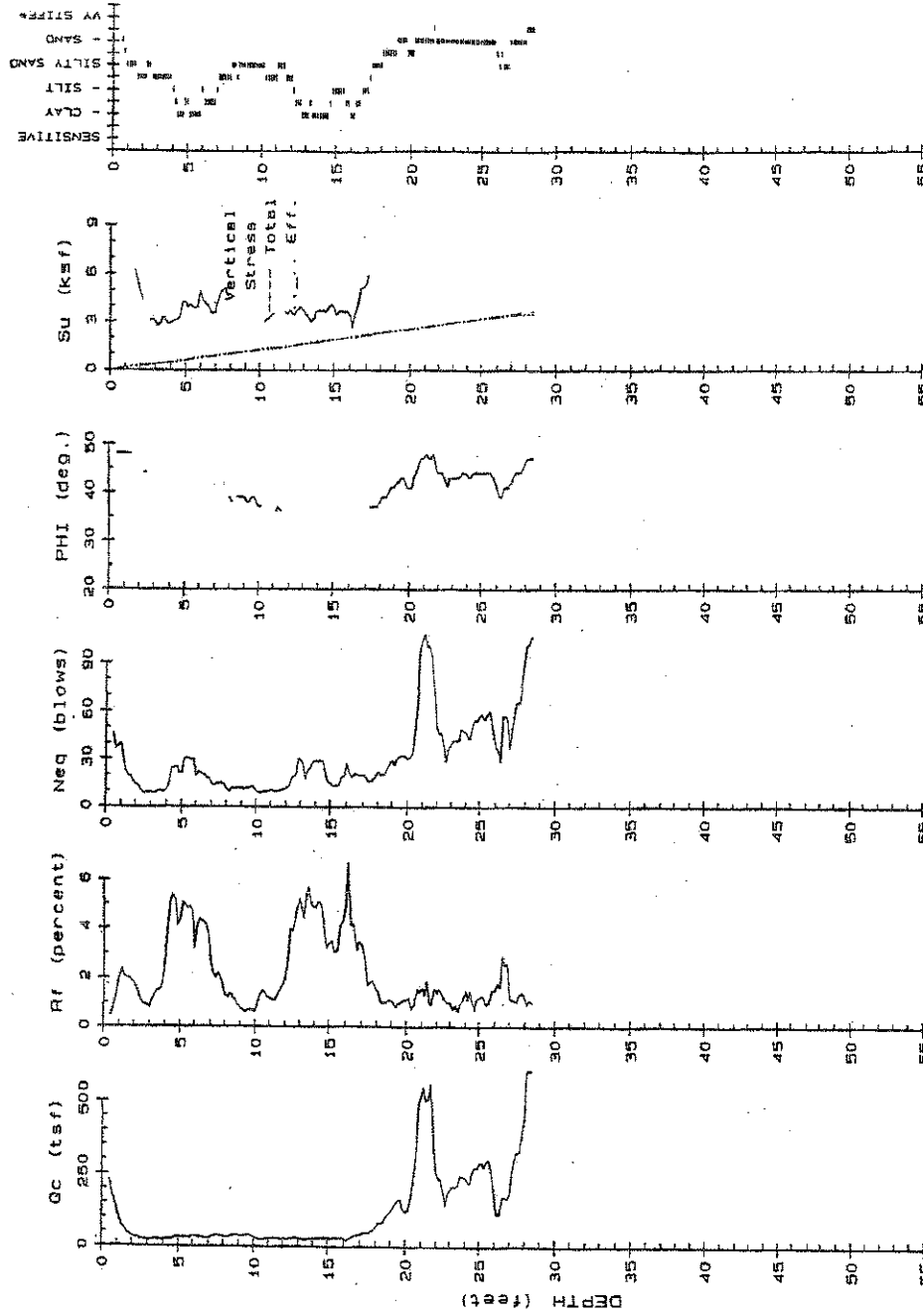
CONE PENETRATION TEST RESULTS CPT-2

Date 9/1/98 Project No. 2434.01 Figure A-9

Treadwell & Rollo

Date performed: 14 August 1998

Elevation: 180.05 feet, NGVD



Terminated at 28.5 feet

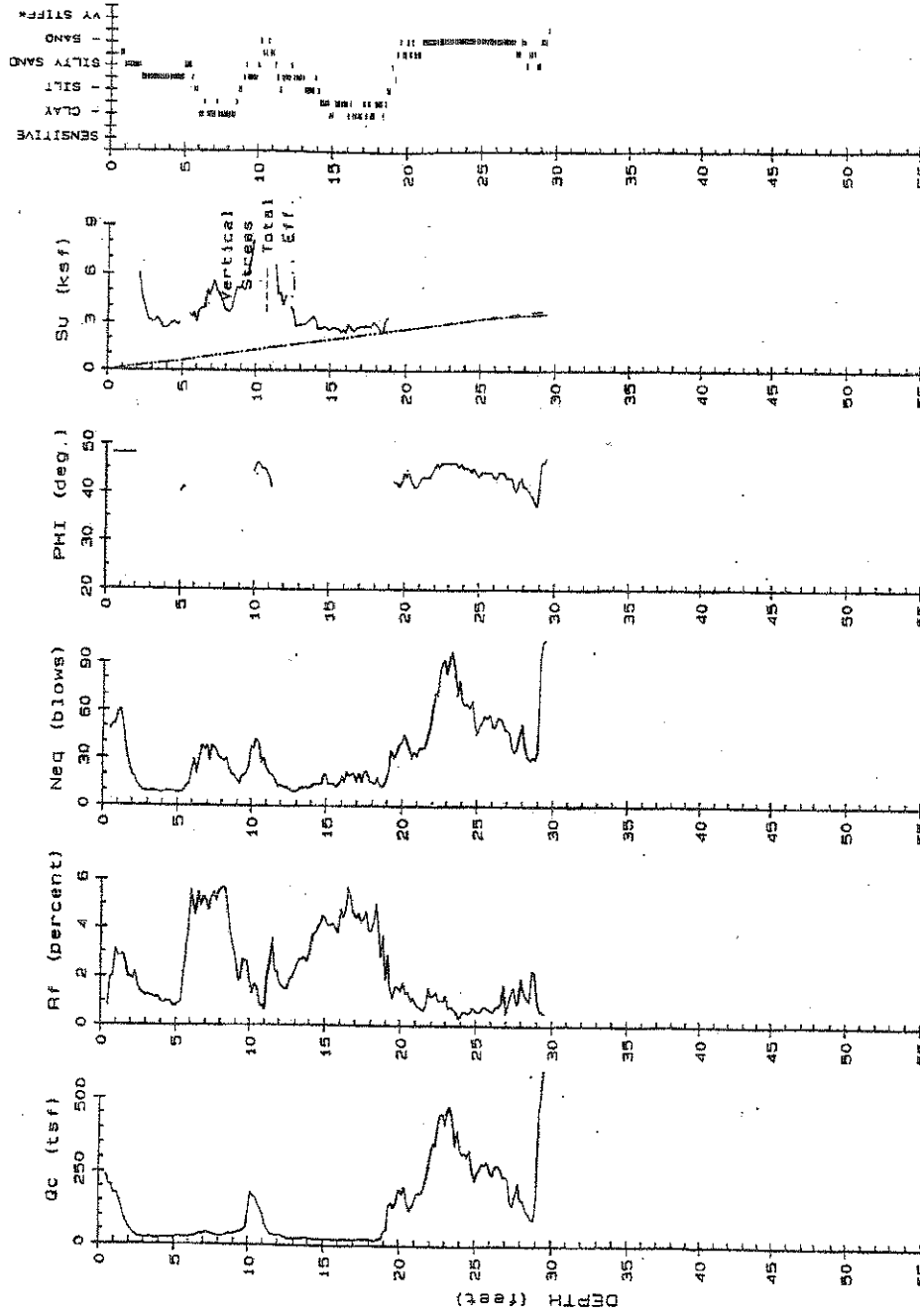
CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

CONE PENETRATION TEST RESULTS CPT-3

Date 9/1/98 Project No. 2434.01 Figure A-10

Treadwell&Rollo

Date performed: 14 August 1998
Elevation: 178.5 feet, NGVD



CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

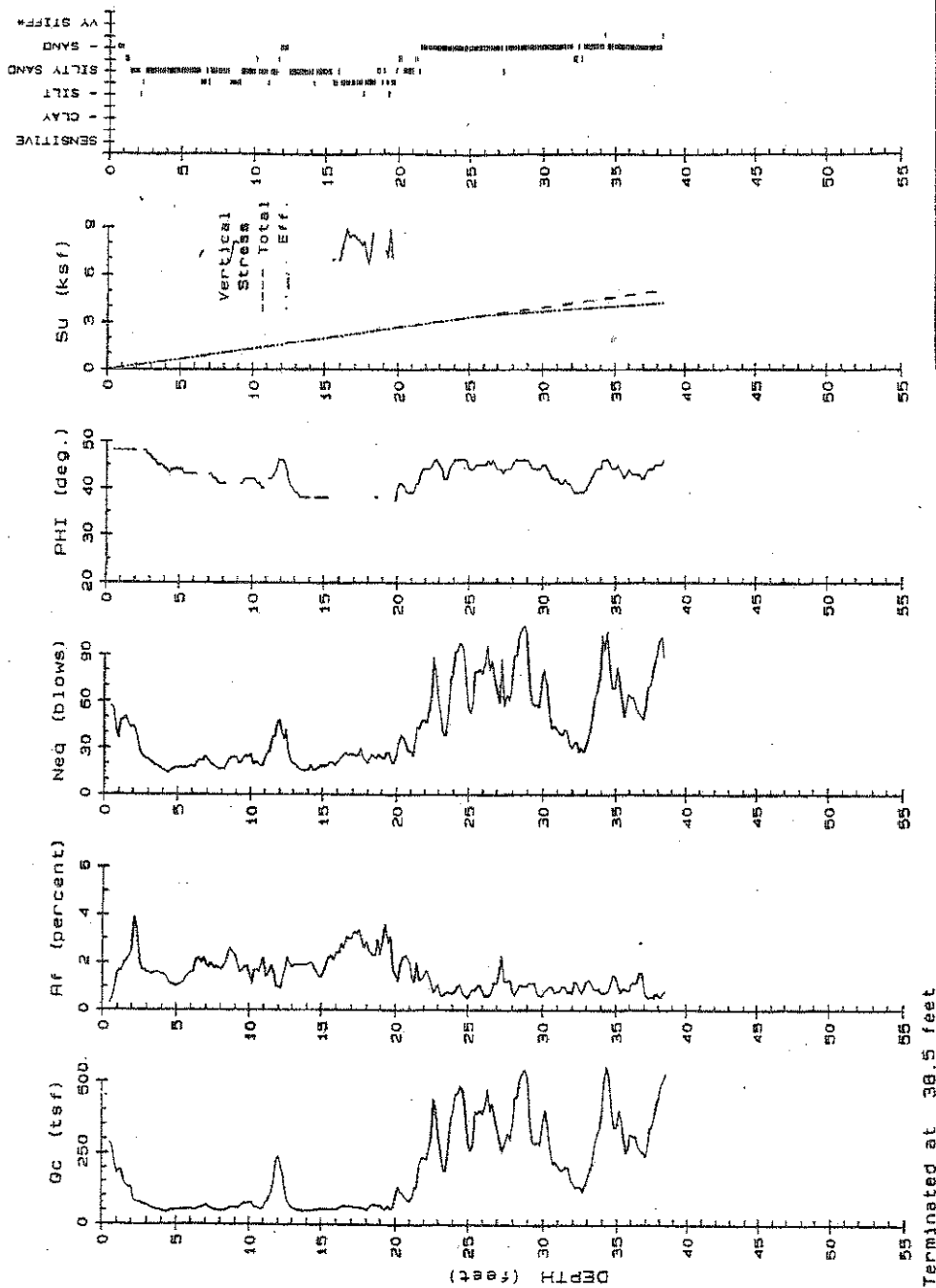
CONE PENETRATION TEST RESULTS CPT-4

Date 9/1/98 Project No. 2434.01 Figure A-11

Treadwell & Rollo

Date performed: 14 August 1998

Elevation: 180.3 feet, NGVD

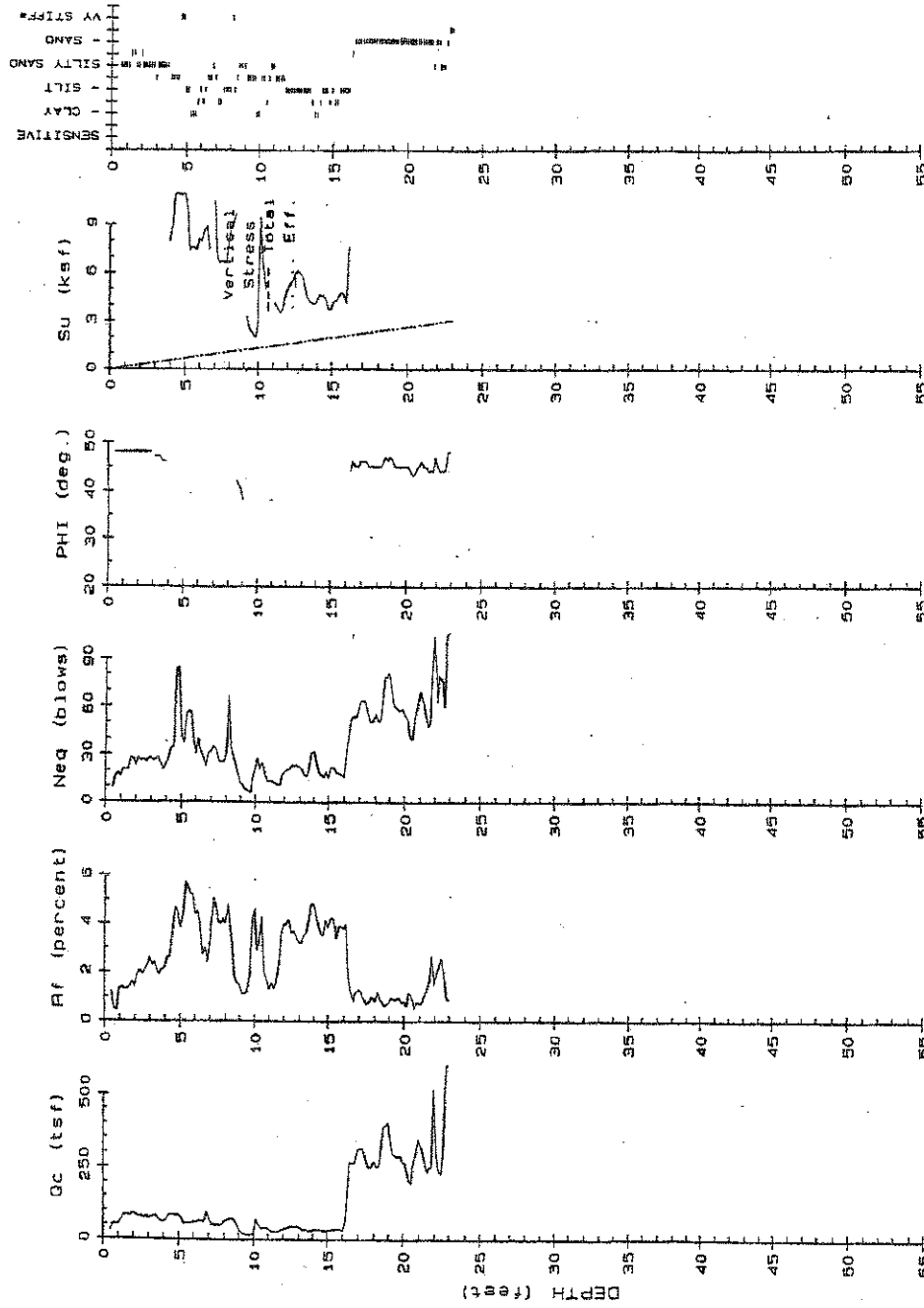


CREEKSIDE OFFICE DEVELOPMENT	
Campbell, California	
CONE PENETRATION TEST RESULTS	
CPT-5	
Date 9/1/98	Project No. 2434.01
Figure A-12	

Date performed: 14 August 1998

Elevation: 181.3 feet, NGVD

Treadwell & Rollo



Terminated at 23.0 feet

Date performed: 14 August 1998

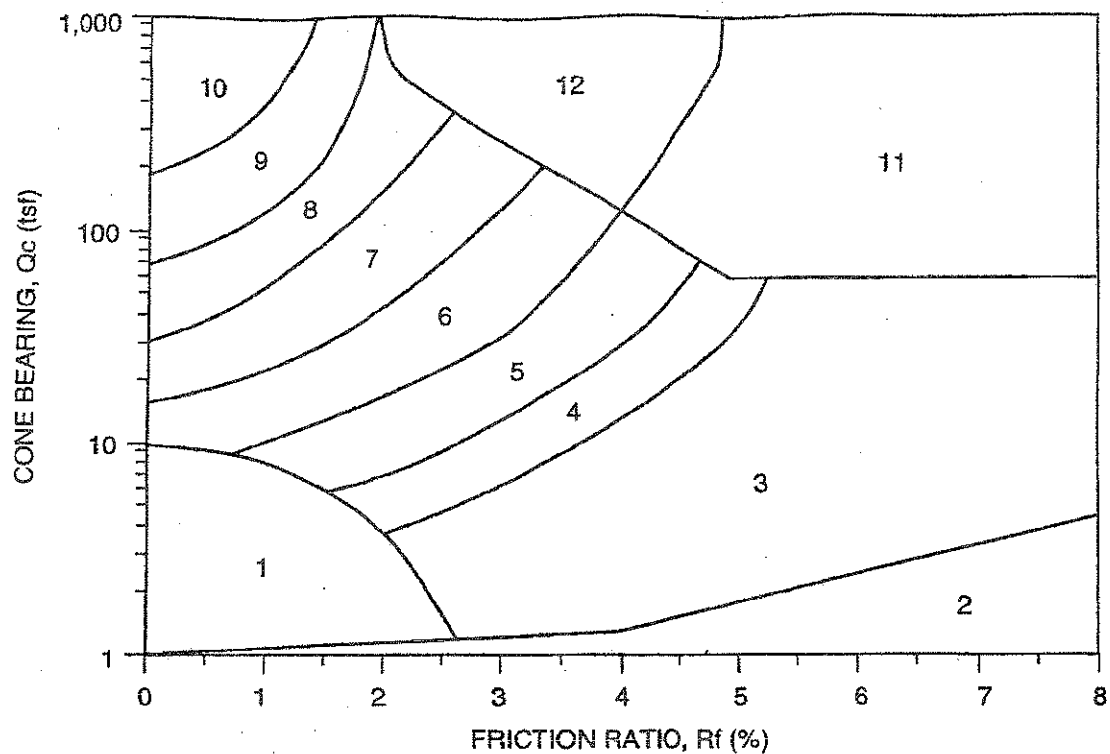
Elevation: 177.5 feet, NGVD

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CONE PENETRATION TEST RESULTS CPT-6

Date 9/1/98 Project No. 2434.01 Figure A-13

Treadwell & Rollo



ZONE	Q_c/N^1	Su Factor $(Nk)^2$	SOIL BEHAVIOR TYPE ¹
1	2	15 (10 for $Q_c \leq 9$ tsf)	Sensitive Fine-Grained
2	1	15 (10 for $Q_c \leq 9$ tsf)	Organic Material
3	1	15 (10 for $Q_c \leq 9$ tsf)	CLAY
4	1.5	15	SILTY CLAY to CLAY
5	2	15	CLAYEY SILT to SILTY CLAY
6	2.5	15	SANDY SILT to CLAYEY SILT
7	3	---	SILTY SAND to SANDY SILT
8	4	---	SAND to SILTY SAND
9	5	---	SAND
10	6	---	GRAVELLY SAND to SAND
11	1	15	Very Stiff Fine-Grained (*)
12	2	---	SAND to CLAYEY SAND (*)

(*) Overconsolidated or Cemented

Q_c = Tip Bearing

F_s = Sleeve Friction

$R_f = F_s/Q_c \times 100 =$ Friction Ratio

Note: Testing performed in accordance with ASTM D3441.

