Initial Study

Morse Street Homes

(PDC11-010)

December 19, 2011

CITY OF SAN JOSE

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Planned Development (PD) Rezoning (PDC11-010)

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. PROJECT DESCRIPTION

A. GENERAL INFORMATION

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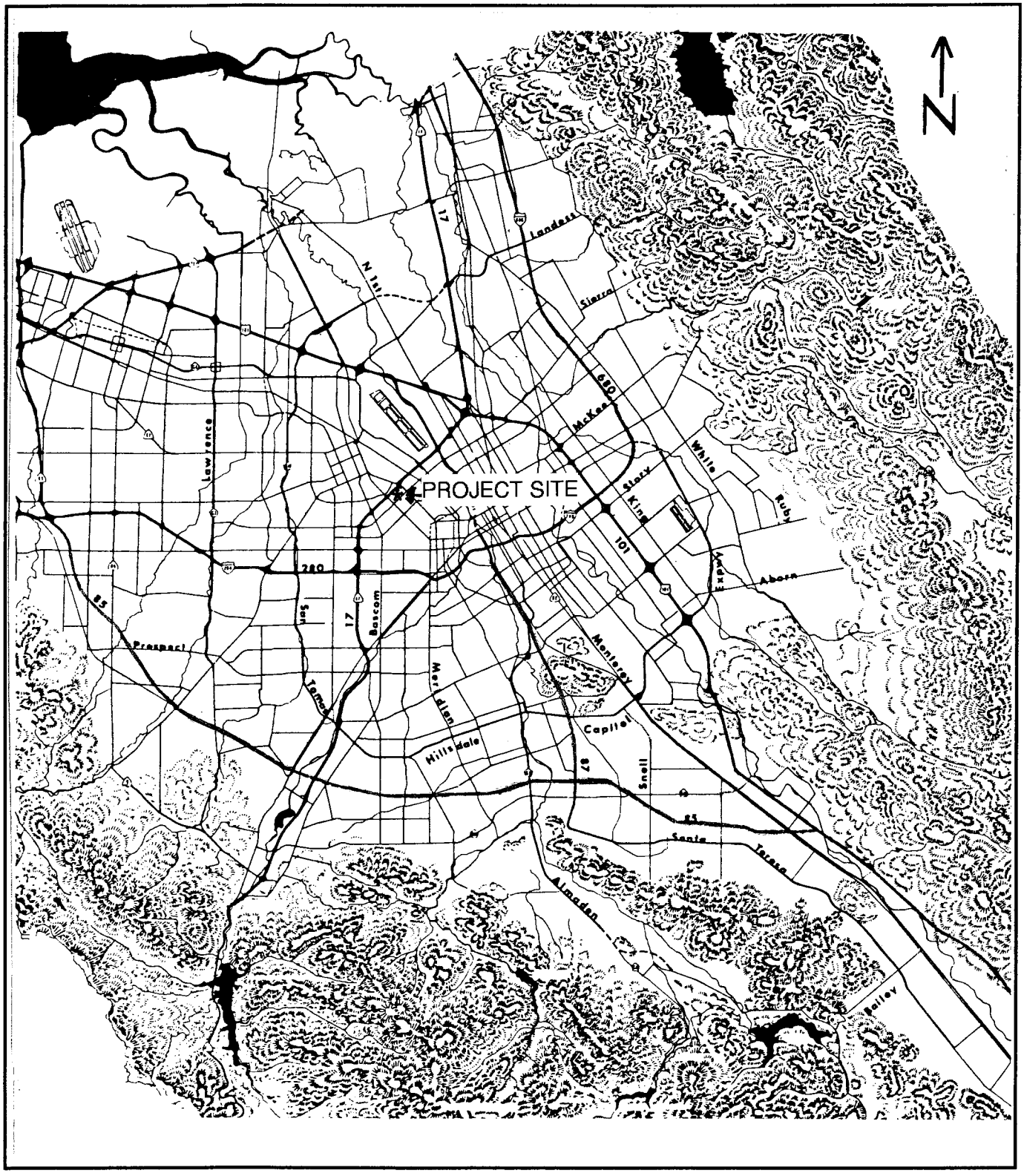
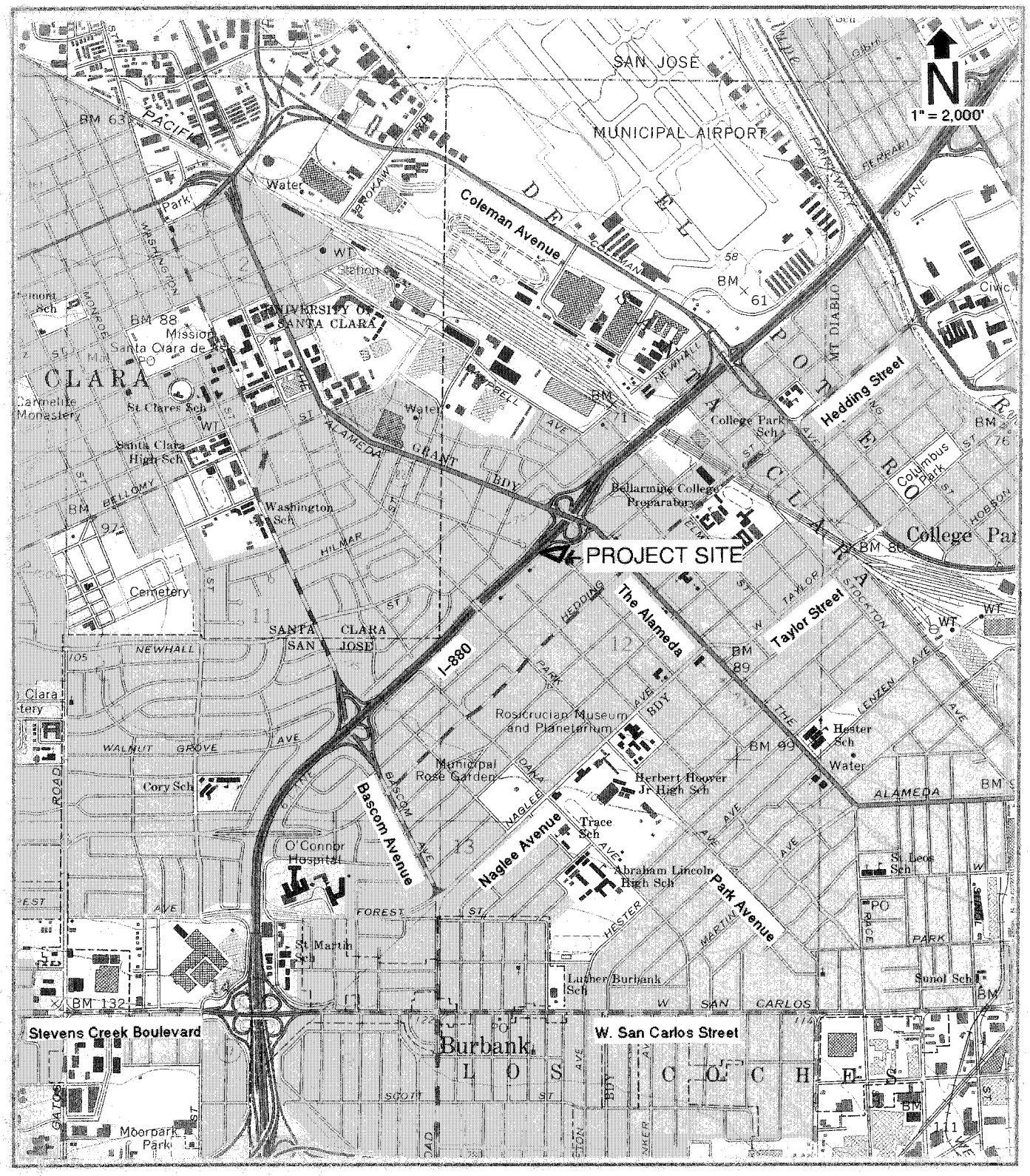
Applicant:	Barry Swenson Builder 777 N. First Street, Fifth Floor San Jose, CA 95113 408-938-6350; (fax) 408-280-5177 Attn: Bob Hightower bhightower@barryswensonbuilder.com
Property Owner:	Green Valley Corp. 777 N. First Street, Fifth Floor San Jose, CA 95113 408-287-6322 Attn: Mike Black
Environmental Consultant:	Mindigo & Associates 1984 The Alameda, Suite 1 San Jose, CA 95126 408-554-6531, (fax) 408-554-6577 rmindigo@aol.com
Name of Project:	Morse Street Courthomes
Location and Address:	East side of Morse Street, approximately 320 feet north of McKendrie Street (980 Morse Street)
Brief Description of Project:	A **Planned Development (PD) Rezoning** application for a 4-unit single family detached residential development on approximately 0.63 gross acres
Assessor's Parcel Number(s):	230-44-040