References: 1. Robertson, 1986, Olsen, 1988.

2. Bonaparte & Mitchell, 1979 (young Bay Mud $Q_c \leq 9$).

Estimated from local experience (fine-grained soils $Q_c > 9$).

CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

CLASSIFICATION CHART FOR CONE PENETRATION TESTS

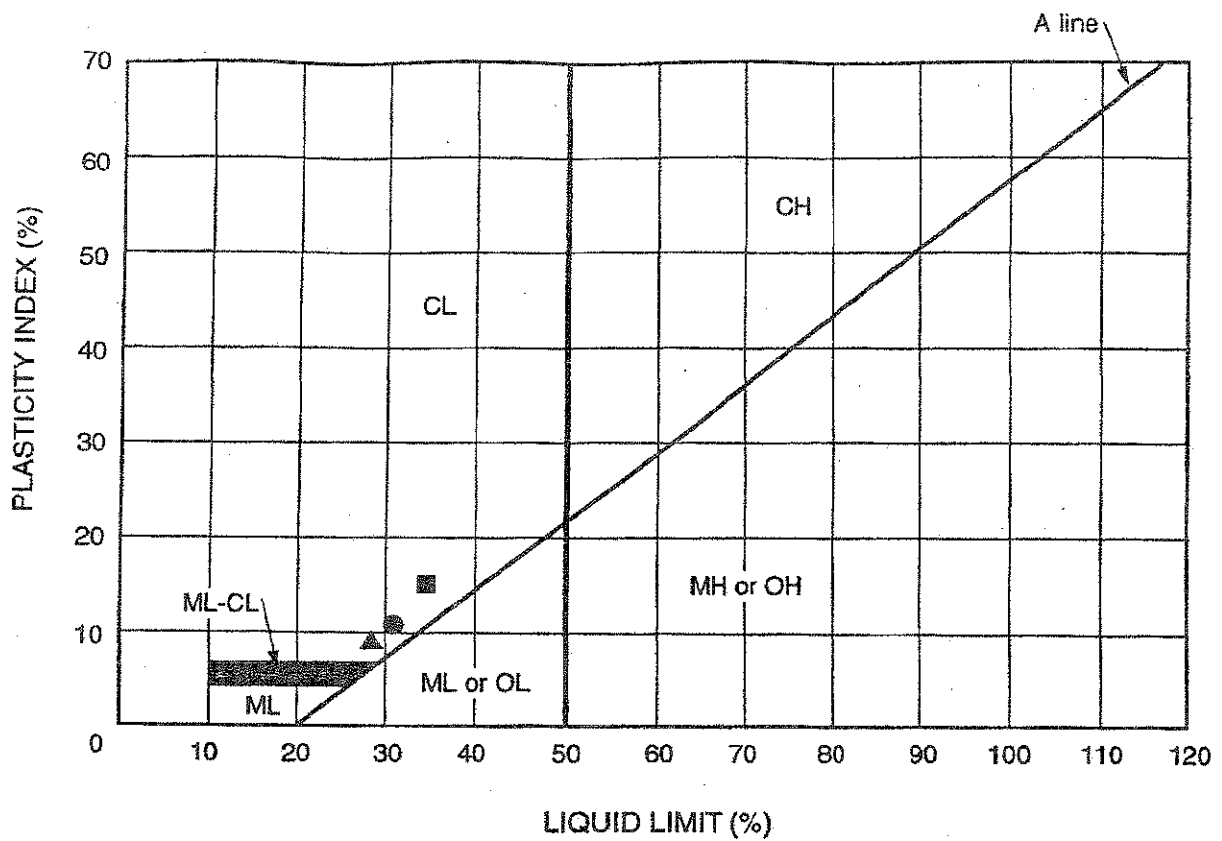
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Date 8/31/98

Project No. 2434.01

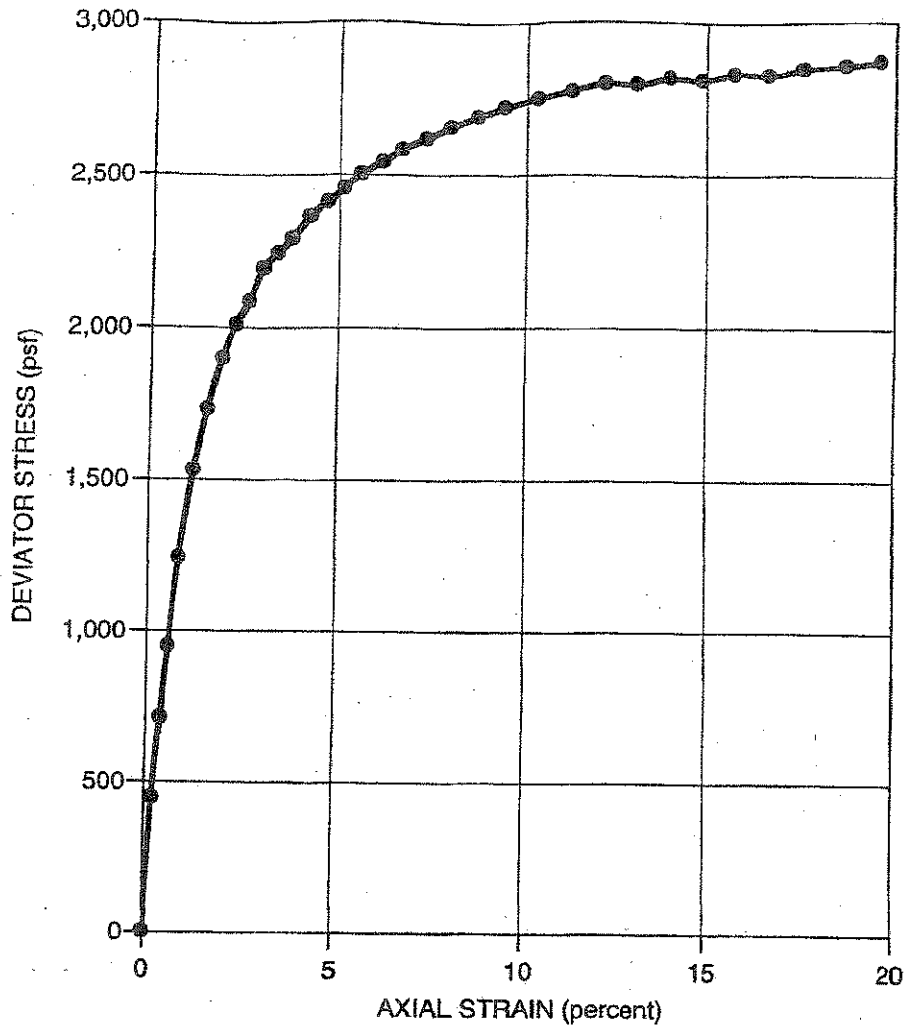
Figure A-14

APPENDIX B
Laboratory Test Results

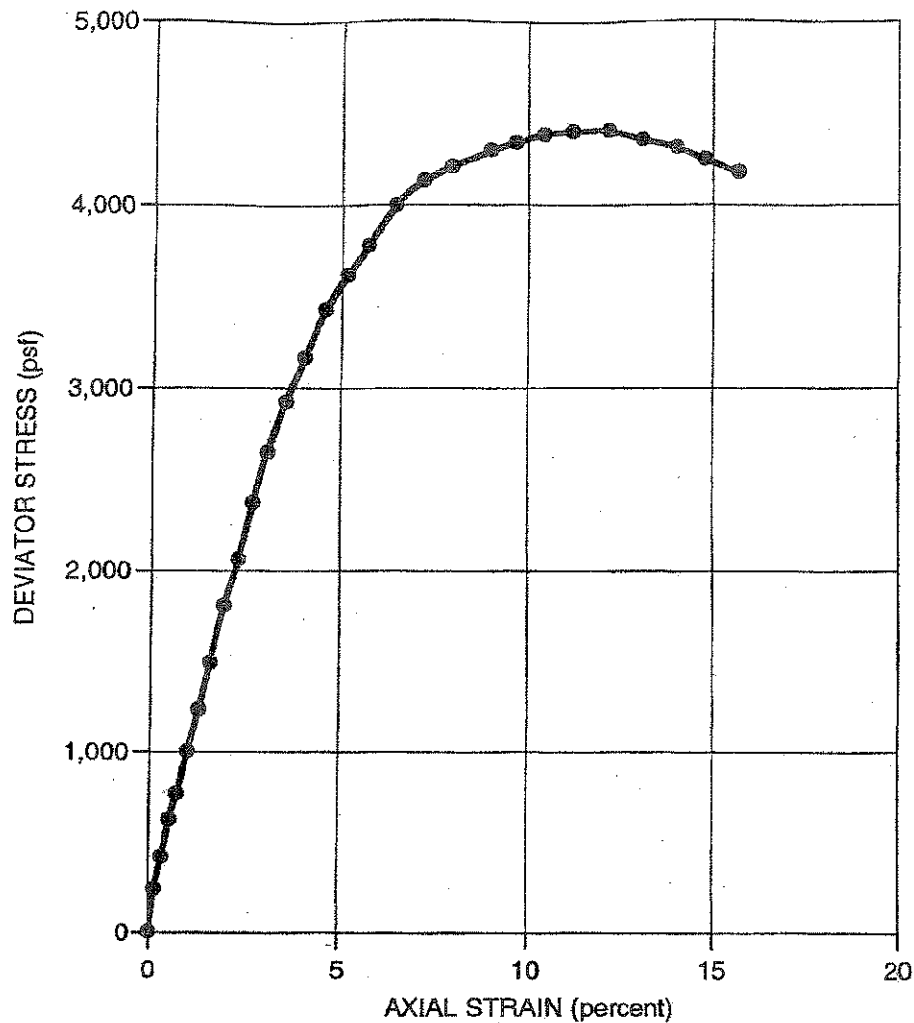


Symbol	Source	Description and Classification	Natural M.C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
●	B-2 at 3 feet	CLAY (CL), brown	---	31	11	
▲	B-3 at 2.5 feet	CLAY (CL), brown	13.4	28	9	
■	B-4 at 2.5 feet	CLAY (CL), dark brown	12.1	34	15	

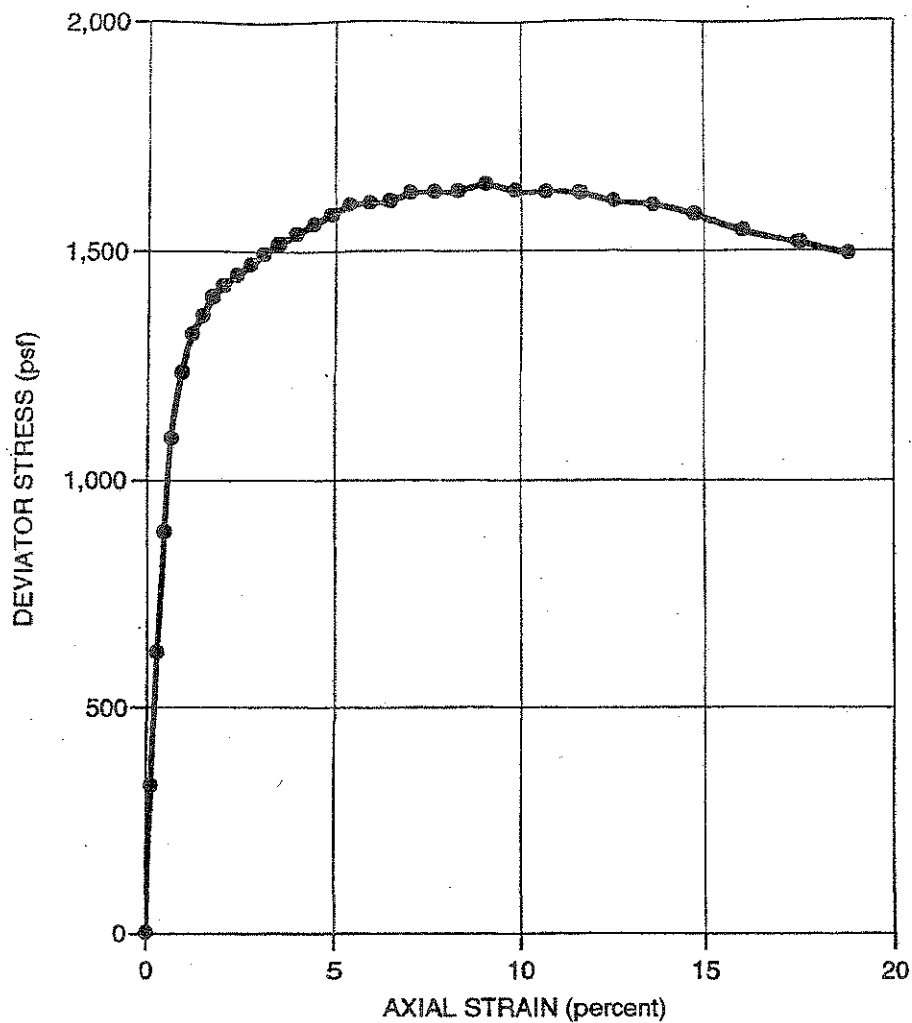
CREEKSIDE OFFICE DEVELOPMENT Campbell, California			PLASTICITY CHART			
Treadwell&Rollo			Date 9/24/98	Project No. 2434.01	Figure B-1	



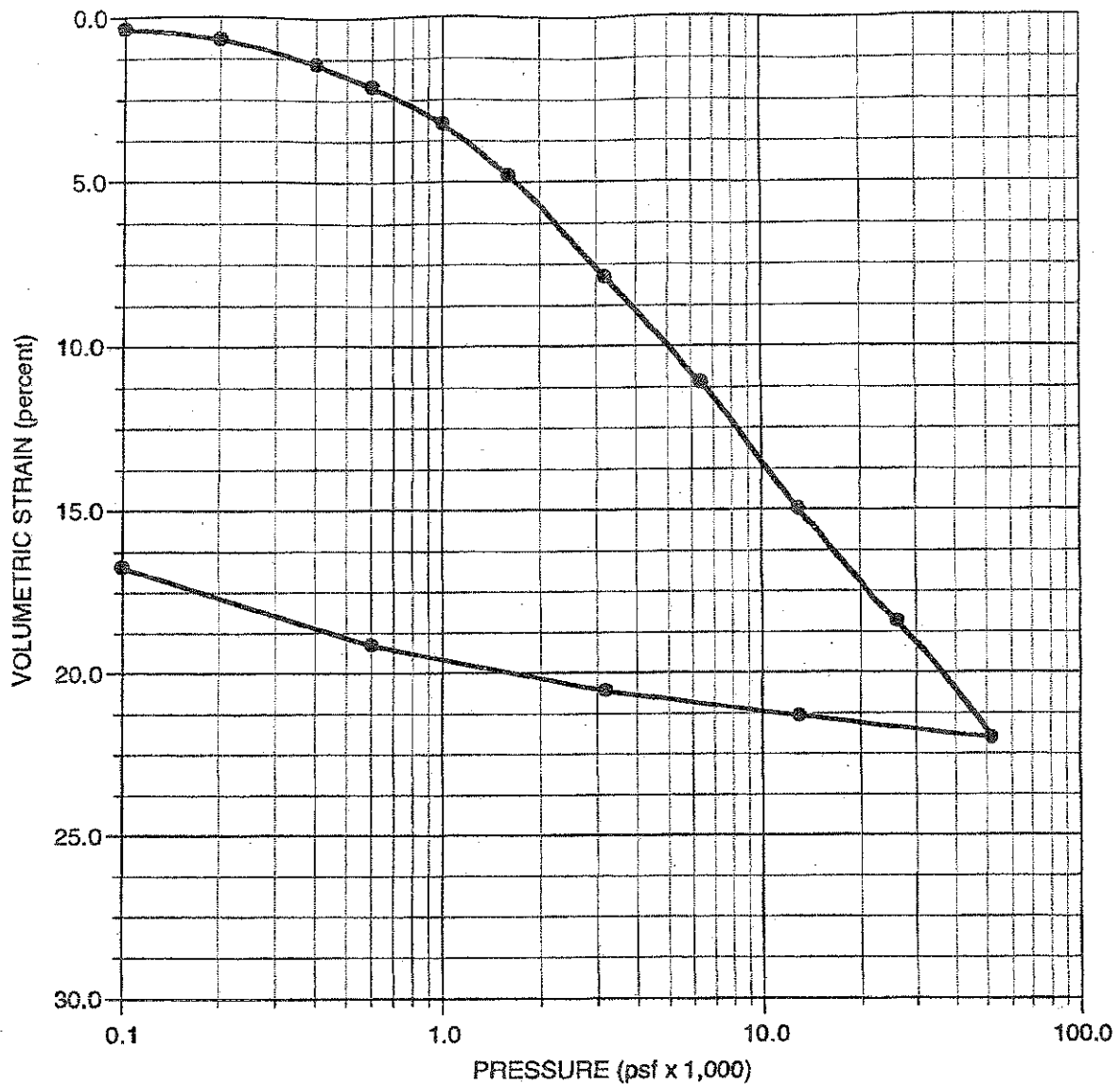
SAMPLER TYPE Sprague & Henwood		SHEAR STRENGTH 1,440 psf	
DIAMETER (in) 2.43	HEIGHT (in) 5.5	STRAIN AT FAILURE 19.6 %	
MOISTURE CONTENT 21.4 %		CONFINING PRESSURE 500 psf	
DRY DENSITY 96 pcf		STRAIN RATE 0.05 in/min	
DESCRIPTION CLAY (CL), brown			SOURCE B-3 at 6 feet
CREEKSIDE OFFICE DEVELOPMENT Campbell, California		UNCONSOLIDATED-UNDRAINED TRIAxIAL COMPRESSION TEST	
Treadwell & Rollo		Date 9/17/98	Project No. 2434.01 Figure B-2