Santa Clara Valley Map

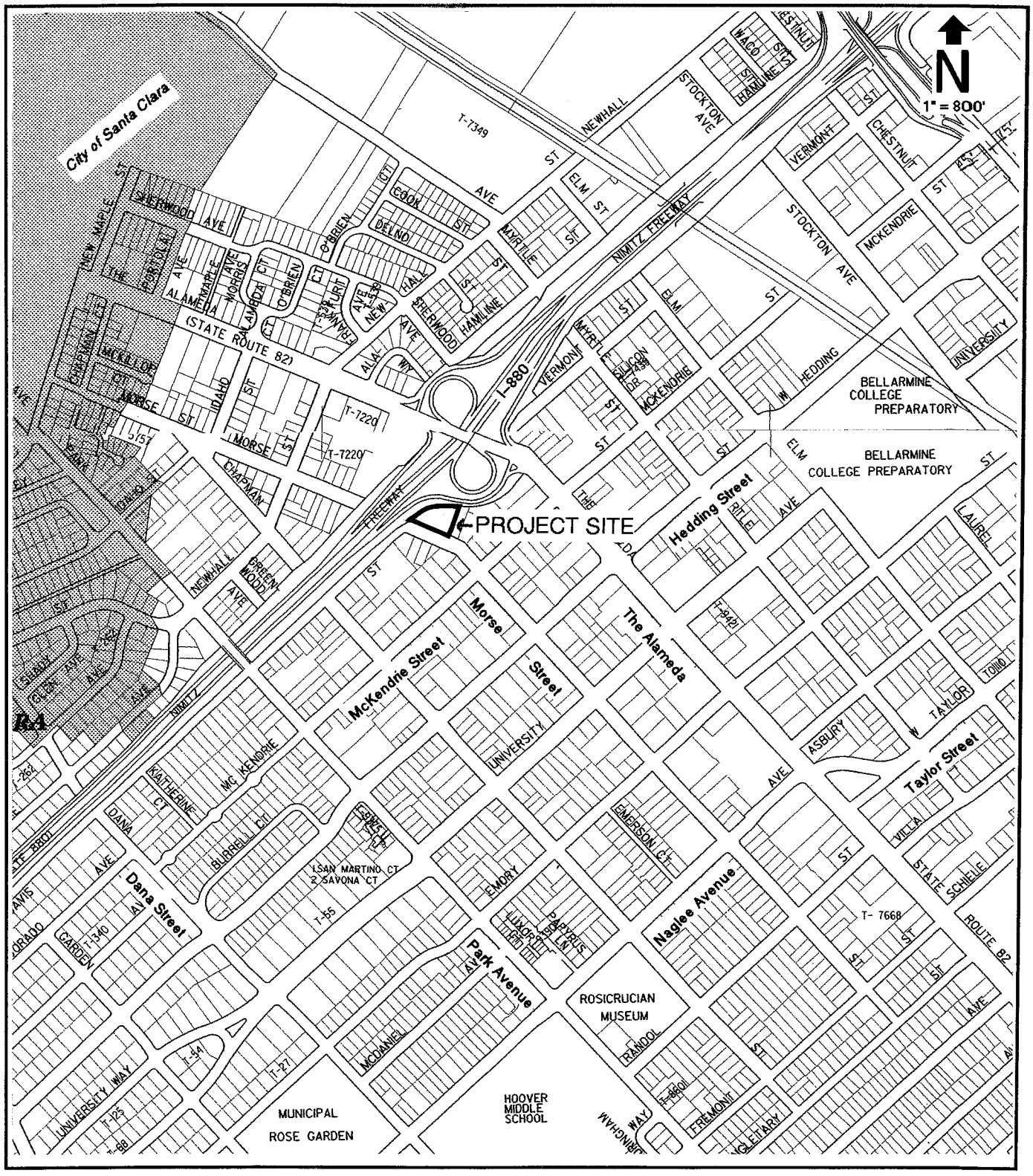
Figure 1



Source: San Jose East Quadrangle (1961, photorevised 1980)

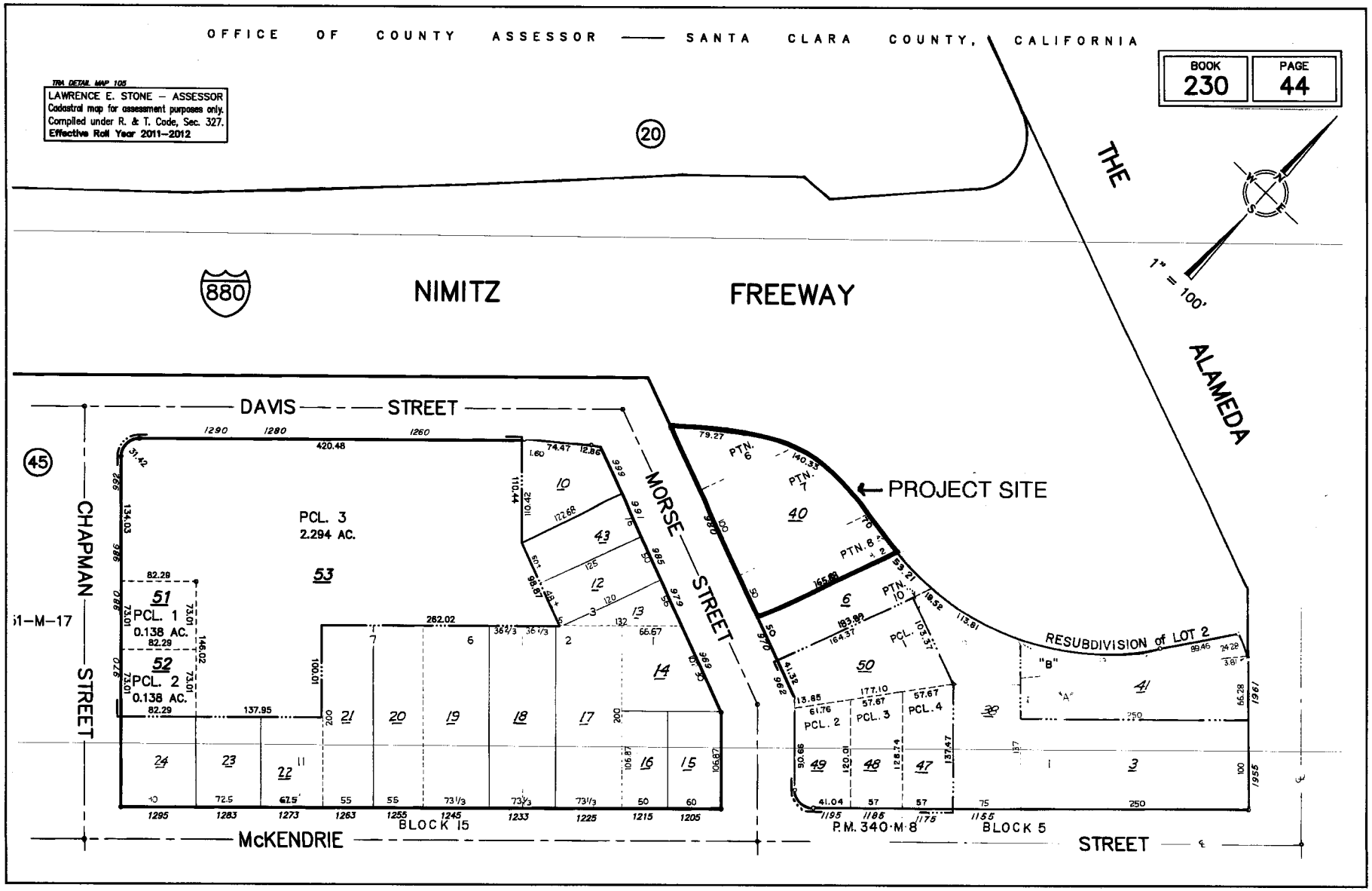
USGS Map

Figure 2



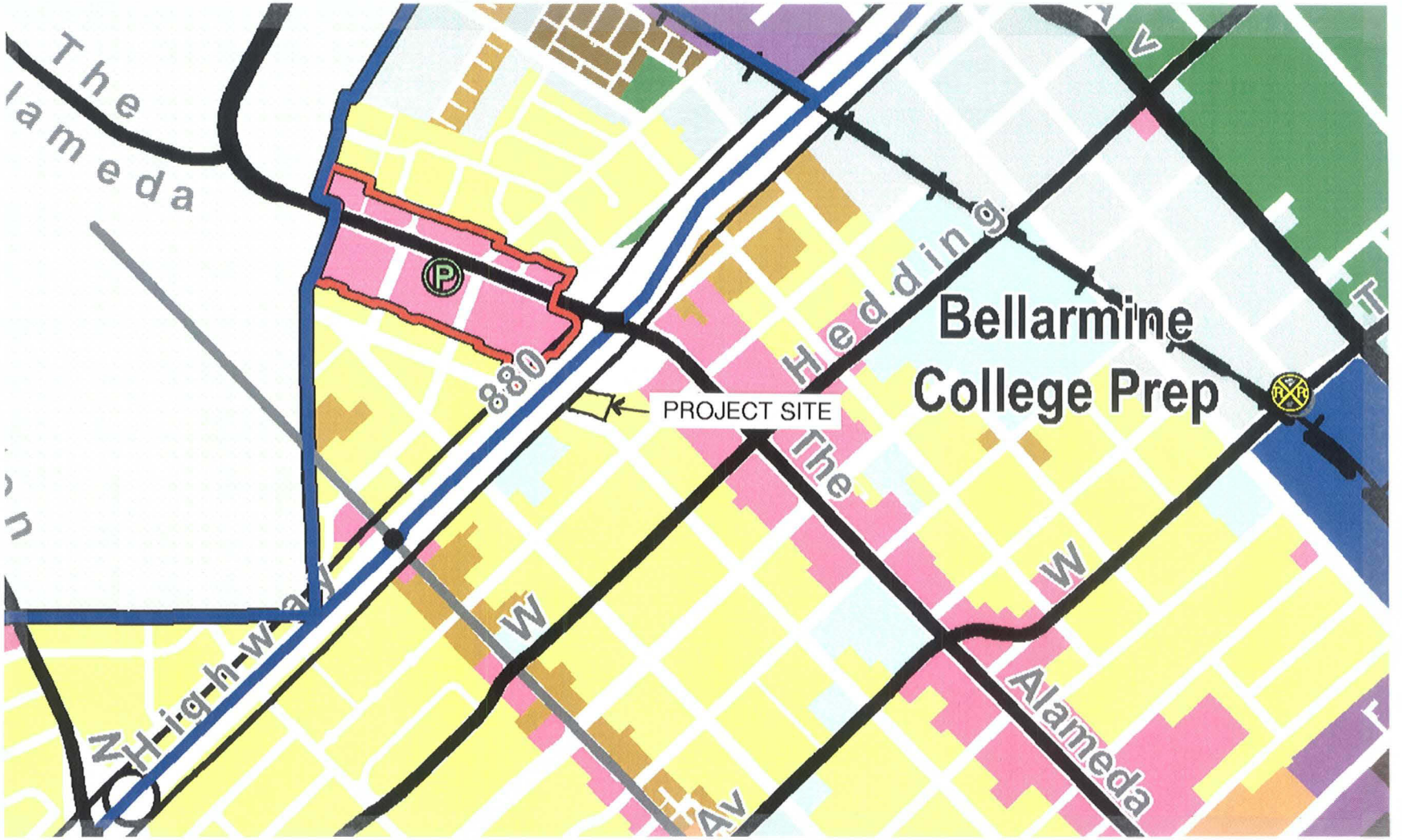
Vicinity Map

Figure 3



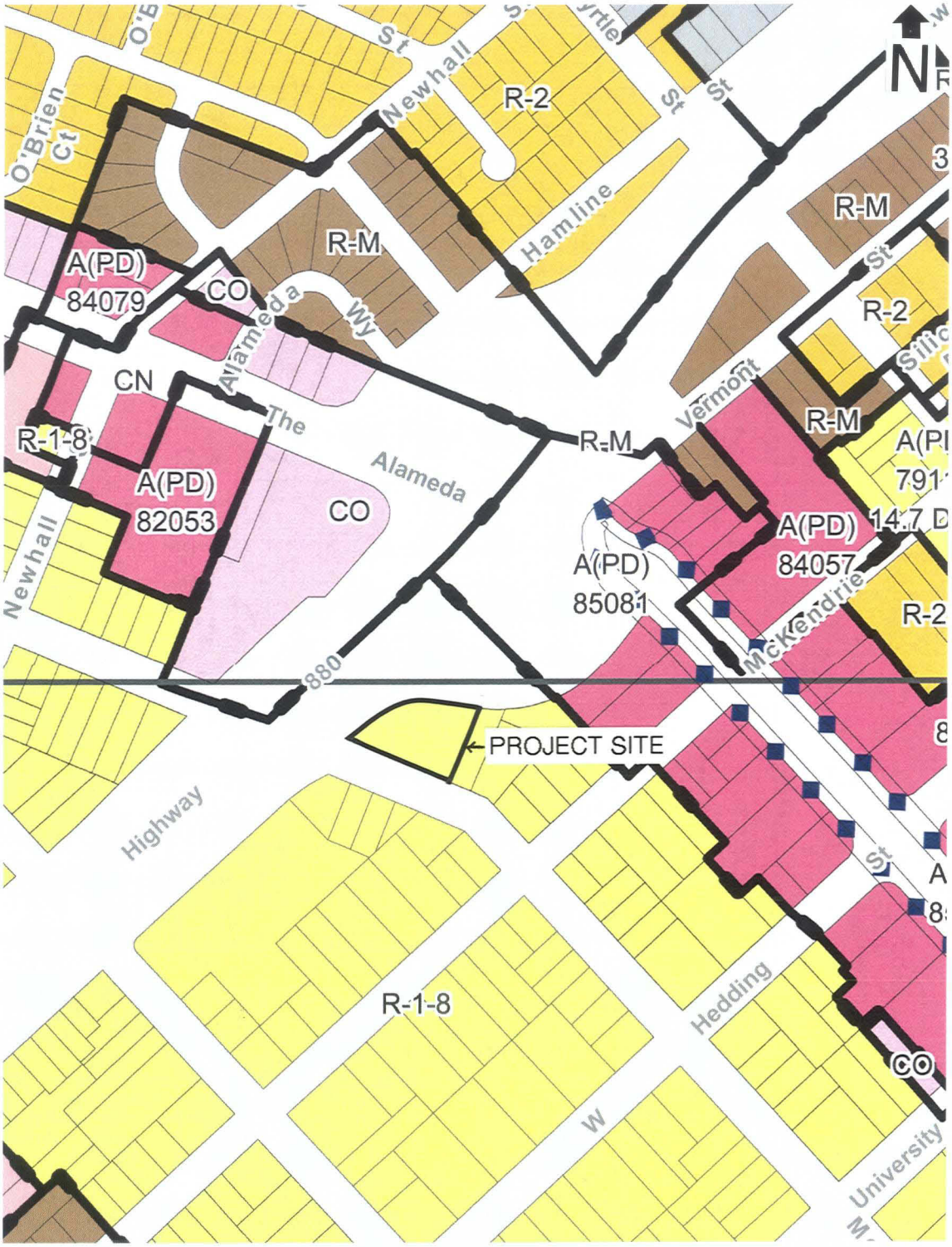
Assessor's Parcels

Figure 4



General Plan Map

Figure 5



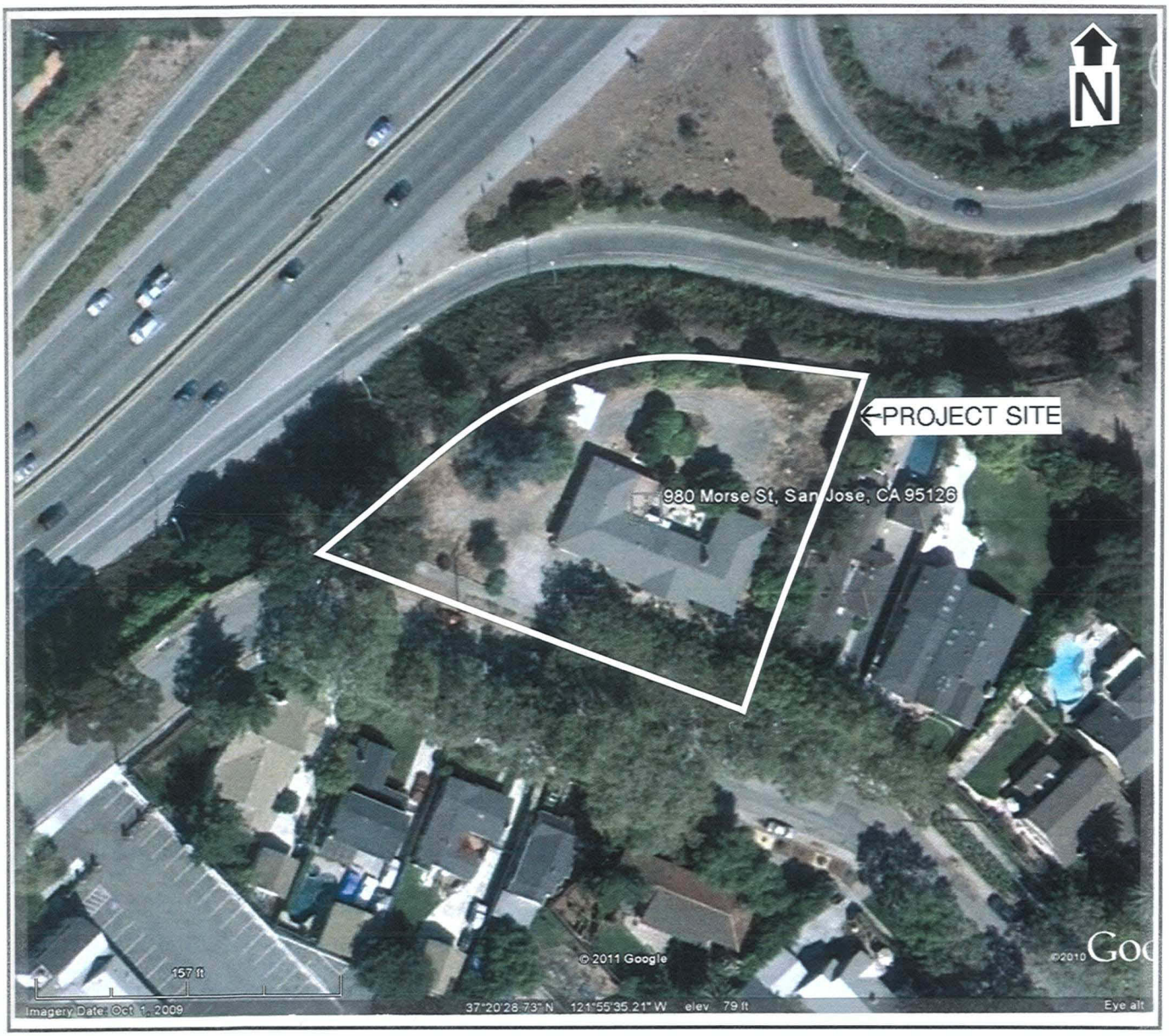
R-1-8 = Single-Family Residential District (8 units per acre)
R-2 = Two-Family Residential District
R-M = Multi-Family Residential District
CO = Commercial Office District
A(PD) = Planned Development District

Zoning Map

Figure 6

Aerial Photo of the Vicinity

October 1, 2009 Figure 7



Aerial Photo of the Site

October 1, 2009 Figure 8

Viewing northerly from the southerly corner on Morse Street.

Viewing easterly from the westerly corner on Morse Street.

View of the Site

August 23, 2011 Figure 9

Viewing westerly from the easterly corner.

Viewing easterly from along the northwesterly boundary.

View of the Site

August 23, 2011 Figure 10

The existing sound wall along the northerly boundary.

Viewing easterly from the westerly corner.

View of the Site

August 23, 2011 Figure 11

B. PROJECT OBJECTIVE

The objective of this project is to rezone the site in order to construct high quality, single family homes on the site, in accordance with the goals and policies of the City of San Jose.

C. DESCRIPTION

The project is a **Planned Development (PD) Rezoning** application.

EXISTING USE

The project site is currently single family residential (one house).

PD ZONING