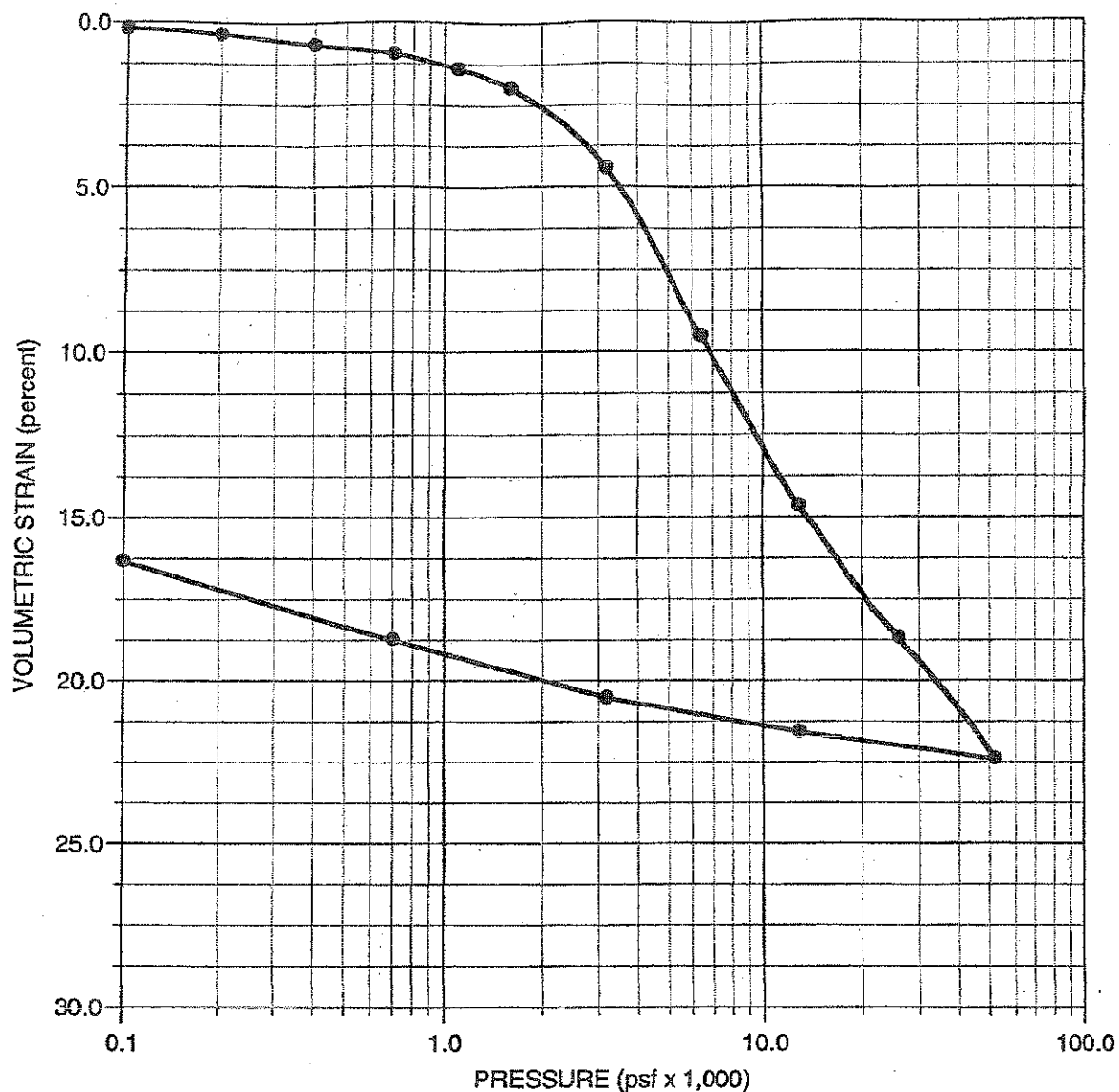
SAMPLER TYPE Sprague & Henwood		SHEAR STRENGTH 2,200 psf	
DIAMETER (in) 2.43	HEIGHT (in) 5.3	STRAIN AT FAILURE 12.1 %	
MOISTURE CONTENT 16.2 %		CONFINING PRESSURE 500 psf	
DRY DENSITY 115 pcf		STRAIN RATE 0.05 in/min	
DESCRIPTION CLAY (CL), dark olive-brown			SOURCE B-5 at 5.5 feet
CREEKSIDE OFFICE DEVELOPMENT Campbell, California		UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST	
Treadwell&Rollo		Date 9/17/98	Project No. 2434.01 Figure B-3



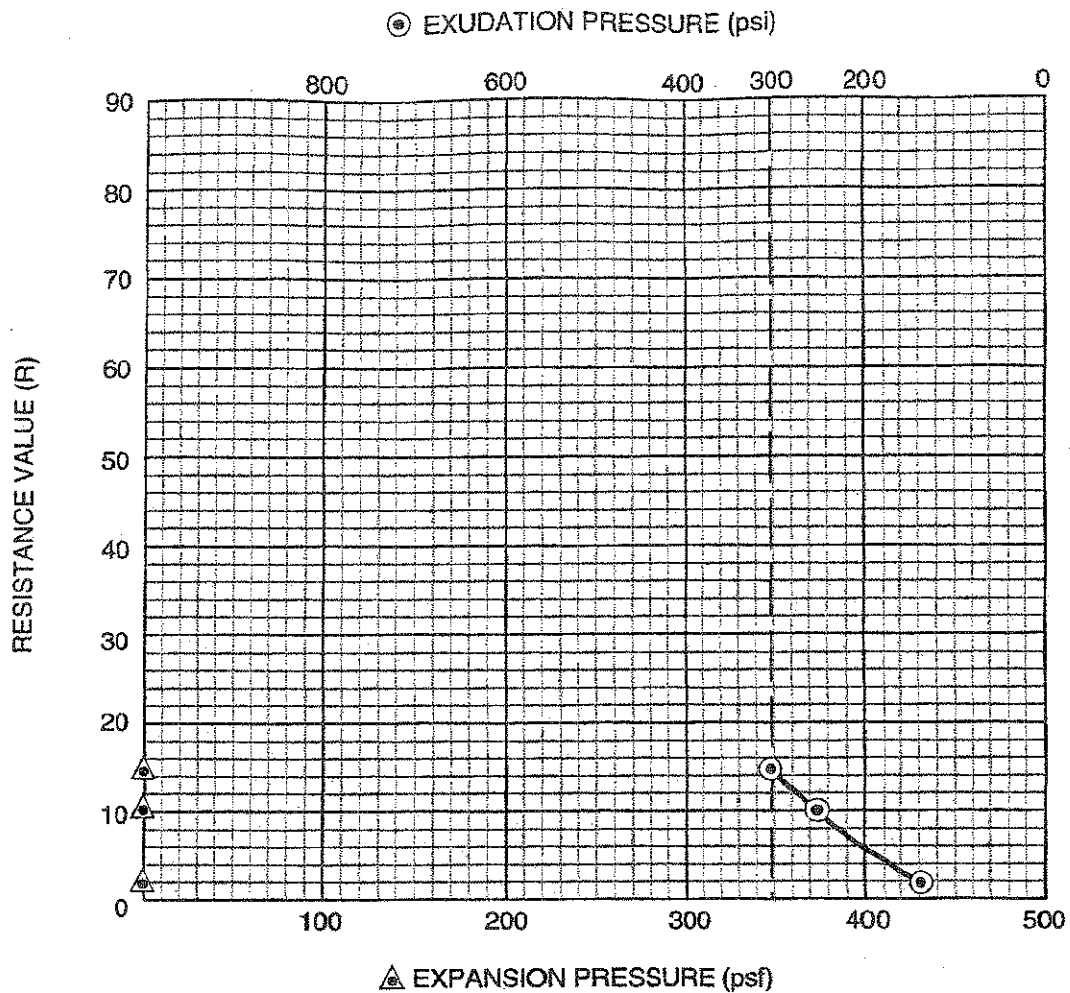
SAMPLER TYPE Sprague & Henwood		SHEAR STRENGTH 820 psf	
DIAMETER (in) 2.43	HEIGHT (in) 5.4	STRAIN AT FAILURE 9.0 %	
MOISTURE CONTENT 12.8 %		CONFINING PRESSURE 500 psf	
DRY DENSITY 106 pcf		STRAIN RATE 0.05 in/min	
DESCRIPTION SANDY CLAY/CLAYEY SAND (CL/SC), olive-brown			SOURCE B-6 at 6 feet
CREEKSIDE OFFICE DEVELOPMENT Campbell, California		UNCONSOLIDATED-UNDRAINED TRIAxIAL COMPRESSION TEST	
Treadwell&Rollo		Date 9/17/98	Project No. 2434.01 Figure B-4



Diameter (in)	2.42	Height (in)	1.0	Condition		Before test		After test		
Overburden Pressure, P_o	1,500	psf		Water Content	w_o	24.2	%	w_f	17.8	%
Preconsol. Pressure, P_c	2,000	psf		Void Ratio	e_o	0.774		e_f	0.477	
Compression Ratio, C_{ec}	0.15			Saturation	S_o	84.3	%	S_f	101.0	%
Recompression Ratio, C_{er}	0.015			Dry Density	γ_d	95	pcf	γ_d	114	pcf
LL	---	PL	---	PI	---	G_s 2.70 (assumed)				
Classification					CLAY (CL), brown		Source B-2 at 12 feet			
CREEKSIDE OFFICE DEVELOPMENT Campbell, California				CONSOLIDATION TEST REPORT						
Treadwell&Rollo										
Date 9/17/98		Project No. 2434.01			Figure B-5					



Diameter (in)	2.42	Height (in)	1.0	Condition		Before test		After test			
Overburden Pressure, P_o	1,500	psf		Water Content	w_o	21.7	%	w_f	16.6	%	
Preconsol. Pressure, P_c	2,800	psf		Void Ratio	e_o	0.742		e_f	0.457		
Compression Ratio, C_{ec}	0.16			Saturation	S_o	78.9	%	S_f	98.0	%	
Recompression Ratio, C_{er}	0.016			Dry Density	γ_d	97	pcf	γ_d	116	pcf	
LL	---	PL	---	PI	---	G_s		2.70 (assumed)			
Classification					CLAY (CL), dark red-brown		Source				B-4 at 12 feet
CREEKSIDE OFFICE DEVELOPMENT Campbell, California					CONSOLIDATION TEST REPORT						
Treadwell&Rollo											
					Date 9/17/98		Project No. 2434.01		Figure B-6		



Specimen No.	A	B	C
Water Content (%)	23.8	18.0	16.7
Dry Density (pcf)	100.5	107.4	110.3
Exudation Pressure (psi)	138	252	307
Expansion Pressure (psf)	0	0	0
Resistance Value (R)	2	10	15

Sample Source	Sample Description	Sand Equivalent	Expansion Pressure	R value
B-1 at 1 to 2 feet	CLAY (CL)		0	14

CREEKSIDE OFFICE DEVELOPMENT
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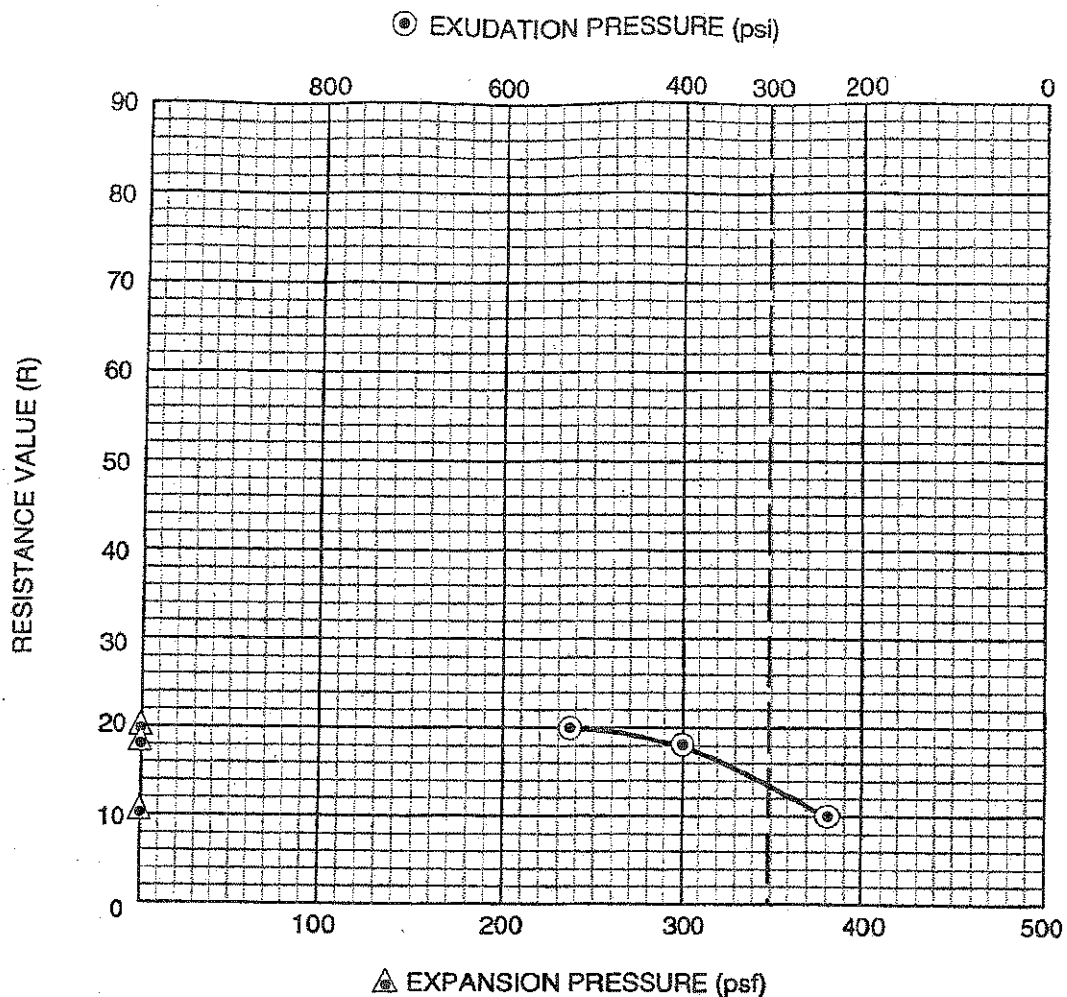
Treadwell & Rollo

RESISTANCE VALUE TEST DATA

Date 9/24/98

Project No. 2434.01

Figure B-7



Specimen No.	A	B	C
Water Content (%)	18.3	16.9	16.4
Dry Density (pcf)	106.2	108.0	112.3
Exudation Pressure (psi)	239	526	401
Expansion Pressure (psf)	0	0	0
Resistance Value (R)	10	20	18

Sample Source	Sample Description	Sand Equivalent	Expansion Pressure	R value
B-5 at 0.5 to 1 foot	SANDY CLAY (CL)		0	14

CREEKSIDE OFFICE DEVELOPMENT
Campbell, California

Treadwell & Rollo

RESISTANCE VALUE TEST DATA

Date 9/17/98

Project No. 2434.01

Figure B-8

APPENDIX C
Soil Corrosivity Testing

C E R C O
analytical, inc.

September 9, 1998

Job No. 9809014
Cust. No. 10727

3942-A Valley Avenue
Pleasanton, CA 94566
Tel: 925.462.2771
Fax: 925.462.2775

Ms. Lori Simpson
Treadwell & Rollo
555 Montgomery St., Ste 1300
San Francisco, CA 94111

SUBJECT: Project No.: 2434.01
Project Name: Creekside Office Dev.
Corrosivity Analysis - ASTM Test Methods

Dear Ms. Simpson:

In accordance with your request, we have analyzed the two soil samples furnished by your office and have evaluated them for corrosivity using ASTM Test Methods. The results are enclosed.

Based upon the conductivity measurements, both these samples are classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron fire water pipelines should be protected against corrosion.

The chloride ion concentrations range none detected to 15 mg/kg. Because the chloride ion concentrations are less than 300 ppm, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations range from 60 to 70 mg/kg and are determined to be insufficient to damage reinforced concrete structures and a cement mortar coating at these locations.

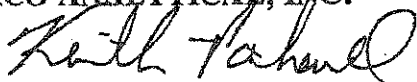
The pH of the soils are 7.5 which does not present corrosion problems for buried iron, steel, mortar coated steel and reinforced concrete structures.

The redox potential ranges are 270-mV which is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

The information provided in this report is general in nature. For specific design recommendations, please call for consultation.

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

Very truly yours,
CERCO ANALYTICAL, INC.



Keith A. Packard, P.E.
Associate Engineer

KAP/jdl

CLINCO Family Group, Inc.
3942-A Valley Avenue Pleasanton, CA 94566-4715 (925) 462-2771 Fax (925) 462-2775

Client: Treadwell & Rollo

Client's Project No.: 2434.01

Client's Project Name: Creekside Office Dev.

Transmittal Dated 09/01/98

Date Sampled: 08/17 & 21/98

Date Received: 2-Sep-98

Date of Report: 8-Sep-98

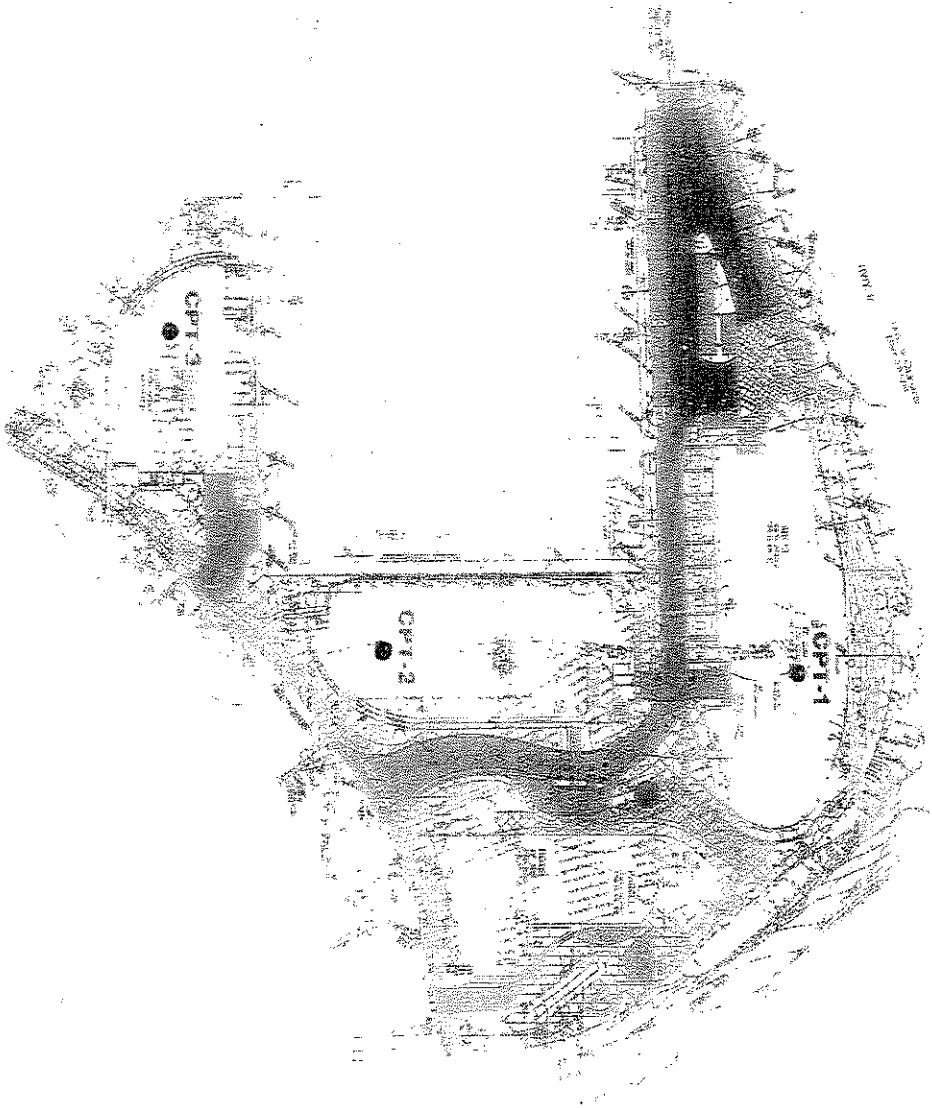
Method:	ASTM D1498	ASTM D4972	ASTM D516	ASTM D1125Mod	ASTM D4658Mod	ASTM D512C
Detection Limit:	-	-	20	10	5	9
Date Analyzed:	8-Sep-98	4-Sep-98	8-Sep-98	4-Sep-98	-	4-Sep-98

Cheryl McMiller
Cheryl McMiller

Laboratory Director

Page No. 1

FIGURE 2
Approximate location of cone penetration test



Based on plan set, dated 2/20/01

SITE PLAN CREEKSIDE DEVELOPMENT FEASIBILITY Campbell, California	
	PROJECT 2 1740-5158449

APPENDIX A

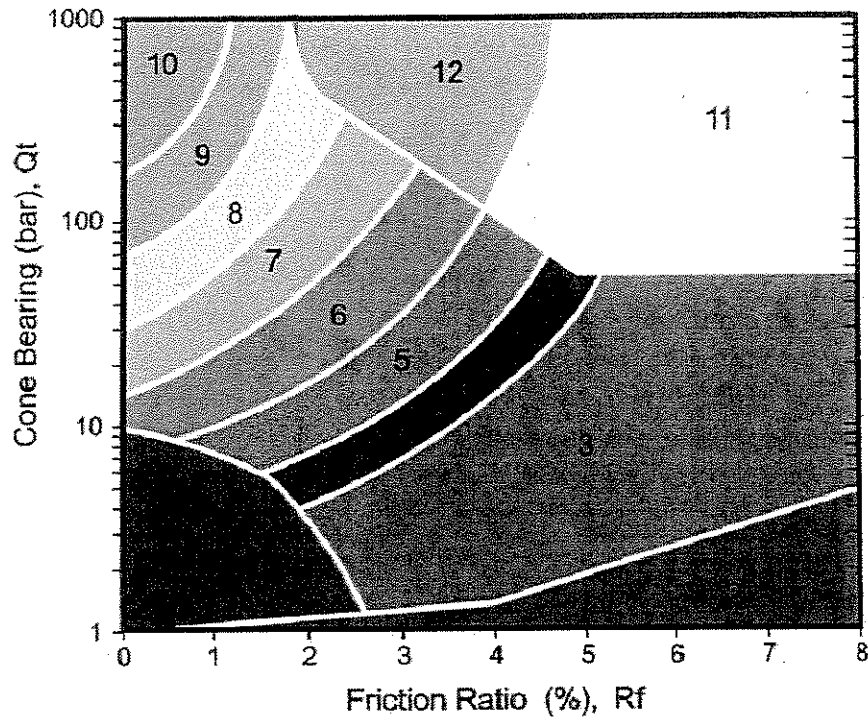
FIELD INVESTIGATION

Our field investigation consisted of a surface reconnaissance and a subsurface exploration program using conventional truck-mounted, Cone Penetration Test (CPT) equipment. Three CPT probes were advanced on March 4, 2008 to a maximum depth of 45 feet. The approximate locations of the CPTs are shown on the Site Plan, Figure 2. The logs of the CPTs, as well as a key to the classification of the soil, are included as part of this appendix.