The project is a **Planned Development (PD) Rezoning** from R-1-8, Single Family Residence District, to A(PD), Planned Development District, to allow the construction of up to 4 residential units and subsequent subdivision, located on the east side of Morse Street, approximately 320 feet north of McKendrie Street (980 Morse Street). The project is a single family detached residential development with individual lots located on Morse Street. The minimum lot size is approximately 5,900 square feet in area and the average lot size is approximately 6,660 square feet. The Conceptual Site Plan, Figure 13, provides for 4 units. The Project Data table and reduced copies of the project plans, Figures 12 through 19, follow. Full size copies are available for review at the City of San Jose Planning Division.

Unit Types

The homes are planned to be two story, wood frame structures with wood and stucco exteriors and composition roofs. They have four bedrooms, two car attached or detached garages and fenced rear yards. Front yard landscaping is to be provided by the developer.

Landscaping

The landscaping proposed is shown in schematic form on the Planting Plan, Figure 19. Street trees, specimen trees, shrubs, lawn and groundcover are planned. A combination of existing and new trees are planned to screen the freeway soundwall.

Access

Access is from Morse Street.

Parking

Off-street parking for the project is to be provided in attached and/or detached 2-car garages and on driveway aprons. A total of 16 off-street parking spaces is to be provided by the project.

Exterior Lighting
Standard electroliers using low pressure sodium vapor lights in accordance with the City's Outdoor Lighting on Private Developments Policy are to be provided along the public (and private) streets. Normal exterior household lighting is to be provided with the residences. All exterior lighting is subject to the City's Outdoor Lighting Policy 4-3.

Utilities
All utilities required to serve the project, including sanitary sewer, wastewater treatment, water supply, storm drainage, natural gas, electricity and telephone, as further described in the following Utilities and Service Systems section, would be provided with the project. All of the utilities within the project are to be underground.

Demolition
The project proposes the demolition of all the onsite structures. A discussion of potential asbestos-containing materials (ACM) and/or lead based paint (LBP) hazards is included in the following Hazards and Hazardous Materials section.

Hazardous Materials
Hazardous materials other than those for normal household and yard use will not be used as a part of the operation of any of the establishments on the project site.

Grading
Grading planned for the project is shown on the following Conceptual Grading and Drainage Plan, Figure 17. The final lot and street grading for the project is to be designed to conform to the natural ground as closely as possible. The amount of grading planned is the minimum required to provide public streets that meet requirements for structural section and rate of grade, and to allow the construction of level building pads with positive drainage. In addition to the lot and street excavation, trenching is required for the underground utilities and sewer system. Approximately 500 to 1,000 cubic yards of material are estimated to be moved during the grading operations. The maximum finished cut or fill is estimated to be less than two feet, and no significant import or export of natural material is expected.