The locations of CPTs were approximately determined by pacing from existing site boundaries. The locations and elevations of the CPTs should be considered accurate only to the degree implied by the method used.

The attached CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

* * * * *

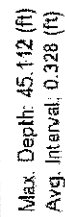


Zone	Q_t / N	Soil Behaviour Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained *
12	2	sand to clayey sand *

* overconsolidated or cemented

Robertson (1990)

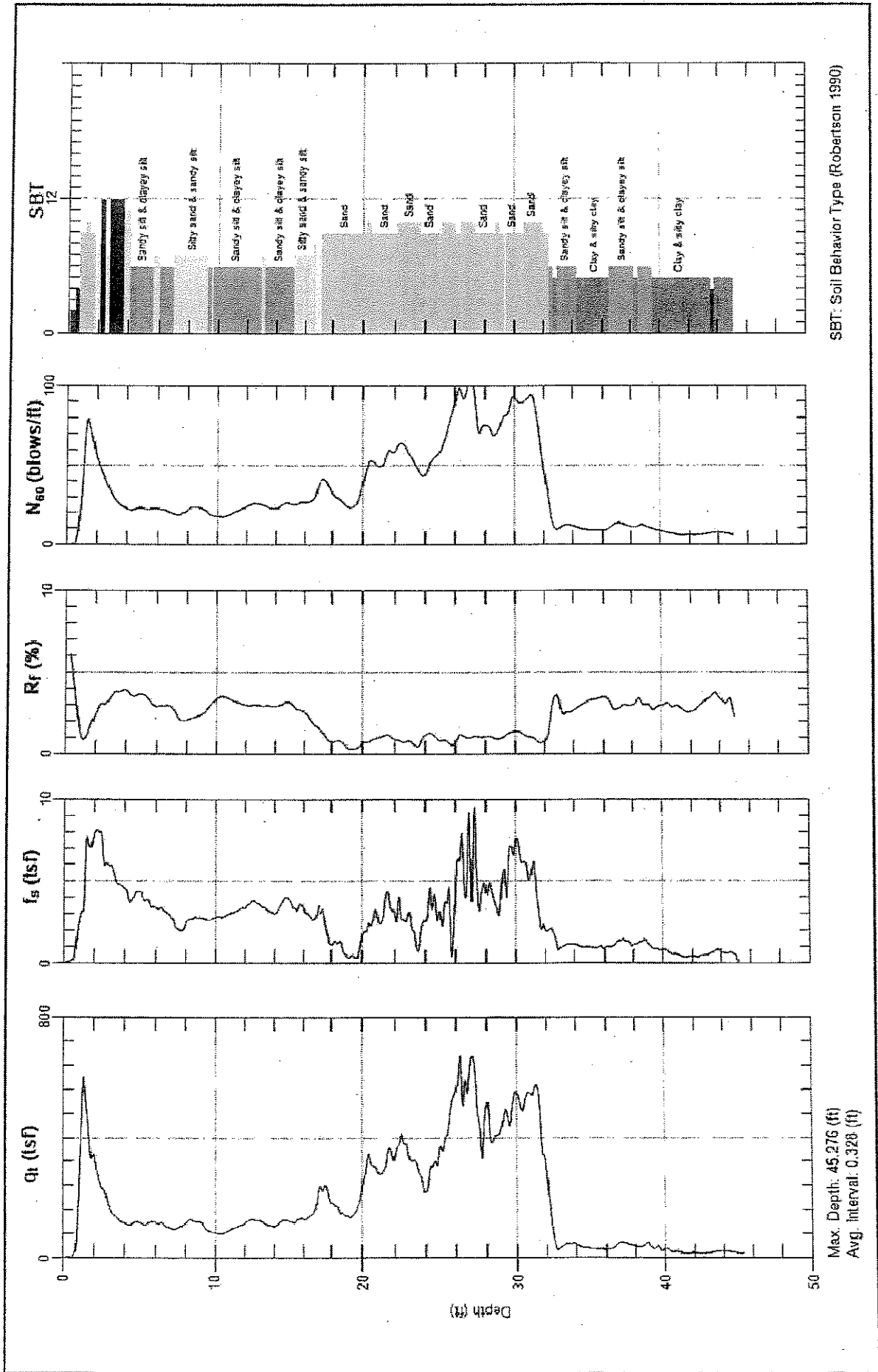
KEY TO CONE PENETROMETER TEST



CONE PENETRATION TEST - CPT-1
CREEKSIDE DEVELOPMENT FEASIBILITY
Campbell, California



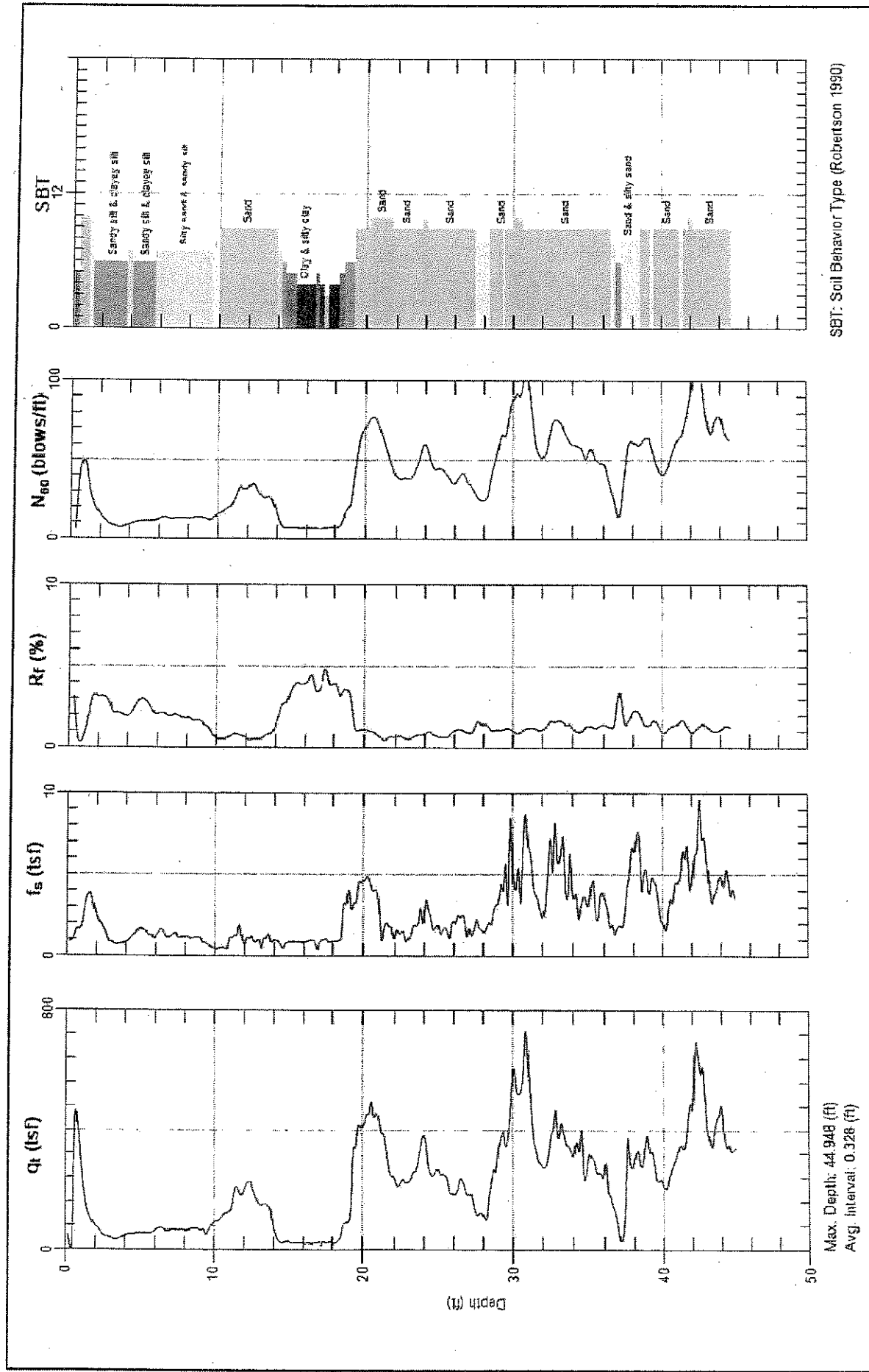
CPT-1
1740-5/158449



308 EB

CONE PENETRATION TEST - CPT-2
CREEKSIDE DEVELOPMENT FEASIBILITY
Campbell, California





308*EB

CONE PENETRATION TEST - CPT-3
CREEKSIDE DEVELOPMENT FEASIBILITY
Campbell, California



EXHIBIT 2

BIOLOGICAL REVIEW

October 16, 2013

Scott Trobbe
Hamilton Campbell, LLC
1690 Dell Avenue
Campbell, CA 95008

Re: Biological Review of the Creekside 1 Story Office Building Project in Campbell, California

Dear Scott:

The purpose of this letter is to inform you of the results of the biological resources review for the Creekside 1 Story Office Building Project located at 640 Creekside Way in Campbell, Santa Clara County, California. The WRA site visit took place on October 8, 2013 and was conducted by qualified biologists experienced in similar site inspections and who were familiar with the background information on this site.

The Study Area is approximately 1.42 acres and is bounded to the north by a Courtyard Hotel, which is south of the intersection of East Hamilton Road and Creekside Way, and to the west by a PG&E substation. Beyond the substation is a strip of disced fill soil with limited ruderal grass cover that directly borders Highway 17, a six-lane freeway. The site is bordered to the east by Creekside Way, beyond which is a commercial business park. South of the Study Area are Santa Clara Valley Water District lands containing a mature riparian corridor surrounding Los Gatos Creek, which flows approximately 120 feet from the southern border of the Study Area. The surrounding areas are extensively developed and the surrounding land uses are primarily commercial and residential.

Methods

Prior to the site visit, background literature was reviewed to determine potential presence of sensitive vegetation types, aquatic communities, and special status plant and wildlife species. Resources reviewed for sensitive vegetation communities and aquatic features include aerial photography, mapped soil types, the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDDB), and the National Wetland Inventory (NWI; USFWS 2013). Background information regarding special status plant and wildlife species was obtained through review of the CNDDDB, California Native Plant Society (CNPS) Online Database (2013), available aerial photography, and species habitat requirements as noted in available literature.

On October 8, 2013, WRA traversed the Study Area on foot to evaluate the potential presence of sensitive vegetation communities and aquatic features, and evaluate on-site habitat to determine the potential for occurrence of special status plant and wildlife species. Observed plant communities, aquatic features and plant and wildlife species were noted. Site conditions were noted as they relate to habitat requirements of special status plant and wildlife species known to occur in the vicinity as determined by the background literature research.

Results

Vegetation Communities

The Study Area does not contain sensitive vegetation communities. The Study Area itself is an actively-used parking lot with landscaped features and contains only ornamental vegetation. There are 18 trees within the Study Area; the tallest was approximately 20 feet high. Half of these trees are slated for removal and half will remain following construction. Vegetation in the surrounding area is composed of ornamental landscaping to the north and east near the hotel and along Creekside Way, and limited, ruderal non-native grass cover to the west of the PG&E substation. The area to the south of the Study Area along Los Gatos Creek is composed of mature riparian vegetation, dominated by sycamore (*Platanus sp.*), Fremont cottonwood (*Populus fremontii*), Coast Live Oak (*Quercus agrifolia*), and willows (*Salix spp.*). The riparian canopy edge of Los Gatos Creek does not extend into the Study Area; it ends approximately 50 feet from the Study Area's southern edge. There is an approximately 20-foot high ledge 40 feet from the southern border of the Study Area, providing an effective vertical barrier between the riparian area of Los Gatos Creek and the Study Area.

Wetlands and Waters of the US

Based on the site visit and review of background literature and databases, the Study Area does not support communities that would meet the definition of wetlands or "Waters of the US". The Study Area is completely paved with the exception of the landscaped areas. No indicators of wetland hydrology or vegetation were present, and the soils are composed of an Urban land-Elpaloalto complex (California Soil Resource Lab 2013), which are not classified as hydric soils.

Special Status Plant Species

Eleven different special status plant species are known to occur in the vicinity (within a 5-mile radius) of the Study Area (CDFW 2013). The majority of the special status plant species from this area occur on serpentine soils, which do not occur in the vicinity of the Study Area. None of the CNNDDB occurrences were located within an approximate 3.5 mile radius of the Study Area. No rare plant species were observed during the site visit. In addition, it was determined that current conditions in the Study Area do not provide suitable habitat for these or other special status plant species known to occur in the vicinity. Based on the lack of appropriate habitat and the developed condition of the site, there are no special status plant species that have potential to occur in the Study Area.

Special Status Wildlife Species

Of the known wildlife occurrences in CNDDDB, five special status species occur, or have been known to occur within 5 miles of the Study Area (CDFW 2013). Three other special status species have the potential to occur in or around the Study Area due to the suitability of the habitats in the area. Special status species that have potential to occur in the vicinity of the Study Area include: Pacific pond turtle (*Actinemys marmorata*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), pallid bat (*Antrozous pallidus*), hoary bat (*Lasiurus cinereus*), Yuma myotis (*Myotis yumanensis*), burrowing owl (*Athene cunicularia*), and white-tailed kite (*Elanus leucurus*). None of these species are likely occur within the Study Area, with the possible exception of the bird and bat species which may

occasionally pass over the site. The potential for each of these species to occur within the Study Area is described in more detail below.

Although Pacific pond turtle, California red-legged frog, and California tiger salamander utilize upland habitats near aquatic features for breeding and/or wintering activities, these species are not expected to occur within or adjacent to the Study Area. There is a 20-foot-high ledge separating the riparian area from the southern Study Area boundary, and the rest of the Study Area is enclosed by developed lands, including commercial development, an electrical substation, and transportation corridors. These features function as impenetrable barriers to the frog, salamander and turtle. Additionally, these species require access to aquatic features which are not available in the Study Area or accessible on adjacent lands. Furthermore, the nearest recorded CNDDDB occurrence of any of these species is 3.5 miles away from the Study Area (CDFW 2013).

White-tailed kite, as well as other raptor and native bird species may utilize the vegetation and riparian habitat of Los Gatos Creek as well as any trees or shrubs within the Study Area. These features may also provide nesting habitat during the breeding season. No remnant nests were found within the Study Area during the October 8 site visit and no large raptor nests were observed in the riparian area. Although no nests were observed, the date of the site visit was outside of the breeding season. The riparian area along Los Gatos Creek and the trees and shrubs within the Study Area have the potential to support nesting birds.

Tree removal and noise disturbance from project activities may impact nesting birds if no avoidance measures are implemented. Avoidance measures include the following: 1) a breeding bird survey should be conducted by a qualified biologist within the Study Area and the surrounding 100-foot area, 2) the biologist should establish suitable buffer areas around active nests (generally 50 feet for passerines and 100 feet for raptors, but these distances may be adjusted in the field by the biologist as appropriate), and 3) the biologist may either monitor the nest while work is conducted within the buffer area and determine whether or not the the buffer area may be reduced, or work can be avoided in the buffer area entirely until the biologist determines that the nest has fledged or failed. The majority of the riparian corridor south of the Study Area is located greater than 50 feet from project activities and thus there is a very limited chance that the presence of passerine nests in the riparian area would limit work activities. If raptors are found nesting within 100 feet of project activities, work may be limited while the nest is active, unless the biologist determines that a buffer reduction is appropriate. A buffer reduction may be appropriate if the biologist determines in the field that the bird(s) and their nesting behavior are not affected by project activities up to the edge of the buffer area.

Pallid bat, Yuma myotis, and hoary bat may utilize the larger trees in the Los Gatos Creek riparian area or the Creekside Way Bridge. However, the trees within the Study Area are small and generally unsuitable for roosting bats. It is therefore unlikely these species will be affected by the proposed construction activities.

Burrowing owl has been documented to occur in the vicinity of the Study Area (CNDDDB 2013) and may utilize open lands. Burrowing owls require pre-made burrows, usually constructed by ground squirrels or badgers. During the site visit, no owls or burrows were present in the Study Area. However, several ground squirrel burrows were found in the ruderal grassland area to the west of the electrical substation as well as in the area along the ledge south of the Study Area and southeast of the substation. There is very limited potential for the owl to occur to the west of the substation; however, due to the vertical topography of the ledge, the potential for the owl

to occur to the south of the Study Area is greatly diminished. The Study Area itself does not provide appropriate habitat for this species and construction activities are not expected to significantly increase noise or disturbance levels in any areas where owls have potential (however limited) to be present. Therefore, no impacts to burrowing owl are anticipated as a result of project activities.

Wildlife species that were observed during the site visit include mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), European starling (*Sturnus vulgaris*), Anna's hummingbird (*Calypte anna*), house sparrow (*Passer domesticus*), red-tailed hawk (*Buteo jamaicensis*), California ground squirrel (*Otospermophilus beecheyi*), and western fence lizard (*Sceloporus occidentalis*). Each of these species is common and adapted to living in urban environments. No special status species were observed.

Conclusions and Recommendations Summary

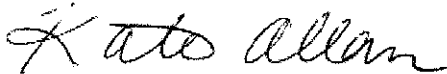
Based on the results of the site visit, the Study Area does not contain jurisdictional wetlands or "Waters of the US", nor does it contain habitat for special status plants or wildlife species. Provided that the existing project plans are implemented without substantial changes, no biological or aquatic resource permits would be required.