Water Quality Treatment
In accordance with the Santa Clara Valley Urban Runoff Pollution Prevention Program NPDES MS4 permit and City Council Policies 6-29 and 8-14, the project includes bioswales, pervious paving and disconnected roof drains, as further discussed in the following Hydrology and Water Quality section.

Tree Removal
There are 32 existing trees onsite, 15 of which are to be removed, as further discussed in the following Biological Resources section.

Public Improvements
There are no public improvements planned with this project.

Public Land Reservations

There are no public land reservations with this project; however, the project will contribute park impact fees in accordance with the City's Park Impact Ordinance (PIO) and/or Parkland Dedication Ordinance (PDO) (Municipal Code Chapters 14.25 and 19.38, respectively).

Other Related Permits

In addition to the proposed **Planned Development (PD) Rezoning**, other related permits to be obtained from the City of San Jose and/or any other public agency approvals required for this project by other local, State or Federal agencies are as follows:

Agency	Permit / Approval
City of San Jose	PD Permit, Tentative Map, Final Map, Grading Permit, Building Permit(s)

Community Meeting

A community meeting to discuss the proposed project with neighbors has not yet been held.

Table 1. Project Data

Category		Figure
Gross and Net Acreage		0.63
Average Lot Size *(square feet)*		
Minimum Lot Size *(square feet)*		5,900
Number of Single Family Homes		
Four bedroom units		4
Total		4
Building Height *(feet)*		27
Estimated Population *		14
Estimated School Children		
K-5 *(0.173)*		1
6-8 *(0.099)*		1
9-12 *(0.111)*		1
Total		3
Estimated Wastewater *(gallons/day)*		950
Estimated Water Demand *(gallons/day)*		1,800
Estimated Solid Waste *(tons/year)*		4
Coverage Factors	Square Feet	Percent
Homes & Garages	6,226	23
Private Open Space	14,738	55
Driveway, Sidewalk, Patio	5,678	22
Total	26,642	100
Impervious Areas	Square Feet	Percent
Existing	7,767	29
Project	7,857	29
Density *(units/net acre)*		4 / 0.63 = 6.3
Start/Completion Dates		Summer, 2012 / Winter, 2012

* Based on 2000 Census average of 3.50 persons per SFD dwelling unit.

II. ENVIRONMENTAL SETTING, IMPACT CHECKLIST AND MITIGATION

1. AESTHETICS

SETTING

The current view of the project site consists primarily of a house, trees and landscaping, which can be seen in the preceding photographs, Figures 9 through 11.

Scenic Route

The project site is located adjacent to Interstate 880 (I-880), which is designated as an Urban Throughway on the Scenic Routes and Trails Diagram of the General Plan. This designation includes all the State and Interstate Highways that traverse San Jose's Sphere of Influence. An Urban Throughway is defined as the actual right-of-way of the scenic route, the shoulders, and any adjacent public improvements that accompany such a route.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
1. AESTHETICS. Would the project:					
a. Have a substantial adverse effect on a scenic vista?			X		25,26,27
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings and historic buildings within a state scenic highway?			X		25,26, 27,29,31
c. Substantially degrade the existing visual character or quality of the site and its surroundings?			X		25,26,27
d. Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?			X		25, 26,28,34
e. Increase the amount of shading on public open space (e.g., parks, plazas and/or school yards)?			X		25,26,28

Scenic Vista

Because of the existing visual character of the project site, the change to 2-story (maximum height = 27 feet) single family detached residential buildings would not have a substantial effect on scenic vistas.

Scenic Resources

Interstate 880 (I-880), which is designated as an Urban Throughway on the Scenic Routes and Trails Diagram of the General Plan, borders the project site; however, as the site is separated from the freeway right-of-way by a 7-foot-high sound wall, the project would have no impact to trees, rock outcrops or historic buildings along a scenic highway.

Visual Character

The project would change the view of the site from a house, trees and landscaping to four houses, trees and landscaping. Any trees that are to be removed will be replaced in conformance with the City's requirements, as further described in the following Biological Resources section; and street trees and landscaping will be provided as part of the project. Detailed architectural and landscape plans will be submitted for review and approval in accordance with the City's Residential Design Guidelines and PD Zoning procedure.

Light and Glare

The project could produce offsite light and/or glare. The project will be designed to utilize downward-directed residential lighting in order to prevent offsite light and glare, in accordance with the City's Outdoor Lighting on Private Developments Policy (Policy 4-3).

Temporary Construction Visual Impacts

Construction of a typical project causes short-term visual impacts. The grading operations create a visual impact, and construction debris, rubbish and trash can accumulate on construction sites and are unsightly if visible from public streets. Public streets that are impacted by project construction activities will be swept and washed down daily. Debris, rubbish and trash will be cleared from any areas onsite that are visible from a public street. The completion of the project improvements and landscaping will eliminate the short-term visual impacts of the grading and construction operations.

STANDARD MEASURES INCLUDED IN THE PROJECT

Design

- The project design will conform to the City's Residential Design Guidelines.

Trees

- Any tree that is removed will be replaced with the addition of a new tree(s) at the ratios shown in the City's standard Tree Replacement Ratios table.

Light and Glare

- Lighting on the site will conform to the City's Outdoor Lighting on Private Developments Policy (Policy 4-3).

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would ensure the project will have a **less-than-significant impact** on aesthetics.

2. AGRICULTURE AND FOREST RESOURCES

SETTING

Agriculture Resources

The *Santa Clara County Important Farmland Map*, prepared by the California Department of Conservation and the USDA Natural Resources Conservation Service, classifies land in seven categories in order of significance: 1) prime farmland, 2) farmland of Statewide importance, 3) unique farmland, 4) farmland of local importance, 5) grazing land, 6) urban and built-up land and 7) other land. The project site is classified as "urban and built-up land," which is defined as land occupied by structures with a building density of at least one unit to one and one-half acres. The project site is not under a Williamson Act contract.