The only biological resources with potential to be impacted by project activities are breeding birds, which may nest in landscape trees within the Study Area or in the riparian corridor south of the Study Area. Nesting birds are protected by the federal Migratory Bird Treaty Act and California Fish and Game Code. If project activities occur during the avian breeding season (February 1 through August 31), a pre-construction breeding bird survey should be conducted by a qualified biologist prior to the initiation of ground disturbance or vegetation removal. The breeding bird survey should be conducted no more than 14 days prior to the initiation of work during the breeding season. If there is a break in construction of greater than 14 days, a new breeding bird survey should be conducted before work resumes. Vegetation removal and ground disturbance may be conducted without a breeding bird survey during the non-breeding season (September 1 through January 31).

Although it is not anticipated that Los Gatos Creek will be impacted by project activities, best management practices should be employed during construction to prevent any indirect impacts to the creek such as sediment runoff and erosion.

Please feel free to contact me or Mike Josselyn if you have any questions or concerns.

Sincerely yours,



Kate Allan
Wildlife Biologist
allan@wra-ca.com

References

[CDFW] California Department of Fish and Wildlife. 2013. Natural Diversity Database, Wildlife and Habitat Data Analysis Branch. Sacramento.

[CNPS] California Native Plant Society. 2013. Electronic Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society, Sacramento, California.

California Soil Resource Lab. 2013. SoilWeb: An Online Soil Survey Browser. <http://casoilresource.lawr.ucdavis.edu/soilweb/>. Accessed October 11.

[USFWS] United States Fish and Wildlife Service. 2013. National Wetlands Inventory. <http://www.fws.gov/wetlands/index.html>. Accessed October 11.

EXHIBIT 3

TRAFFIC REPORT

RECEIVED
MAR 18 2014
Public Works Administration



March 14, 2014

Mr. Matthew Jue
Traffic Engineer
City of Campbell
70 North First Street
Campbell, CA, 95008

Whitlock & Weinberger
Transportation, Inc.
475 14th Street
Suite 290
Oakland, CA 94612
voice 510.444.2600
web www.w-trans.com

Traffic Engineering Analysis Update for the Creekside Center Project

Dear Mr. Jue;

Whitlock & Weinberger Transportation, Inc. (W-Trans) has completed the traffic engineering analysis update for the Creekside Center Project in Campbell. The traffic analysis was completed in accordance with the criteria established by the City of Campbell and the Santa Clara Valley Transportation Authority (VTA), which administers the Santa Clara County Congestion Management Program (CMP).

Project Understanding

Currently, there is a 210-room hotel on the southeast corner of the State Route (SR) 17 Northbound Off-Ramp/Creekside Way intersection. Vehicular access to the hotel is provided via a driveway located on the west side of Creekside Way approximately 240 feet south of the SR 17 Northbound Off-Ramp. This driveway is directly opposite the northern driveway for 900 East Hamilton Avenue. There is also an approved 170,000 square-foot office building that will be located just southwest of the existing hotel. As originally proposed, the driveway for the office/hotel was to be shared and aligned with the 900 East Hamilton Avenue northern driveway. The *Creekside Center Traffic Analysis*, Fehr & Peers, August 2006, concluded that a traffic signal was not warranted at this driveway. However, a traffic signal was included as a condition of approval to provide gaps and minimize the delays to traffic exiting the project driveway.

The applicant for the office building has now proposed a new layout including a nine-story parking garage to be located opposite the hotel, and a separate parking lot at the office site. The proposal includes use of the existing northern driveway that would be shared with the office/hotel and provide access to the parking garage as well as the parking lot at the office site. Also proposed is a new full access driveway approximately 200 feet south of the existing northern driveway. The proposed southern driveway would provide access to the parking garage and would be directly opposite the southern driveway for 900 East Hamilton Avenue.

Additionally, a new 11,400 square-foot one-story office building is proposed in lieu of a previously-approved parking garage on the parcel to the south along Creekside Way. Vehicular access to the new office building would be from Creekside Way just south of the proposed southern driveway. The proposed site plan is enclosed.

Study Area and Period

The study area focused on three key intersections as listed below:

1. Hamilton Way/Creekside Way
2. SR 17 Northbound Off-Ramp/Creekside Way (CMP)
3. Creekside Way/Campisi Way

Operating conditions during the weekday p.m. peak period were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The evening peak occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute. The p.m. peak period was evaluated for the following scenarios:

- Background Conditions (including the Baywest Development approved project)
- Background Plus Project Conditions

Capacity Analysis

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersections are controlled by traffic signals and were analyzed using the signalized methodology published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2000 as well as the *Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority, Congestion Management Program, 2003. These sources contain methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. The signalized methodology is based on factors including traffic volumes, green time for each movement, phasing, whether or not the signals are coordinated, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. It should be noted that the average stopped delay for the signalized intersections was calculated using Synchro analysis software and correlated to a level of service designation as shown Table 1.

Table I
Signalized Intersection Level of Service Criteria

Level of Service	Average Control Delay (in seconds per vehicle)	Description
A	Delay $\leq$ 10.0	Free Flow; minimal to no delay
B+	10.0 < Delay $\leq$ 12.0	Stable flow, but speeds are beginning to be restricted by traffic conditions; slight delays.
B	12.0 < Delay $\leq$ 18.0	
B-	18.0 < Delay $\leq$ 20.0	
C+	20.0 < Delay $\leq$ 23.0	Stable flow, but most drivers cannot select their own speeds and feel somewhat restricted; acceptable delays.
C	23.0 < Delay $\leq$ 32.0	
C-	32.0 < Delay $\leq$ 35.0	
D+	35.0 < Delay $\leq$ 39.0	Approaching unstable flow, and drivers have difficulty maneuvering; tolerable delays
D	39.0 < Delay $\leq$ 51.0	
D-	51.0 < Delay $\leq$ 55.0	
E+	55.0 < Delay $\leq$ 60.0	Unstable flow with stop and go; delays
E	60.0 < Delay $\leq$ 75.0	
E-	75.0 < Delay $\leq$ 80.0	
F	Delay > 80.0	Total breakdown; congested conditions with excessive delays.

Reference: *Traffic Level of Service Guidelines*, Santa Clara County Congestion Management Program, 2003

Traffic Operation Standards

The City of Campbell has established a minimum acceptable operating level of LOS D for local intersections and LOS E for CMP intersections.

The City of Campbell has established criteria to determine the level of significance of traffic impacts based on standards set by the Santa Clara County *Congestion Management Program (CMP)* in the *Transportation Impact Analysis Guidelines*, adopted in March 2009. For local intersections not in the CMP network, a traffic impact is considered significant if:

- The addition of project-generated traffic causes operation of an intersection to deteriorate from an acceptable level of service (LOS D or better) to LOS E or LOS F, or
- For intersections where LOS E operation has been established as acceptable, the project condition causes operation to deteriorate from LOS E to LOS F.

For intersections in the CMP network, a traffic impact is considered significant if:

- The addition of project-generated traffic causes operation of an intersection to deteriorate from an acceptable level of service (LOS E or better) to LOS F, or
- For intersections operating at LOS F under background conditions, the project condition increases the average control delay for critical movements by four seconds or more and project traffic increases the critical volume-capacity (v/c) ratio by 0.01 or more.

Trip Generation

The trip generation given in the previous *Creekside Center Traffic Analysis* was updated to reflect the standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 9th Edition, 2012 for "General Office Building" (ITE LU #710) and "Hotel" (ITE LU #310) uses. The trips generated by the currently proposed 11,400 square-foot office were estimated using standard rates for a "General Office Building." Similar to what was used in the previous traffic analysis, a 3-percent trip reduction was applied to the office use to account for employees using the Hamilton Avenue Light Rail Station.

The currently proposed project would be expected to generate 3,744 new weekday trips including 403 new trips during the p.m. peak hour. The trip generation summary is presented in Table 2.

Table 2
Trip Generation Summary

Land Use	Units	Daily		Weekday PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out
Proposed							
Hotel	210 rms	8.17	1,716	0.6	126	64	62
Office	170 ksf	11.56	1,965	1.58	269	46	223
Office	11.4 ksf	11.03	126	1.49	17	3	14
LRT Reduction ¹		-3%	-63	-3%	-9	-1	-7
Total Net-New Trips			3,744		403	112	292

Note: rms = rooms; ksf = 1,000 square feet

¹ LRT reduction was applied to office use only

Trip Distribution/Assignment

The pattern used to allocate new project trips to the street network was determined by reviewing the project trips at the study intersections given in the previous *Creekside Center Traffic Analysis*. The resulting trip distribution is provided in Table 3.

Table 3
Trip Distribution

Route	Percent (%)	
	In	Out
Hamilton Ave west of Creekside Way	48%	60%
Hamilton Ave east of Creekside Way	20%	20%
Campisi Way East of Creekside Way	20%	20%
SR 17 NB Off-Ramp at Creekside Way	12%	-
TOTAL	100%	100%

Project trips were assigned to the project driveways based on the parking supply information, and the locations of the hotel, office, nine-story parking garage, and separate office parking lot. The assumptions are listed below.

Hotel

Given that the hotel is closer to the existing northern driveway, and the two lower levels of the proposed nine-level parking garage (147 spaces) would generally accommodate all the hotel parking demand, it was assumed that all the hotel inbound and outbound trips during the p.m. peak hour would use the northern driveway.

Office (170 ksf)

It was estimated that out of the total 818 parking spaces in the nine-story garage, the 671 spaces in the upper seven levels would generally be available for office employees and visitors, and people would tend to enter/exit the garage via the southern driveway to access the upper floors of the garage. The office building would also provide about 156 surface parking spaces at the office site that would be accessible via the northern driveway. The total parking spaces provided for the office would therefore be 827 spaces (671 spaces at the garage plus 156 spaces at the office lot).

Inbound Traffic

The most direct route to the office is via the northern driveway, and thus it is reasonable to assume that all p.m. peak hour inbound traffic including visitors, deliveries, and employees would tend to drive to the office site first to look for parking, and then either park or circulate back to the garage to find an available parking spot. Therefore, it was assumed that all the office inbound traffic during the p.m. peak hour would access the site via the northern driveway and park at the office or the garage.

Outbound Traffic

The traffic outbound from the office during the p.m. peak hour would use either the northern driveway or southern driveway in proportion to the parking spaces allocated at the nine-story garage (671 spaces – exit via the southern driveway) and office (156 spaces – exit via the northern driveway). This would result in nearly 80 percent of the office traffic ($671 \text{ spaces} / 827 \text{ total spaces} = 80\%$) exiting via the southern driveway as they would be coming out of the nine-story garage; the remaining 20 percent would exit via the northern driveway.

Background Conditions

The City of Campbell has identified the Baywest Development, (*1677 South Bascom Avenue Traffic Study*, Whitlock & Weinberger Transportation, March 2012) as an approved project near the study area. The Background Conditions traffic volumes for this study were developed by adding the trips generated by this approved project to the Background Conditions traffic volumes given in the *Creekside Center Traffic Analysis*.

Intersection Levels of Service

Under Background Conditions, all three study intersections would operate acceptably during the p.m. peak hour. The intersection level of service calculations are summarized in Table 4 and copies of the level of service calculations are enclosed.

Table 4
Background Conditions PM Peak Hour Intersection Levels of Service

Study Intersection	Delay	LOS
1. Hamilton Ave/Creekside Way	23.5	C
2. SR 17 NB Off-Ramp/Creekside Way	17.2	B
3. Creekside Way/Campisi Way	12.6	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Background plus Project Conditions

Upon the addition of the project-generated trips to the Background traffic volumes, all three study intersections would be expected to continue operating acceptably during the p.m. peak hour. The intersection level of service calculations for the Background plus Project Conditions are summarized in Table 5 with Background Conditions values shown for comparison. Copies of the level of service calculations are enclosed.

Table 5
Existing PM Peak Hour Intersection Levels of Service

Study Intersection	Background Conditions		Background plus Project	
	Delay	LOS	Delay	LOS
1. Hamilton Ave/Creekside Way	23.5	C	27.8	C
2. SR 17 NB Off-Ramp/Creekside Way	17.2	B	16.1	B
3. Creekside Way/Campisi Way	12.6	B	13.1	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service

Driveway Operation

While the concept of "Level of Service" is typically applied to intersections of two public streets, there are no similar standards for driveways. Instead, the amount of delay that drivers would experience and the ability to find gaps in the traffic flow were considered. The delay that drivers would experience exiting the northern and southern driveways was determined under Background plus Project Conditions utilizing the HCM 2000 "Two-Way Stop Controlled" intersection capacity LOS methodology.

Background plus Project Conditions

With the addition of project traffic to Background traffic volumes, both the northern and southern driveway approaches to Creekside Way would be expected to operate with average delays of less than 17 seconds. The results are summarized in Table 6 and a copy of the calculations is enclosed.

Table 6
Background plus Project Conditions Average PM Peak Hour Delay

Driveway Location Approach	Delay	LOS
Creekside Way/Northern Driveway	3.1	A
<i>Eastbound Approach</i>	<i>16.7</i>	<i>C</i>
Creekside Way/Southern Driveway	4.3	A
<i>Eastbound Approach</i>	<i>15.1</i>	<i>C</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service;
 Results for minor stop-controlled approaches are indicated in *italics*

As originally proposed, access to the office building, a parking garage and the hotel was to be provided via a single northern driveway. In the previous *Creekside Center Traffic Analysis*, the northern driveway approach at Creekside Way operated at an unacceptable LOS F with excessive delays. With the proposed change that includes a northern and a southern driveway, traffic accessing the site would now be split between the two driveways, thereby improving operation and reducing delay at the northern project driveway as shown in Table 6.

Queuing

A queuing analysis was performed for Creekside Way between Hamilton Avenue and the northern project driveway to estimate the northbound Creekside Way queues using the SIMTRAFFIC application of Synchro, and averaging the 95th percentile queues for each of five runs.

As shown in Table 7, the northbound left-turn queue at the Hamilton Avenue/Creekside Way intersection would exceed the available storage length. At the SR 17 Northbound Off-Ramp intersection, the northbound through queues would also exceed the available storage space, extending beyond the northern project driveway, potentially blocking the egress from the 900 East Hamilton Avenue northern driveway as well as the outbound left-turn movement from the northern project driveway onto Creekside Way. Copies of the SIMTRAFFIC projections are enclosed.

Table 7
95th Percentile Queues

Intersection Approach	Available Storage (feet)	Background plus Project Conditions PM Peak Queue (feet)
Hamilton Ave/Creekside Way		
<i>Northbound left-turn</i>	<i>135</i>	180
SR 17 NB Off-Ramp/Creekside Way		
<i>Northbound Through</i>	<i>115</i>	187

Notes: All distances are measured in feet;

Bold text = queue length exceeds available storage

A field visit during the p.m. peak hour indicates that the northbound through queue on Creekside Way currently extends beyond the northern project driveway and blocks the outbound left-turn movement. This resulted in some of the hotel traffic having to exit the site via the existing southern driveway. The longest northbound Creekside Way queue was observed to extend just south of the southern driveway for 900 Hamilton Avenue.

Warrants

A peak hour traffic signal warrant analysis was conducted for the northern and proposed southern project driveways on Creekside Way using the criterion published in the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD), 2012. For the purposes of this study, Warrant 3, the Peak Hour Volume Warrant, which determines the need for signalized traffic control based on the highest volume hour of the day, was analyzed for the following two locations:

- Creekside Way/Northern Driveway
- Creekside Way/Southern Driveway

The Peak Hour Volume Warrant was used in conjunction with the operational analysis to determine the potential need for traffic signalization. The Peak Hour Volume Warrant would not be satisfied at either location under Background plus Project volumes and the results are consistent with the previous *Creekside Center Traffic Analysis*. The warrant analysis worksheets are enclosed.

Alternatives

Based on the queuing analysis and field observations, it appears that the northbound Creekside Way queue would extend beyond the northern project driveway, potentially blocking the egress from the 900 East Hamilton driveways as well as the outbound left-turning movement from the northern project driveway onto Creekside Way. Consideration was given to signalizing either of the project driveways on Creekside Way so that egress from the project as well as 900 Hamilton Avenue is not blocked.

Creekside Way/Northern Driveway

With the installation of a traffic signal at this location including permissive left-turn phasing for the eastbound and westbound approaches, the driveway would operate with minimal delay during the p.m. peak hour under Background plus Project Conditions. With a traffic signal, the conflict between the northbound through traffic on Creekside Way and traffic making an outbound left-turn movement from the northern project driveway onto Creekside Way, as well as traffic exiting the 900 East Hamilton driveway, would be eliminated. A traffic signal would provide gaps for motorists exiting the northern project driveway and improve the safety for pedestrians and motorists at this location. Unlike today, however, the through traffic on Creekside Way would stop at the traffic signal, resulting in an increase of average vehicle delay for the southbound and northbound through movements.

Given that the SR 17 Northbound Off-Ramp and the northern project driveway are less than 300 feet apart, if a traffic signal were to be installed, it would need to be interconnected with the SR 17 Northbound Off-Ramp/Creekside Way intersection to minimize delays along Creekside Way in the northbound and southbound directions. It is therefore recommended that, should there be a new traffic signal, that when it is designed, the City conducts a detailed traffic operations analysis to determine the exact signal timing and phasing, and how the traffic signal would connect to and operate in conjunction with other traffic signals on Creekside Way and Hamilton Avenue.

Creekside Way/Southern Driveway

Due to the proximity of the proposed 11,400-square-foot office driveway to the southern project driveway, a traffic signal at this location is not recommended. It should be noted that a two-way left-turn lane (TWLTL) exists on Creekside Way adjacent to the southern project driveway that would provide temporary storage to vehicles making an outbound left-turn movement from the southern driveway onto Creekside Way. When a sufficient gap is available, motorists would enter the northbound through lane from the center turn lane. Therefore, if the northbound Creekside Way through queue extends beyond the southern project driveway, drivers would occasionally have to enter the center turn lane first and then merge into the northbound Creekside Way through lane.

To allow egress from the southern 900 East Hamilton driveway when the queue for northbound Creekside Way extends beyond this driveway, it is recommended that "KEEP CLEAR" pavement marking be installed on northbound Creekside Way at the southern 900 East Hamilton driveway. With this improvement, the 900 East Hamilton driveway would not be blocked and motorists would be able to exit the driveway safely.

Driveway Spacing

There would be 84 feet between the project southern driveway and the 11.4 ksf office driveway on Creekside Way. Guidelines for driveway spacing are based on arterial roadways with higher traffic volumes than Creekside Way, which is designated as a collector roadway. Per the *Institute of Transportation Engineers (ITE)*, *Transportation and Land Development* and *Transportation Research Board (TRB)*, *Access Management Manual*, driveway spacing guidelines, the minimum driveway spacing required on an arterial roadway is 100 feet for a roadway with speeds of 30 miles per hour (mph), and 160 feet for a roadway with speeds of 35 mph.

Creekside Way is designated as a collector roadway, with a posted speed limit of 30 mph and an 85th percentile speed of 35 mph. On arterial roadways, traffic volumes tend to be higher compared to collector roadways, and drivers on an arterial need more time to react, thus leading to the need for more driveway spacing. On a collector roadway such as Creekside Way, although the proposed spacing between the project southern driveway and the 11.4 ksf office driveway is less than 100 feet, the driveway locations are expected to adequately serve both driveways and are not anticipated to result in any safety issues. This is due to the lower traffic volumes on a collector roadway, the relatively low volume of traffic that would use the 11.4 ksf office driveway, and the adequate site distance at these driveways for motorists to see one another.

Conclusions

- Under Background Conditions, all three study intersections would be expected to operate at an acceptable LOS C or better and would continue to do so with the addition of traffic from the proposed project, resulting in a less-than-significant project impact.
- The average vehicle delay for egress at the northern and southern project driveways on Creekside Way would average less than 17 seconds with the addition of project traffic to Background Conditions traffic volumes.
- The northbound Creekside Way queues would extend beyond the northern project driveway and at times extend beyond the southern project driveway, blocking egress from 900 East Hamilton Avenue as well as the outbound left-turn movement from the project driveways onto Creekside Way.

- The Peak Hour Volume Warrant would not be satisfied at either driveway location under Background plus Project Conditions. This is consistent with the results presented in the previous *Creekside Center Traffic Analysis*.
- Installation of a traffic signal at the northern project driveway at Creekside Way would eliminate the conflict between the Creekside Way through traffic and traffic exiting the northern project driveway as well as the 900 East Hamilton driveways across the street. Although it would not satisfy a peak hour traffic signal warrant, the City may decide to install a traffic signal at this location for these other reasons.
- Installation of a traffic signal on Creekside Way at the southern project driveway is not recommended due to its proximity to the proposed office driveway.
- The proposed spacing of 84 feet between the southern project driveway and the 11.4 ksf office driveway would not satisfy design guidelines. However, the driveway locations are expected to adequately serve both driveways and are not anticipated to result in any safety issues.

Recommendations

- If a traffic signal is desired, it is recommended that it be installed at the northern project driveway. The City should conduct a detailed traffic operations analysis to determine the exact signal timing and phasing and how it would connect to and operate with other traffic signals on Creekside Way and Hamilton Avenue.

We appreciate the opportunity to provide these services. Please call us if you have any questions or comments.

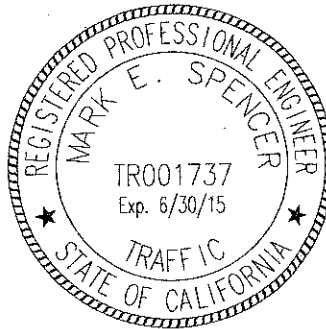
Sincerely,



Jaspreet Anand, PE
Transportation Engineer



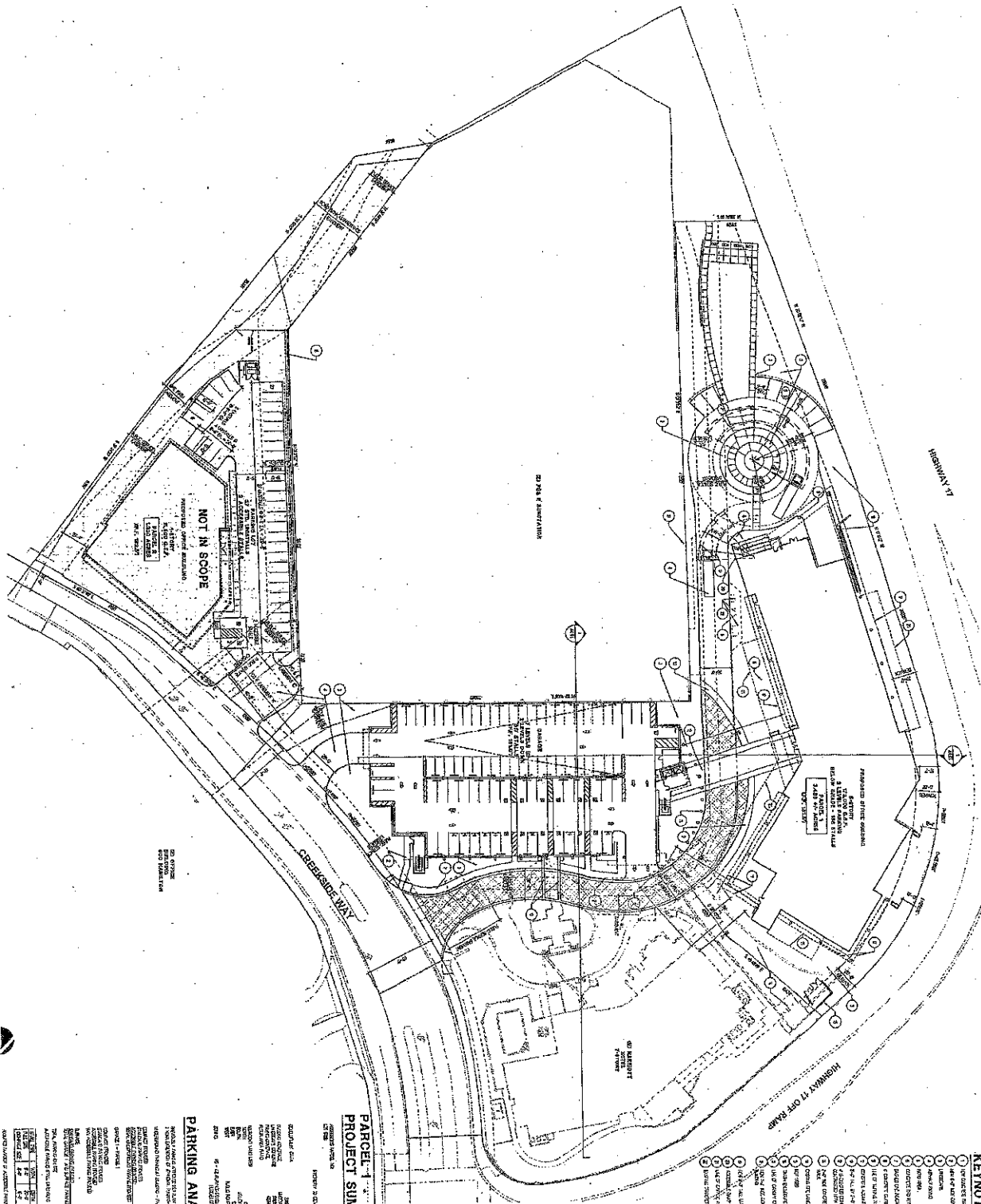
Mark Spencer, PE
Principal



MS/jka/CMP010.L1

Enclosure: Proposed Site Plan
 Level of Service Calculations
 Queuing
 Warrants Spreadsheet
 Driveway Spacing Guidelines

1
SITE PLAN
SECTION 1 • 10-10-10



PROJECT SUMMARY

DATE	DESCRIPTION	AMOUNT	BALANCE
10/1/88	10/1/88	100.00	100.00
10/2/88	10/2/88	100.00	200.00
10/3/88	10/3/88	100.00	300.00
10/4/88	10/4/88	100.00	400.00
10/5/88	10/5/88	100.00	500.00
10/6/88	10/6/88	100.00	600.00
10/7/88	10/7/88	100.00	700.00
10/8/88	10/8/88	100.00	800.00
10/9/88	10/9/88	100.00	900.00
10/10/88	10/10/88	100.00	1000.00
10/11/88	10/11/88	100.00	1100.00
10/12/88	10/12/88	100.00	1200.00
10/13/88	10/13/88	100.00	1300.00
10/14/88	10/14/88	100.00	1400.00
10/15/88	10/15/88	100.00	1500.00
10/16/88	10/16/88	100.00	1600.00
10/17/88	10/17/88	100.00	1700.00
10/18/88	10/18/88	100.00	1800.00
10/19/88	10/19/88	100.00	1900.00
10/20/88	10/20/88	100.00	2000.00
10/21/88	10/21/88	100.00	2100.00
10/22/88	10/22/88	100.00	2200.00
10/23/88	10/23/88	100.00	2300.00
10/24/88	10/24/88	100.00	2400.00
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10/27/88	10/27/88	100.00	2700.00
10/28/88	10/28/88	100.00	2800.00
10/29/88	10/29/88	100.00	2900.00
10/30/88	10/30/88	100.00	3000.00
10/31/88	10/31/88	100.00	3100.00
11/1/88	11/1/88	100.00	3200.00
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11/5/88	11/5/88	100.00	3600.00
11/6/88	11/6/88	100.00	3700.00
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11/22/88	11/22/88	100.00	5300.00
11/23/88	11/23/88	100.00	5400.00
11/24/88	11/24/88	100.00	5500.00
11/25/88	11/25/88	100.00	5600.00
11/26/88	11/26/88	100.00	5700.00
11/27/88	11/27/88	100.00	5800.00
11/28/88	11/28/88	100.00	5900.00
11/29/88	11/29/88	100.00	6000.00
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12/13/88	12/13/88	100.00	7400.00
12/14/88	12/14/88	100.00	7500.00
12/15/88	12/15/88	100.00	7600.00
12/16/88	12/16/88	100.00	7700.00
12/17/88	12/17/88	100.00	7800.00
12/18/88	12/18/88	100.00	7900.00
12/19/88	12/19/88	100.00	8000.00
12/20/88	12/20/88	100.00	8100.00
12/21/88	12/21/88	100.00	8200.00
12/22/88	12/22/88	100.00	8300.00
12/23/88	12/23/88	100.00	8400.00
12/24/88	12/24/88	100.00	8500.00
12/25/88	12/25/88	100.00	8600.00
12/26/88	12/26/88	100.00	8700.00
12/27/88	12/27/88	100.00	8800.00
12/28/88	12/28/88	100.00	8900.00
12/29/88	12/29/88	100.00	9000.00
12/30/88	12/30/88	100.00	9100.00
12/31/88	12/31/88	100.00	9200.00

PARKING ANALYSIS

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KEYNOTES

- | | | |
|----|--|---|
| 1 | What is the purpose of the study? | To investigate the effect of a new teaching method on student performance. |
| 2 | What is the research question? | Does the new teaching method improve student performance compared to the traditional method? |
| 3 | What is the hypothesis? | The new teaching method will result in higher student performance than the traditional method. |
| 4 | What is the independent variable? | Teaching method (New vs. Traditional). |
| 5 | What is the dependent variable? | Student performance (Score). |
| 6 | What is the sample size? | 30 students. |
| 7 | What is the data collection method? | Quasi-experimental design with pre-test and post-test scores. |
| 8 | What is the data analysis method? | Paired sample t-test. |
| 9 | What is the conclusion? | The new teaching method significantly improved student performance. |
| 10 | What are the limitations of the study? | Small sample size, lack of randomization, and potential bias in data collection. |
| 11 | What are the implications of the study? | The findings suggest that the new teaching method could be a valuable tool for improving student performance. |
| 12 | What are the future research directions? | Further studies with larger sample sizes and more rigorous designs are needed to confirm the findings. |

ARC TEC
ARCHITECTURAL TECHNOLOGIES

A Planning Application Package For:
CREEKSIDE
Creekside Way
Campbell, CA

A1.01

PREDICTED. **12.31.15**

HCM Signalized Intersection Capacity Analysis

1: Hamilton Ave & Creekside Way

2/3/2014

	→	↘	↙	←	↗	↖
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↑	↑↑↑	↑↑↑	↑
Volume (vph)	1837	265	94	1979	703	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	1.00	0.80	0.94	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5961	4990	1521
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5961	4990	1521
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90
Adj. Flow (vph)	1997	288	102	2151	781	362
RTOR Reduction (vph)	0	95	0	0	0	148
Lane Group Flow (vph)	1997	193	102	2151	781	214
Confl. Peds. (#/hr)		7	7			14
Confl. Bikes (#/hr)		1				7
Turn Type		Prot	Prot			Perm
Protected Phases	2	2	1	6	4	
Permitted Phases						4
Actuated Green, G (s)	95.3	95.3	13.6	112.9	37.1	37.1
Effective Green, g (s)	96.3	96.3	13.6	113.9	38.1	38.1
Actuated g/C Ratio	0.60	0.60	0.08	0.71	0.24	0.24
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	4.0	4.0
Lane Grp Cap (vph)	3061	953	150	4243	1188	362
v/s Ratio Prot	c0.39	0.12	c0.06	0.36	c0.16	
v/s Ratio Perm						0.14
v/c Ratio	0.65	0.20	0.68	0.51	0.66	0.59
Uniform Delay, d1	20.9	14.4	71.1	10.4	55.1	54.1
Progression Factor	1.00	1.00	1.00	1.00	0.82	0.84
Incremental Delay, d2	1.1	0.5	9.7	0.4	1.4	2.8
Delay (s)	22.0	14.9	80.7	10.8	46.7	48.2
Level of Service	C	B	F	B	D	D
Approach Delay (s)	21.1			14.0	47.2	
Approach LOS	C			B	D	
Intersection Summary						
HCM Average Control Delay		23.5		HCM Level of Service		C
HCM Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		160.0		Sum of lost time (s)	12.0	
Intersection Capacity Utilization		68.7%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: SR 17 NB Off Ramp & Creekside Way

2/3/2014

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↗		↑↑↑	↑↑	
Volume (vph)	765	155	0	255	354	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1563		5085	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1563		5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.88	0.88
Adj. Flow (vph)	832	168	0	280	402	0
RTOR Reduction (vph)	0	110	0	0	0	0
Lane Group Flow (vph)	832	58	0	280	402	0
Confl. Peds. (#/hr)		1	6			6
Confl. Bikes (#/hr)						2
Turn Type	Perm					
Protected Phases	4			2	2	
Permitted Phases		4				
Actuated Green, G (s)	26.9	26.9		44.1	44.1	
Effective Green, g (s)	27.4	27.4		44.6	44.6	
Actuated g/C Ratio	0.34	0.34		0.56	0.56	
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1176	535		2835	1973	
v/s Ratio Prot	0.24			0.06	0.11	
v/s Ratio Perm		0.04				
v/c Ratio	0.71	0.11		0.10	0.20	
Uniform Delay, d1	22.8	18.0		8.3	8.8	
Progression Factor	1.00	1.00		1.00	0.79	
Incremental Delay, d2	2.0	0.1		0.1	0.2	
Delay (s)	24.8	18.0		8.4	7.2	
Level of Service	C	B		A	A	
Approach Delay (s)	23.7			8.4	7.2	
Approach LOS	C			A	A	
Intersection Summary						
HCM Average Control Delay	17.2			HCM Level of Service		B
HCM Volume to Capacity ratio	0.40					
Actuated Cycle Length (s)	80.0			Sum of lost time (s)		8.0
Intersection Capacity Utilization	46.8%			ICU Level of Service		A
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

3: Campisi Way & Creekside Way

2/3/2014

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↗	↘	↙
Volume (vph)	224	124	116	245	242	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Flt	1.00	1.00	1.00	0.85	0.92	
Flt Protected	0.95	1.00	1.00	1.00	0.98	
Satd. Flow (prot)	1770	1863	1863	1583	3247	
Flt Permitted	0.95	1.00	1.00	1.00	0.98	
Satd. Flow (perm)	1770	1863	1863	1583	3247	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	135	126	266	263	305
RTOR Reduction (vph)	0	0	0	207	235	0
Lane Group Flow (vph)	243	135	126	59	333	0
Turn Type	Prot			Perm		
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	9.9	22.7	8.8	8.8	9.2	
Effective Green, g (s)	9.9	22.7	8.8	8.8	9.2	
Actuated g/C Ratio	0.25	0.57	0.22	0.22	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	439	1060	411	349	749	
v/s Ratio Prot	0.14	0.07	0.07		0.10	
v/s Ratio Perm				0.04		
v/c Ratio	0.55	0.13	0.31	0.17	0.45	
Uniform Delay, d1	13.1	4.0	13.0	12.6	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.1	0.4	0.2	0.4	
Delay (s)	14.6	4.1	13.4	12.8	13.6	
Level of Service	B	A	B	B	B	
Approach Delay (s)		10.8	13.0		13.6	
Approach LOS		B	B		B	
Intersection Summary						
HCM Average Control Delay			12.6	HCM Level of Service		B
HCM Volume to Capacity ratio			0.44			
Actuated Cycle Length (s)			39.9	Sum of lost time (s)		12.0
Intersection Capacity Utilization			41.5%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

1: Hamilton Ave & Creekside Way

2/3/2014

	→	↘	↙	←	↗	↖
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑	↑	↑	↓↓↓	↑↑↑	↑
Volume (vph)	1837	319	116	1979	889	373
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	1.00	*0.80	0.94	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5085	1583	1770	5961	4990	1523
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5961	4990	1523
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.90	0.90
Adj. Flow (vph)	1997	347	126	2151	988	414
RTOR Reduction (vph)	0	132	0	0	0	138
Lane Group Flow (vph)	1997	215	126	2151	988	276
Confl. Peds. (#/hr)		7	7			14
Confl. Bikes (#/hr)		1				7
Turn Type		Prot	Prot			Perm
Protected Phases	2	2	1	6	4	
Permitted Phases						4
Actuated Green, G (s)	85.7	85.7	14.9	104.6	45.4	45.4
Effective Green, g (s)	86.7	86.7	14.9	105.6	46.4	46.4
Actuated g/C Ratio	0.54	0.54	0.09	0.66	0.29	0.29
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	4.0	4.0
Lane Grp Cap (vph)	2755	858	165	3934	1447	442
v/s Ratio Prot	c0.39	0.14	c0.07	0.36	c0.20	
v/s Ratio Perm						0.18
v/c Ratio	0.72	0.25	0.76	0.55	0.68	0.63
Uniform Delay, d1	27.7	19.4	70.8	14.5	50.3	49.3
Progression Factor	1.00	1.00	1.00	1.00	0.81	0.76
Incremental Delay, d2	1.7	0.7	17.0	0.6	1.4	2.9
Delay (s)	29.3	20.1	87.8	15.0	42.3	40.5
Level of Service	C	C	F	B	D	D
Approach Delay (s)	28.0			19.1	41.7	
Approach LOS	C			B	D	
Intersection Summary						
HCM Average Control Delay			27.8		HCM Level of Service	C
HCM Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			160.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			72.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

2: SR 17 NB Off Ramp & Creekside Way

2/3/2014

	↖	↗	↙	↑	↓	↘
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↖	↗		↑↑↑	↑↑	
Volume (vph)	765	169	0	488	430	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.91	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1563		5085	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1563		5085	3539	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.88	0.88
Adj. Flow (vph)	832	184	0	536	489	0
RTOR Reduction (vph)	0	121	0	0	0	0
Lane Group Flow (vph)	832	63	0	536	489	0
Confl. Peds. (#/hr)		1	6			6
Confl. Bikes (#/hr)						2
Turn Type	Perm					
Protected Phases	4			2	2	
Permitted Phases		4				
Actuated Green, G (s)	27.0	27.0		44.0	44.0	
Effective Green, g (s)	27.5	27.5		44.5	44.5	
Actuated g/C Ratio	0.34	0.34		0.56	0.56	
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1180	537		2829	1969	
v/s Ratio Prot	0.24			0.11	0.14	
v/s Ratio Perm		0.04				
v/c Ratio	0.71	0.12		0.19	0.25	
Uniform Delay, d1	22.7	18.0		8.8	9.1	
Progression Factor	1.00	1.00		1.00	0.91	
Incremental Delay, d2	1.9	0.1		0.1	0.3	
Delay (s)	24.7	18.1		9.0	8.6	
Level of Service	C	B		A	A	
Approach Delay (s)	23.5			9.0	8.6	
Approach LOS	C			A	A	
Intersection Summary						
HCM Average Control Delay	16.1			HCM Level of Service		B
HCM Volume to Capacity ratio	0.42					
Actuated Cycle Length (s)	80.0			Sum of lost time (s)		8.0
Intersection Capacity Utilization	46.8%			ICU Level of Service		A
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