Forest Resources

"Forest land" is defined by the California Public Resources Code as land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. "Timberland" means land, other than land owned by the federal government and land designated as experimental forest land, which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees. The project site is not located on forest land or timberland.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
2. AGRICULTURE AND FOREST RESOURCES. Would the project:					
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?				X	35,36
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X	37,66
c. Conflict with existing zoning for, or cause rezoning of, forest land [as defined in PRC Section 12220(g)], timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production [as defined by GC Secion 51104(g)]?				X	25,27,29
d. Result in the loss of forest land or conversion of forest land to non-forest use?				X	25,26,28

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
2. AGRICULTURE AND FOREST RESOURCES (Cont.). Would the project:					
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?				X	25,26,28

Agriculture Resources

The project site is classified as urban and built-up land on the *Important Farmland Map* for Santa Clara County. Since the site is not located in an area identified as prime farmland, nor is the site being used for or zoned for agricultural use or is under a Williamson Act contract, the project would have no impact on agricultural land.

Forest Resources

Since the site is not located in an area identified as forest land or timberland, nor is the site being used for or zoned for forestry use, the project would have no impact on forest resources.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The proposed project would have **no impact** on agriculture or forest resources.

3. AIR QUALITY

SETTING

Regional Climate

The air quality of a given area is not only dependent upon the amount of air pollutants emitted locally or within the air basin, but also is directly related to the weather patterns of the region. The wind speed and direction, the temperature profile of the atmosphere, and the amount of humidity and sunlight react with the emitted pollutants each day, and determine the resulting concentrations of air pollutants defining the "air quality."

The Bay Area climate is Mediterranean, with mild, rainy winters November through March, and warm, sunny and nearly dry summers June through September. Summer temperature inversions trap ground level pollutants. Winter conditions are less conducive to smog, but thin evening inversions sometimes concentrate carbon monoxide emissions at ground level. A temperature inversion is a thin layer of the atmosphere where the normal decrease in temperature with height switches to the temperature increasing with height; an inversion acts like a lid.

San Jose is located in the southern portion of the San Francisco Bay Area Air Basin. The proximity of this location to both the Pacific Ocean and San Francisco Bay has a moderating influence on the climate. Northwest winds and northerly winds are most common in the project area, reflecting the orientation of the Bay and the San Francisco Peninsula. Winds from these directions carry pollutants released by automobiles and factories from upwind areas of the Peninsula toward San Jose, particularly during the summer months. Winds are lightest on average in fall and winter. Every year in fall and winter there are periods of several days when winds are very light and local pollutants can build up.

Regulatory Overview

The Federal Clean Air Act establishes pollutant thresholds for air quality in the United States; which are administered by the U.S. Environmental Protection Agency (EPA). In addition to being subject to Federal requirements, California has its own, more stringent, regulations under the California Clean Air Act, which is administered by the California Air Resources Board (CARB) at the State level and by Air Quality Management Districts at the local level. The project site is located within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), which includes seven Bay Area counties and portions of two others.

Criteria Pollutants

The BAAQMD is primarily responsible for ensuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. These ambient air quality standards are levels of contaminants that represent safe levels in order to avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. The major criteria pollutants, characteristics, health effects and typical

sources for the Bay Area are identified in the table on the following page, Table 2. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for and inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, and many other associated activities.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage and death.

Air Quality Standards

Air quality is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing the concentration to an appropriate ambient air quality standard. The U.S. EPA and CARB have both established ambient air quality standards for common pollutants to avoid adverse health effects from each pollutant. The pollutants, which include ozone, carbon monoxide (CO), nitrogen dioxide, and particulate matter (PM_{10} and $PM_{2.5}$), and their standards are included in the Local Air Quality table, Table 2, that follows. In Santa Clara County, ozone and particulate matter are the pollutants of greatest concern since measured air pollutant levels exceed the State and Federal air quality standards concentrations at times.

Attainment Status

The Federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the Federal or State ambient air quality standards are not met as "nonattainment areas". Because of the differences between the Federal and State standards, the designation of nonattainment areas is different under Federal and State legislation.

The U.S. EPA has classified the San Francisco Bay Area as a nonattainment area for the Federal 8-hour ozone and $PM_{2.5}$ standards. The Bay Area was designated as unclassifiable/attainment for the Federal PM_{10} standard.

Under the California Clean Air Act, Santa Clara County is a nonattainment area for ozone and particulate matter (PM_{10} and $PM_{2.5}$). The county either meets attainment or is unclassified for the other pollutants. The California Clean Air Act requires local air pollution control districts to

prepare air quality attainment plans; these plans must provide for district-wide emission reductions of five percent per year averaged over consecutive three-year periods or, if not, provide for adoption of "all feasible measures on an expeditious schedule".

Local Air Quality

Air quality in the project area is subject to the problems experienced by most of the Bay Area. Emissions from millions of vehicle-miles of travel each day often are not mixed and diluted, but are trapped near ground level by an atmospheric temperature inversion. Prevailing air currents generally sweep from the mouth of the Bay toward the south, picking up and concentrating pollutants along the way. A combination of pollutants emitted locally, the transport of pollutants from other areas, and the natural mountain barriers (the Diablo Range to the east and the Santa Cruz Range to the southwest) give San Jose a relatively high atmospheric potential for pollution compared to other parts of the San Francisco Bay Air Basin.

The BAAQMD maintains a network of monitoring sites in the Bay Area. The closest to the project site is located in Downtown San Jose. Violations of air quality standards for the last three reported years at the downtown San Jose monitoring station are shown in the following table. Federal ambient air quality standards are met in the project area with the exception of ozone and $PM_{2.5}$. State ambient standards are met with the exception of ozone and PM_{10} / $PM_{2.5}$.

Table 2. Local Air Quality

Pollutant	Standard	Days Exceeding Standard 2007	2008	2009
OZONE				
State 1-hour	0.09 ppm	0	1	0
State 8-hour	0.07 ppm	0	3	0
Federal 8-hour	0.08 ppm	0	2	0
CARBON MONOXIDE				
State/Federal 8-hour	9.0 ppm	0	0	0
NITROGEN DIOXIDE				
State 1-hour	0.25 ppm	0	0	0
PARTICULATE MATTER (PM_{10})				
State 24-hour	50 $\mu g/m^3$	3	1	0
Federal 24-hour	150 $\mu g/m^3$	0	0	0
PARTICULATE MATTER ($PM_{2.5}$)				
Federal 24-hour	35 $\mu g/m^3$	9	5	0

ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter

SOURCE: Bay Area Air Quality Management District monitoring data for Downtown San Jose.