3: Campisi Way & Creekside Way

2/3/2014

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↑	↑	↑	↘	↘
Volume (vph)	224	124	116	267	301	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	1.00	1.00	0.85	0.93	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	1863	1863	1583	3268	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	1863	1863	1583	3268	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	135	126	290	327	305
RTOR Reduction (vph)	0	0	0	227	229	0
Lane Group Flow (vph)	243	135	126	63	403	0
Turn Type	Prot			Perm		
Protected Phases	7	4	8		6	
Permitted Phases				8		
Actuated Green, G (s)	10.0	22.9	8.9	8.9	10.2	
Effective Green, g (s)	10.0	22.9	8.9	8.9	10.2	
Actuated g/C Ratio	0.24	0.56	0.22	0.22	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	431	1038	403	343	811	
v/s Ratio Prot	c0.14	0.07	c0.07		c0.12	
v/s Ratio Perm				0.04		
v/c Ratio	0.56	0.13	0.31	0.18	0.50	
Uniform Delay, d1	13.6	4.3	13.5	13.1	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.7	0.1	0.4	0.3	0.5	
Delay (s)	15.3	4.4	14.0	13.4	13.7	
Level of Service	B	A	B	B	B	
Approach Delay (s)		11.4	13.6		13.7	
Approach LOS		B	B		B	
Intersection Summary						
HCM Average Control Delay			13.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			41.1		Sum of lost time (s)	12.0
Intersection Capacity Utilization			43.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

4: Hotel/Office (Northern) Driveway & Creekside Way

2/4/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	0	21	12	0	117	21	287	1	24	487	88
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	84	0	21	12	0	117	21	287	1	24	487	88
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			None	
Median storage (veh)								2				
Upstream signal (ft)								970			229	
pX, platoon unblocked	0.94	0.94	0.94	0.94	0.94		0.94					
vC, conflicting volume	1025	909	288	642	952	288	575			288		
vC1, stage 1 conf vol	579	579		330	330							
vC2, stage 2 conf vol	446	330		312	623							
vCu, unblocked vol	906	783	124	500	829	288	429			288		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	100	98	98	100	84	98			98		
cM capacity (veh/h)	365	464	852	574	440	709	1063			1271		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	105	129	21	288	24	325	250					
Volume Left	84	12	21	0	24	0	0					
Volume Right	21	117	0	1	0	0	88					
cSH	412	694	1063	1700	1271	1700	1700					
Volume to Capacity	0.25	0.19	0.02	0.17	0.02	0.19	0.15					
Queue Length 95th (ft)	25	17	2	0	1	0	0					
Control Delay (s)	16.7	11.4	8.5	0.0	7.9	0.0	0.0					
Lane LOS	C	B	A		A							
Approach Delay (s)	16.7	11.4	0.6		0.3							
Approach LOS	C	B										

Intersection Summary

Average Delay	3.1						
Intersection Capacity Utilization	39.2%		ICU Level of Service		A		
Analysis Period (min)	15						

HCM Unsignalized Intersection Capacity Analysis

5: Parking Garage (Southern) Driveway & Creekside Way

2/4/2014

	↗	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	138	0	35	33	0	85	0	86	0	11	509	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	138	0	35	33	0	85	0	86	0	11	509	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)								835			364	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	702	617	254	398	617	86	509			86		
vC1, stage 1 conf vol	531	531		86	86							
vC2, stage 2 conf vol	171	86		312	531							
vCu, unblocked vol	640	552	180	327	552	86	442			86		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	72	100	96	95	100	91	100			99		
cM capacity (veh/h)	486	522	810	660	523	956	1085			1508		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	173	118	86	181	339							
Volume Left	138	33	0	11	0							
Volume Right	35	85	0	0	0							
cSH	529	849	1085	1508	1700							
Volume to Capacity	0.33	0.14	0.00	0.01	0.20							
Queue Length 95th (ft)	35	12	0	1	0							
Control Delay (s)	15.1	9.9	0.0	0.5	0.0							
Lane LOS	C	A		A								
Approach Delay (s)	15.1	9.9	0.0	0.2								
Approach LOS	C	A										

Intersection Summary

Average Delay	4.3		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

6: New Office Driveway & Creekside Way

2/4/2014

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (veh/h)	11	3	1	75	575	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	3	1	75	575	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage (veh)				2	2	
Upstream signal (ft)				764	435	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	653	576	577			
vC1, stage 1 conf vol	576					
vC2, stage 2 conf vol	77					
vCu, unblocked vol	569	485	486			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	545	530	980			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	14	76	577			
Volume Left	11	1	0			
Volume Right	3	0	2			
cSH	541	980	1700			
Volume to Capacity	0.03	0.00	0.34			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	11.8	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.8	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization		40.4%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Background Conditions plus Project

2/3/2014

Intersection: 1: Hamilton Ave & Creekside Way

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	T	T	T	R	L	T	T	T	T	L	L	L
Maximum Queue (ft)	472	484	476	213	164	229	260	301	302	137	166	161
Average Queue (ft)	357	378	382	85	123	189	210	252	248	119	156	154
95th Queue (ft)	529	552	548	335	202	248	291	335	348	153	180	165
Link Distance (ft)	463	463	463			1476	1476	1476	1476		146	146
Upstream Blk Time (%)	3	4	5							3	31	51
Queuing Penalty (veh)	26	28	41							0	131	213
Storage Bay Dist (ft)				330	425					119		
Storage Blk Time (%)			10	0						21	40	
Queuing Penalty (veh)			33	0						61	118	

Intersection: 1: Hamilton Ave & Creekside Way

Movement	NB
Directions Served	R
Maximum Queue (ft)	132
Average Queue (ft)	71
95th Queue (ft)	152
Link Distance (ft)	146
Upstream Blk Time (%)	2
Queuing Penalty (veh)	9
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: SR 17 NB Off Ramp & Creekside Way

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	L	R	T	T	T	T	T
Maximum Queue (ft)	156	170	65	156	161	81	83	208
Average Queue (ft)	119	166	41	127	137	57	29	141
95th Queue (ft)	196	181	85	187	184	96	95	227
Link Distance (ft)	155	155	155	154	154	154	146	146
Upstream Blk Time (%)	9	57		9	12			7
Queuing Penalty (veh)	0	0		15	19			16
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Campisi Way & Creekside Way

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	LR
Maximum Queue (ft)	79	163	57	68	120	142
Average Queue (ft)	71	74	41	49	52	97
95th Queue (ft)	90	190	71	76	121	160
Link Distance (ft)		269	347	347		598
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	55				165	
Storage Blk Time (%)	24	2			0	0
Queuing Penalty (veh)	30	4			0	0

Zone Summary

Zone wide Queuing Penalty 746

Signal Warrant Analysis

Warrant 3: Peak-Hour Volumes and Delay

Creekside Way & Northern Project Driveway

City of Campbell

	Major Street	Minor Street
Street Name	Creekside Way	Northern Project Driveway
Direction	N-S	E-W
Number of Lanes	2	1
Approach Speed	40	20

Low population (<10,000)? No

Warrant 3: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Not Met

Not Met

Not Met

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes

Met

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

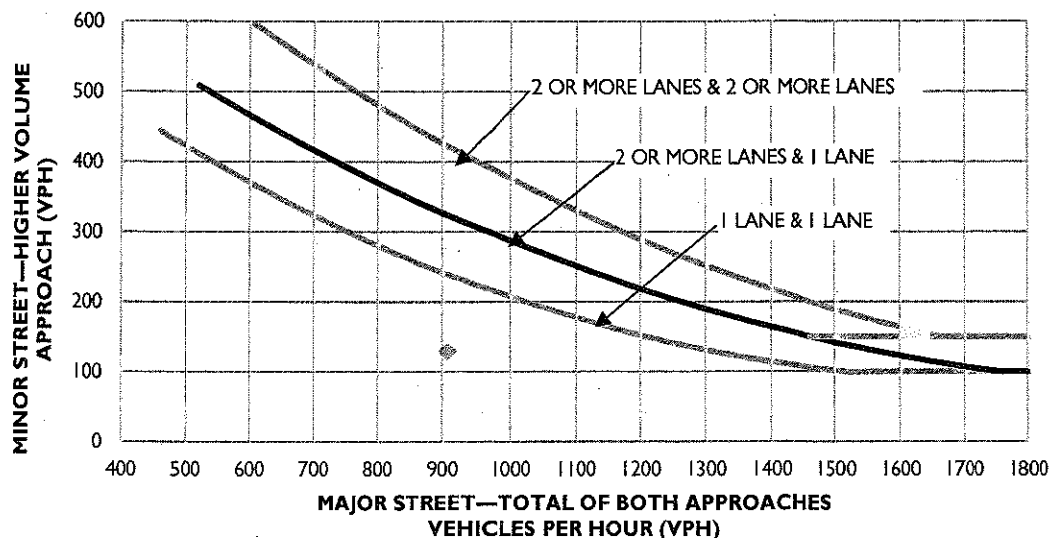
Met

Condition B

The plotted point falls above the curve

Not Met

Warrant 3, Peak Hour



Signal Warrant Analysis
Warrant 3: Peak-Hour Volumes and Delay
 Creekside Way & Southern Project Driveway
 City of Campbell

	Major Street	Minor Street
Street Name	Creekside Way	Southern Project Driveway
Direction	N-S	E-W
Number of Lanes	1	1
Approach Speed	40	20

Low population (<10,000)? No

Warrant 3: Met when either Condition A or B is met

Condition A: Met when conditions A1, A2, and A3 are met

Condition A1

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Not Met

Not Met

Not Met

Condition A2

The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes

Met

Condition A3

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

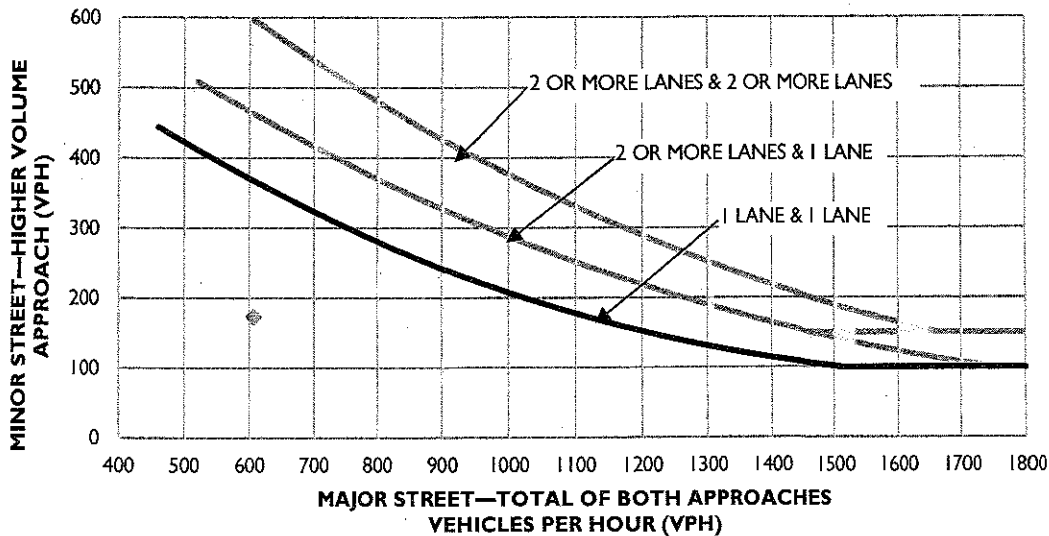
Met

Condition B

The plotted point falls above the curve

Not Met

Warrant 3, Peak Hour



Contrary to popular belief, the use of frontage roads is not a good technique to limit direct access to an arterial street in urban or developing urban areas. As shown in Figure 4-22, 64 major conflict points are created. When development occurs along the frontage roads, especially commercial development, the resulting traffic volumes result in congestion and accident potential as a result of the low-capacity, overlapping maneuver areas, close proximity of numerous conflict points, and the need for the driver to observe a large and poorly defined area.

Location and Spacing

No direct-access drive to an arterial should be located within the operational area of a signalized intersection. Short spacing between unsignalized access drives compounds the driving task by requiring the driver to watch for ingress and egress traffic at several points simultaneously while maintaining lateral and longitudinal control of the vehicle together with monitoring several vehicles ahead, behind, and in adjacent lanes. Longer spacings simplify the driving task by reducing the amount of information which must be simultaneously acquired, processed, and reacted to and increasing the time between medial and marginal conflict points.

Table 4-6 presents the access-drive spacing that is needed to eliminate overlap of the conflict areas created by a vehicle making a right turn from a driveway and entering the through traffic stream. Thus, it represents the minimum driveway spacing which allows the driver of a through vehicle to monitor one driveway at a time, rather than two or more simultaneously. As indicated by footnotes (b) and (c) to Table 4-6, notice that very high speed differentials will result even at relatively low speeds. Therefore, they should be interpreted as the minimum spacing at which adjacent access drives begin to function as independent intersections.

Major and Buckley [18] have indicated that, from the standpoint of delay to vehicles entering the traffic stream and the ability of the traffic stream to absorb vehicles exiting from driveways, numerous driveways at close spacings result in delay and cause conflicts which increase the traffic hazard. On the other hand, driveways spaced at distances greater than 1.5 times the acceleration distance will reduce delay to vehicles entering the traffic stream and will improve the traffic-absorption characteristics of the traffic stream. Mini-

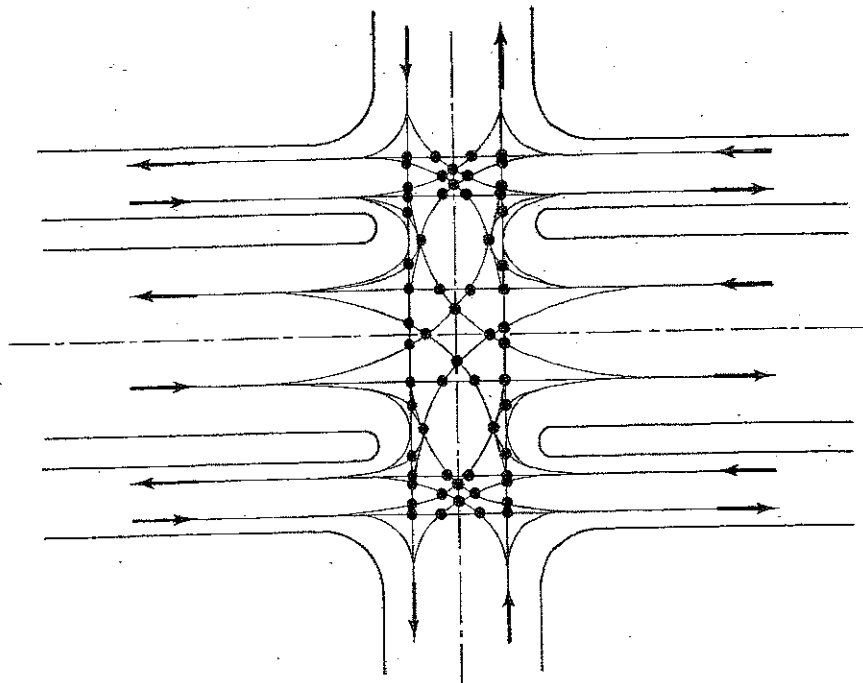


Figure 4-22 Conflict points with parallel frontage road.

TABLE 4-6

Minimum Distance to Reduce Collision Potential Due to Right-Turn Conflict Overlap

Speed (mph)	Minimum Spacing (feet) ^a		
	Author ^b		Glennon, et al. ^e
	Preferable ^c	Limiting ^d	
30	185	100	125
35	245	160	150
40	300	210	185
45	350	300	230

SOURCE: Vergil G. Stover [27].

^aSpacing allows drivers in the through-traffic stream to consider one access drive at a time. It requires that a through vehicle decelerate in order to avoid a collision when a vehicle enters the through-traffic lane.^bMeasured center to center of access drives.^cA vehicle entering the traffic stream from a driveway completes the 90-degree right turn and accelerates from a stop at 2.0 fps². The vehicle in the outside through-traffic lane does not change lanes and decelerates at 6.0 fps² after a 2.0-second perception-reaction time. No clearance is provided between the through vehicle and the vehicle entering from the driveway. The implied speed differentials between the driveway vehicle and the through traffic stream are:

Arterial speed, mph	30	35	40	45
Speed differential, mph	20	24	28	32

^dThe driveway vehicle completes the 90-degree right turn and accelerates at an average of 3.1 fps². The through vehicle decelerates at an average of 6.0 fps² after a one-second perception-reaction time. No clearance is provided between the vehicles. The implied speed differentials are

Arterial speed, mph	30	35	40	45
Speed differential, mph	14	19	24	29

The lower speed differentials for the "limiting" case result from the higher assumed acceleration rate of the driveway vehicle.

^eMeasured near curb to near curb. Assumes: 8.5 fps² by the through vehicle; driveway vehicle accelerates at an average of 2.1 fps² for a 30-mph speed and an average of 1.7 fps² for all higher speeds.

TABLE 4-7

Driveway Spacing Based on AASHTO Acceleration Distances from Stop

Operating Speed (mph)	Spacing (feet)
25	360
30	585
35	825
40	1,140
45	1,575

imum spacings based on AASHTO acceleration distances for passenger cars on level grades are given in Table 4-7.

Influence of Progression on the Choice of Direct-Access Location

The existence of signal systems in urban street networks creates traffic streams which are organized into platoons of vehicles. Platoon flow is substantially different from a random pattern, because intermittent groups of vehicles arrive, followed by substantial gaps between groups (or platoons) in which flow is light.

Therefore, the time-space diagram for platoon flow on the arterial street should be analyzed when considering the location of unsignalized access (public or private). For purposes of example, consider the time-space diagram illustrated in Figure 4-23. The signalized intersections are spaced at quarter-mile intervals. A single alternate system would provide progression in both directions at 30 mph.

Even on arterials with strongly platooned flow, not all flow occurs within platoons. As vehicles enter and/or leave the major street from a variety of sources, such as un-

TABLE 9-5 Stopping Sight Distances for Passenger Cars (9)

U.S. Customary Units						Metric Units					
Stopping Distance (ft)						Stopping Distance (m)					
Speed (mph)	Level Grade	Downgrade		Upgrade		Speed (km/h)	Level Grade	Downgrade		Upgrade	
		3%	9%	3%	9%			3%	9%	3%	9%
30	200	205	227	200	179	50	65	66	74	61	58
40	305	315	354	289	269	70	105	110	124	100	93
50	425	446	507	405	375	90	160	164	187	148	136
60	570	598	686	538	495	110	220	227	262	203	186
70	730	771	891	690	631						

Stopping Sight Distance

Minimum stopping sight distance is the minimum distance needed to allow drivers to react to a potential conflict and come to a stop. Ideally, a vehicle clears an intersection before the driver is required to respond to vehicles entering, leaving, or crossing the roadway at a downstream access connection. This simplifies the driving task and minimizes driver mistakes and collisions.

A discussion of stopping sight distance, together with tables of the stopping distance for various speeds, is provided in the AASHTO "Green Book" (9). Table 9-5 provides an abbreviated table based on the distances given in the Green Book.

Intersection Sight Distance

Intersection sight distance is the distance needed to provide a driver who is waiting in an access connection an opportunity to enter, or cross, the major roadway. A driver of a vehicle on the major roadway may need to take some action to avoid the vehicle entering, or crossing, the major roadway. The amended course notes for National Highway Institute Course 133078 (4) and the book *Transportation and Land Development* (3) address the issues involved in using AASHTO gap acceptance criteria (9). Intersection sight distances for passenger cars are presented in Table 9-6. Comparison of Tables 9-5 and 9-6 indicates

that use of intersection sight distance as a criterion for intersection spacing will result in longer spacings than stopping sight distance. However, it will result in shorter spacings than the functional area or influence distance.

Functional Area

AASHTO indicates the need to separate access connections by a distance not less than the functional area of at-grade intersections. Guidance on determining the functional boundary of an intersection is provided in Chapter 8, as well as several supplementary sources (3, 4) (9, 2001 edition). This approach recognizes that all access connections (signalized and unsignalized, public streets, and driveways) have a functional area that extends some distance upstream from the connection. Ideally, no connection would be located within this upstream functional distance according to this criterion.

Right-Turn Conflict Overlap

A right-turn conflict overlap occurs when a driver in a through-traffic lane must monitor more than one access connection at a time (Figure 9-6). Separating the access connections simplifies the driver workload and reduces the risk of collisions. Minimum distances needed to avoid the right-turn conflict overlap are presented in Table 9-7. These distances would result in a speed differential between a turning vehicle and through traffic that is substantially

TABLE 9-6 Minimum Intersection Sight Distances for Passenger Cars Entering a Two-Lane Roadway, Grades Less Than 3.0% (9)

U.S. Customary Units			Metric Units		
Speed (mph)	Left Turn (ft)	Right Turn (ft)	Speed (km/h)	Left Turn (m)	Right Turn (m)
30	335	290	40	85	75
40	445	385	50	105	95
50	555	480	60	130	110
60	665	575	70	150	130
70	775	670	80	170	145
			90	190	165
			100	210	185

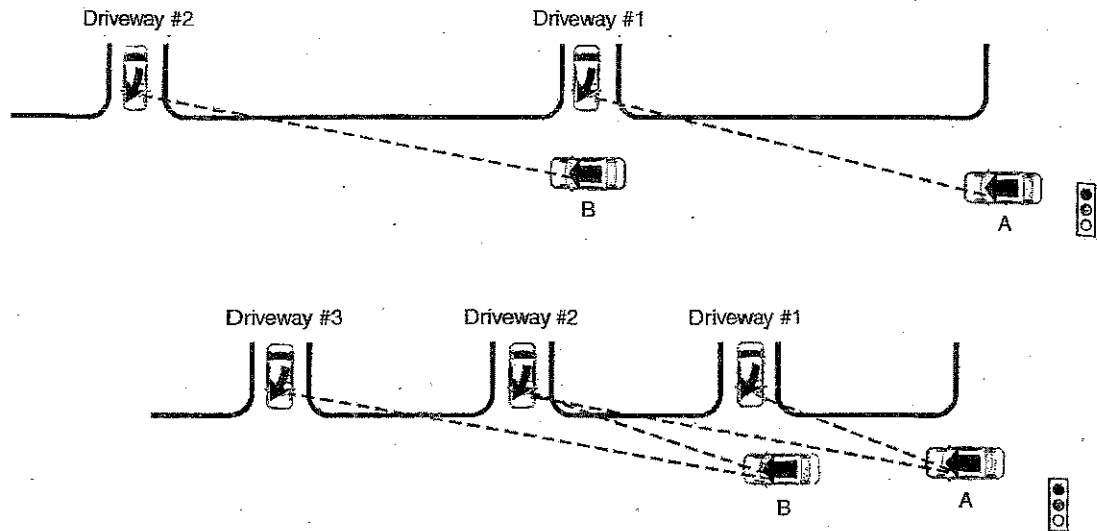


FIGURE 9-6 Right-turn conflict overlap (3): *top*, single right-turn conflict; *bottom*, double right-turn conflict.

greater than 10 mph. Thus, the conflict overlap criteria result in considerably shorter access spacing than the criteria of a 10-mph speed differential. High-speed differentials in the through-traffic lanes pose a potential collision problem on high-speed, high-volume roadways. Therefore, the minimum spacing in Table 9-7 represents conditions where access spacing will have a significant impact on through traffic. Comparing the distances in Table 9-7 with those in Table 9-5 indicates that the distance for a single right-turn conflict overlap is similar to that for stopping sight distance.

TABLE 9-7 Minimum Distances to Reduce Collision Potential due to Overlapping Right-Turn Maneuvers (3, 1988, p. 733)

Speed (mph)	Minimum Spacing ^a (ft)
30	185
35	245
40	300
45	350

NOTE: A vehicle entering the traffic stream from a driveway completes the 90-degree right turn and accelerates from a stop at 2.0 ft/s^2 . The vehicle in the outside through-traffic lane does not change lanes and decelerates at 6.0 ft/s^2 after a 2.0-s perception-reaction time. No clearance is provided between the through vehicle and the vehicle entering from the driveway. The resulting speed differentials between the driveway vehicle and the through traffic stream range from about 20 mph on a roadway having a 30-mph speed to over 30 mph where the through traffic speed is 45 mph.

^aMeasured center-to-center of access connections.

The driveway spacing and downstream corner clearance distances in Table 9-7 can be used to determine minimum spacing by dividing the distance by the number of driveways a driver would need to monitor simultaneously. For example, at 40-mph a separation of at least 300 ft is needed if a driver is to monitor one access connection at a time. A spacing of 150 ft requires drivers to monitor two connections at a time; 100-ft spacing requires simultaneous monitoring of three connections.

Influence Distance

NCHRP Project 3-52 (1) obtained observed data on the impact of right-turning vehicles on following through traffic. The impact distance was defined as that point upstream from the access drive where the brake lights of a following through vehicle were activated. This distance is comparable to the maneuver distance d_2 , as defined in the functional intersection area. The influence distance is defined as the impact distance plus the distance traveled during perception-reaction time. This is comparable to distances $d_1 + d_2$ in the functional intersection area.

Figure 9-7 illustrates the three conditions that may occur at or upstream from a driveway:

1. A through vehicle is not influenced by a turning vehicle,
2. A through vehicle is influenced by a turning vehicle, and

EXHIBIT 4

PARKING ANALYSIS EXECUTIVE REPORT

Executive Summary

This report presents the results of the site traffic impact and parking analyses conducted for the proposed Creekside mixed-use development in Campbell, California. The proposed project is for the development of a 170,000 s.f. office building, a 210-room hotel with a restaurant, and two parking structures. The project site is generally located in the southeast quadrant of the SR 17 and Hamilton Avenue junction. Specifically, the site is bounded by the northbound SR 17 off-ramp to the northwest and Creekside Way to the east. Access to the site is provided via two driveways on Creekside Way.

The impacts of the project were evaluated following the guidelines set forth by both the City of Campbell and the Santa Clara Valley Transportation Authority (VTA) for the Congestion Management Program (CMP). Ten study intersections were evaluated utilizing the approved guidelines. Four of the ten study intersections are designated CMP intersections as listed in Table ES-1. AM and PM peak-hour operations of the study intersections were evaluated for the following scenarios:

- Scenario 1:** *Existing Conditions.* Existing peak-hour volumes.
- Scenario 2:** *Background Conditions.* Existing peak-hour volumes plus projected volumes from approved but not yet completed developments from the City of Campbell Approved Trip Inventory (ATTI).
- Scenario 3:** *Project Conditions.* Background peak-hour volumes plus project-generated traffic estimated for the proposed development.
- Scenario 4:** *Cumulative Conditions.* Existing peak-hour volumes plus background and project-generated traffic plus expected future growth.

It should be noted that the background, project, and cumulative scenarios were analyzed under two alternatives. The first alternative considers the traffic impacts with the existing geometric roadway configuration. The second alternative considers the traffic impacts assuming an extension of Campisi Way, connecting to the Pruneyard Shopping Center. The project volumes remained the same for both alternatives, though the existing traffic is redistributed to reflect the Campisi Way extension in Alternative 2.

The traffic generated by the proposed project was estimated by applying the appropriate vehicular trip generation rates to the proposed development size. The trip generation rates used are those contained in

the Institute of Transportation Engineers' *Trip Generation (ITE) 6th Edition*, for office buildings and hotels. Based on the linear regression equations presented in *Trip Generation* for office uses, a 170,000 s.f. office building is estimated to generate 1,995 daily trips with 285 trips occurring during the AM peak-hour and 263 trips occurring during the PM peak-hour. Using the same source, a 210-room hotel is estimated to generate 1,511 daily trips, 103 AM peak-hour trips, and 112 PM peak-hour trips. Because development on the site has been previously approved for a 250-room hotel, trip generation figures were modified to reflect this allowance and to reflect reductions for the mixed-use nature of the development. These reductions were reviewed and approved by the City of Campbell staff. These trips were assigned to the roadway system based on existing travel patterns on the surrounding roadways and the relative locations of complementary land uses.

Table ES-1
Key Project Intersections

No.	Key Intersection	CMP Intersection?
1	Hamilton Avenue/ Almarida Drive	No
2	Hamilton Avenue/Salmar Avenue	Yes
3	Hamilton Avenue/Creekside Way	Yes
4	Hamilton Avenue/Bascom Avenue	Yes
5	Creekside Way/Northbound SR 17 Off-ramp	No
6	Creekside Way/Campisi Way	No
7	Bascom Avenue/Campisi Way	No
8	Bascom Avenue/Pruneyard	No
9	Bascom Avenue/Campbell Avenue	Yes
10	Campbell Avenue/Union Avenue	No

Level of service calculations were conducted for existing, background, project, and cumulative conditions using information provided by the City of Campbell (CMP existing counts, approved trip inventory volumes, lane configurations, and signal phasing). Level of service calculations for all study intersections were conducted using the TRAFFIX computer software package, the method approved in the CMP and by the City of Campbell staff. The results of these calculations are presented in Tables ES-2 and ES-3 for both alternatives. Level of service calculation sheets are included in Appendix B of this report.

All intersections, including CMP intersections, are projected to operate at acceptable levels based on both CMP and City of Campbell standards during each peak hour and under all scenarios except for the intersection of Salmar Avenue and Hamilton Avenue in the PM peak hour. However, the project does not significantly impact this intersection and no mitigation is required. Therefore, the results of the analysis indicate that the project will not have any significant adverse impact on the study intersections. It should be noted that the implementation of on-site Transportation Demand Management (TDM) measures such as facilitation of transit usage and preferred parking for carpooling will further ameliorate impacts that may occur. Further, the extension of light rail transit service near the site, scheduled for 2003, would also reduce project-related impacts.

Impacts of site-generated traffic on freeway segments near the site were also analyzed. For purposes of this study, northbound and southbound segments of SR 17 both north and south of Hamilton Avenue were included. Results indicate that no significant adverse impacts on these freeway segments are expected as a result of site-generated traffic.

Table ES-2

Intersection Levels of Service Summary - Alternative 1 (Without Campisi Way Extension)

	Intersections	Peak	Existing Conditions			Background Conditions			Project Conditions			Change			Impact		Cumulative Conditions			
			LOS	Avg. Del. (sec.)	Crit. V/C	Avg. Del. (sec.)	Crit. V/C	Avg. Del. (sec.)	LOS	Avg. Del. (sec.)	Crit. V/C	Avg. Del. (sec.)	Crit. V/C	Change Del. (sec.)	Impact?	Deter- mination	LOS	Avg. Del. (sec.)	Crit. V/C	Avg. Del. (sec.)
1	Almarida (N/S) AL_Hamilton (E/W)	AM	B+	6.7	0.417	6.7	6.6	0.419	6.7	B+	6.6	0.42	6.7	0.001	0.0	-	B+	6.7	0.432	6.8
		PM	B	11.0	0.575	10.9	11.0	0.578	10.9	B	11.0	0.582	10.9	0.004	0.0	-	B	11.3	0.600	11.1
2	Salmar/SB17 Off-Ramp (N/S) AL_Hamilton (E/W)	AM	C-	23.3	0.787	26.8	23.7	0.795	27.2	C-	25.0	0.819	28.6	0.024	1.4	-	D+	36.3	0.843	30.3
		PM	F	74.1	1.082	92.3	79.1	1.103	99.0	F	79.9	1.105	100.1	0.002	1.1	NO	F	94.6	1.138	119.7
3	Creekside (N/S) AL_Hamilton (E/W)	AM	B	12.6	0.651	15.9	13.5	0.677	17.4	B-	14.4	0.707	18.1	0.030	1.7	-	B-	14.7	0.728	19.5
		PM	C+	15.4	0.732	18.0	16.6	0.755	19.8	C	18.1	0.781	21.6	0.026	1.8	-	C	18.5	0.804	22.3
4	Bascom (N/S) AL_Hamilton (E/W)	AM	E	51.1	0.821	53.6	51.5	0.834	54.5	E	51.8	0.839	54.6	0.005	0.1	NO	E	53.0	0.863	56.1
		PM	E-	58.1	0.925	62.3	58.8	0.933	63.3	E-	59.2	0.937	63.8	0.004	0.5	NO	F	61.8	0.965	68.1
5	Creekside (N/S)W AL_ NB17 Off-Ramp (E/W)	AM	B	8.1	0.336	8.2	8.1	0.357	8.3	B	8.0	0.405	8.3	0.048	0.0	-	B	8.1	0.415	8.4
		PM	B	9.9	0.447	8.3	10.4	0.469	9.0	B	10.9	0.473	9.1	0.004	0.1	-	B	11.0	0.487	9.2
6	Creekside (N/S) AL_Campisi (E/W)	AM	B-	14.8	0.242	15.5	14.8	0.255	15.5	B-	14.6	0.284	15.3	0.029	-0.2	-	B-	14.7	0.292	15.4
		PM	C	18.6	0.276	18.5	19.0	0.292	19.0	C	18.7	0.307	18.6	0.015	-0.4	-	C	18.8	0.315	18.8
7	Bascom (N/S) AL_Campisi (E/W)	AM	B	12.7	0.447	8.9	13.0	0.454	9.0	B-	13.3	0.454	9.0	0.000	0.0	-	B-	13.4	0.468	9.1
		PM	C-	23.2	0.762	24.0	23.2	0.775	24.2	C-	24.2	0.801	25.4	0.028	1.2	-	C-	24.9	0.824	26.3
8	Bascom (N/S) AL_Pruneyard (E/W)	AM	A	3.9	0.366	3.4	3.9	0.394	3.3	A	3.9	0.402	3.3	0.008	0.0	-	A	3.9	0.414	3.4
		PM	B	6.7	0.587	11.6	8.6	0.592	11.5	B	8.6	0.6	11.5	0.008	0.0	-	B	8.7	0.618	11.7
9	Bascom (N/S) AL_Campbell (E/W)	AM	C-	23.3	0.540	20.9	21.8	0.621	24.6	C	21.8	0.624	24.6	0.003	0.0	-	C	22.0	0.643	24.9
		PM	C	20.1	0.677	20.6	20.7	0.694	21.3	C	20.8	0.701	21.4	0.007	0.1	-	C	21.3	0.722	22.0
10	Union (N/S) AL_Campbell (E/W)	AM	C-	23.3	0.705	23.9	24.7	0.724	24.4	C-	24.8	0.724	24.5	0.000	0.1	-	D+	25.7	0.747	25.5
		PM	C-	24.1	0.812	32.4	26.7	0.853	36.3	D+	26.7	0.853	36.3	0.000	0.0	-	D	28.1	0.878	38.9

Table ES-3

Intersection Levels of Service Summary - Alternative 2 (With Camplis Way Extension)

Intersections	Peak	Existing Conditions			Background Conditions			Project Conditions			Change			Impact			Cumulative Conditions		
		LOS	Avg. Del. (sec.)	Crit. V/C	Del. (sec.)	LOS	Avg. Del. (sec.)	Crit. V/C	Del. (sec.)	LOS	Avg. Del. (sec.)	Crit. V/C	Del. (sec.)	Change	Avg. Del. (sec.)	Deter. mination	LOS	Avg. Del. (sec.)	Crit. V/C
1 Almarida (N/S) AL_Hamilton (E/W)	AM	B+	6.7	0.417	6.7	B+	6.6	0.419	6.7	B+	6.6	0.420	6.7	0.001	0.0	-	B+	6.7	0.420
	PM	B	11.0	0.575	10.9	B	11.0	0.578	10.9	B	11.0	0.582	10.9	0.004	0.0	-	B	11.3	0.600
2 Salmar/SB17 Off-Ramp (N/S) AL_Hamilton (E/W)	AM	C-	23.3	0.787	26.8	C-	23.7	0.795	27.2	C-	25.0	0.819	28.6	0.024	1.4	-	D+	26.3	0.843
	PM	F	74.1	1.092	92.3	F	79.1	1.103	98.0	F	79.9	1.105	100.1	0.002	1.1	-	F	94.6	1.138
3 Creekside (N/S) AL_Hamilton (E/W)	AM	B	12.6	0.651	15.9	B-	13.7	0.661	17.5	B-	14.2	0.736	24.6	0.075	7.1	-	B-	14.5	0.755
	PM	C+	15.4	0.732	18.0	C	17.8	0.713	19.8	C	19.3	0.725	23.5	0.012	3.7	-	C	19.7	0.784
4 Bascom (N/S) AL_Hamilton (E/W)	AM	E	51.1	0.821	53.6	E	51.5	0.827	54.0	E	51.8	0.832	54.2	0.005	0.2	-	E	52.9	0.861
	PM	E-	58.1	0.925	62.3	E	54.6	0.867	56.2	E	54.8	0.871	56.3	0.004	0.1	-	E-	56.4	0.897
5 Creekside (N/S) AL_NB17 Off-Ramp (E/W)	AM	B	8.1	0.336	8.2	B	8.0	0.383	8.3	B	7.9	0.431	8.3	0.048	0.0	-	B	8.0	0.442
	PM	B	9.9	0.447	8.3	B	11.2	0.536	10.3	B	11.5	0.540	10.7	0.004	0.4	-	B	11.8	0.556
6 Creekside (N/S) AL_Campisi (E/W)	AM	B-	14.8	0.242	15.5	C+	16.3	0.345	16.7	C+	18.4	0.374	16.9	0.029	0.2	-	C+	16.5	0.385
	PM	C	18.6	0.276	18.5	D+	25.6	0.611	25.8	D+	25.6	0.626	25.8	0.015	0.0	-	D+	26.0	0.644
7 Bascom (N/S) AL_Campisi (E/W)	AM	B	12.7	0.447	8.9	B	12.8	0.450	8.9	B-	13.1	0.450	8.9	0.000	0.0	-	B-	13.2	0.464
	PM	C-	23.2	0.762	24.0	C	20.5	0.661	21.1	C	21.4	0.687	22.0	0.026	0.9	-	C	21.7	0.707
8 Bascom (N/S) AL_Pruneyard (E/W)	AM	A	3.9	0.386	3.4	A	3.8	0.388	3.2	A	3.8	0.397	3.2	0.009	0.0	-	A	3.8	0.408
	PM	B	8.7	0.587	11.6	B+	8.9	0.482	9.5	B+	8.9	0.490	9.5	0.008	0.0	-	B+	8.9	0.505
9 Bascom (N/S) AL_Campbell (E/W)	AM	C-	23.3	0.540	20.9	C	21.8	0.621	24.6	C	21.8	0.624	24.6	0.003	0.0	-	C	22.0	0.643
	PM	C	20.1	0.677	20.8	C	20.7	0.694	21.3	C	20.8	0.701	21.4	0.007	0.1	-	C	21.3	0.722
10 Union (N/S) AL_Campbell (E/W)	AM	C-	23.3	0.705	23.9	C-	24.7	0.724	24.4	C-	24.8	0.824	24.5	0.100	0.1	-	D-	25.7	0.747
	PM	C-	24.1	0.812	32.4	D+	28.7	0.853	36.3	D+	28.7	0.853	36.3	0.000	0.0	-	D	28.1	0.878

Parking Analysis

For purposes of this study, the analysis of parking requirements was conducted differently than the analysis of traffic impacts. Because of an existing parking easement, the existing 900 Hamilton facility (350,000-s.f. office building) just east of and adjacent to the proposed site is also expected to utilize parking spaces on the proposed site (328 maximum spaces as per the easement).

The result of these analyses indicates that the site will generate the need for about 737 parking spaces for the proposed office and hotel alone. After considering a shared parking concept for the proposed mixed-use development, 633 parking spaces will be required. The addition of the 328 spaces required by the easement results in a total, on-site need of approximately 961 parking spaces. According to the proposed site plan, three separate parking facilities will be provided, including two parking structures and one surface parking area. A total of 964 parking spaces will be supplied as part of the site plan. This is sufficient to accommodate both the proposed project parking demand and parking required under the terms of the existing parking easement.