Project Site

The project site is similar to other locations in the South Bay; air quality meets adopted State and/or Federal standards (the more stringent standard applies) on most days, and during periods when regional atmospheric conditions are stagnated, the air quality is poor throughout the

extended South Bay area. There are no existing sources on the project site that currently adversely affect local air quality.

Sensitive Receptors

Some groups of people are more affected by air pollution than others. CARB has identified the following people who are most likely to be affected by air pollution: children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and parks. The closest sensitive receptors are the single family detached residences located south and west of the project site.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
3. AIR QUALITY. Would the project:					
a. Conflict with or obstruct implementation of the applicable air quality plan?				X	29,39
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X		26,39
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is classified as non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?			X		26,39
d. Expose sensitive receptors to substantial pollutant concentrations?		X			28,39
e. Create objectionable odors affecting a substantial number of people?				X	26,28

Project Impacts

Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

For most types of development projects, motor vehicles traveling to and from a project represent the primary source of air pollutant emissions associated with the project. The BAAQMD has

established thresholds of significance for these indirect impacts from projects on local and regional air quality. If project vehicle emissions of carbon monoxide (CO) exceed 9 ppm (8-hour average) or 20 ppm (1-hour average); and if a project generates over 54 lbs/day of reactive organic gases (ROG), nitrogen oxides (NO_x) or suspended particulate matter ($PM_{2.5}$ from exhaust) or over 82 lbs/day (PM_{10} from exhaust), it would have a significant air quality impact. For construction-related PM_{10} and $PM_{2.5}$ fugitive dust, the threshold of significance is a requirement that the facility employ Best Management Practices (BMPs) to minimize dust.

The BAAQMD developed screening criteria to provide lead agencies and project applicants with a conservative indication of whether a proposed project could result in potentially significant air quality impacts. If the screening criteria are met, then an air quality assessment of a project's air pollutant emissions is not required and the project would not result in the generation of operational-related criteria air pollutants and/or precursors that exceed the District's thresholds of significance. Operation of a proposed project would, therefore, result in a less-than-significant cumulative impact to air quality from criteria air pollutant and precursor emissions. For single family residential projects, the screening level is 325 units. The proposed 4-unit project is substantially below that level and, therefore, would not have a significant air quality impact.

Odors

The project would not generate objectionable odors or place sensitive receptors adjacent to a use that generates odors (i.e., landfill, composting, etc.).

Sensitive Receptors

The closest sensitive receptors (the single family detached residences located south and west of the project site) could be subjected to fugitive dust as a result of construction, as discussed below.

Temporary Construction Dust

The project would produce short-term fugitive dust generated as a result of site preparation and construction. The effects of construction activities would be increased dustfall and locally elevated levels of PM_{10} and $PM_{2.5}$ downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties. This is considered a potentially significant impact. The BAAQMD threshold of significance for construction dust impacts is whether Best Management Practices (BMPs) are to be utilized. Mitigation measures include all basic BMPs identified by the BAAQMD; according to the District threshold of significance for construction impacts, implementation of the measures would reduce construction dust impacts of the project to a less-than-significant level.

MITIGATION MEASURES INCLUDED IN THE PROJECT

Temporary Construction Dust

- The following Best Management Practices shall be required of construction contracts and specifications for all construction to prevent visible dust emissions from leaving the site:
  - All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
  - All haul trucks transporting soil, sand or other loose material off-site shall be covered.
  - All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day The use of dry power sweeping is prohibited.
  - All vehicle speeds on unpaved roads shall be limited to 15 mph.
  - All roadways, driveways and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
  - Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by CCR Title 13). Clear signage shall be provided for construction workers at all access points.
  - All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
  - A publicly-visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints shall be posted. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

CONCLUSION

The implementation of the above mitigation measure would reduce the project's impact on air quality to a **less-than-significant impact with mitigation**.

4. BIOLOGICAL RESOURCES

Monarch Consulting Arborists LLC conducted a tree protection and assessment survey dated September 15, 2011 that is included in the Technical Appendix.

SETTING

Vegetation

Vegetation on the project site consists of trees and landscaping around the existing house. No rare or endangered plant species are known to inhabit the site.

Trees

The City of San Jose has a Tree Ordinance that regulates the removal of trees. An "Ordinance-sized tree" is defined as any native or non-native tree with a circumference of 56 inches (diameter of 18 inches) measured at 24 inches above the natural grade. For multi-trunk trees, the circumference is measured as the sum of the circumferences of all trunks at 24 inches above grade. A "heritage tree" is defined as a tree of special significance to the community due to history, girth, height, species, or other unique quality.

A detailed tree survey of all trees on the site was conducted. A total of 32 trees, ranging in circumference from 9 inches to 143 inches, were tagged and evaluated. Ten (10) trees exceed 56 inches in circumference, are considered to be Ordinance-sized trees, and come under the review of the City's Tree Ordinance. There are no designated Heritage Trees on the site. The approximate locations of the trees are shown on the following Tree Locations map, and their description by type, size and general condition is given in the following table. Ordinance-sized trees are shown in **bold** in the table. Photographs of each Ordinance-sized tree are included in the report in the Technical Appendix.

Riparian Corridor Habitat

Riparian corridor habitat is not located on or within 300 feet of the project site.

Wildlife

The project site contains developed habitat. Wildlife typically associated with this habitat type include birds, reptiles, and small mammals. No rare or endangered animal species are known to inhabit the site. The site does not contain any known important wildlife breeding, nesting or feeding areas.

Table 3. Existing Trees

No.	Scientific Name	Common Name	Native Tree	Circumference * *(inches)*	General Condition	To Be Removed
1628.	*Platanus acerifolia*	London Plane		50	Fair	
1629.	***Platanus acerifolia***	**London Plane**		**69**	**Fair**	**X**
1630.	***Platanus acerifolia***	**London Plane**		**69**	**Fair**	
1631.	***Citrus paradisi***	**Grapefruit**		**19,15,15, 13,13 ****	**Fair**	**X**
1632.	*Citrus paradisi*	Grapefruit		22,16	Fair	X
1633.	*Citrus paradisi*	Grapefruit		25,16	Fair	X
1634.	*Citrus paradisi*	Grapefruit		13	Fair	X
1635.	*Citrus paradisi*	Grapefruit		19,19,15	Fair	X
1636.	*Taxus baccata*	Yew		50	Fair	X
1637.	***Pittosporum eugenioides***	**Pittosporum**		**58**	**Fair**	**X**
1638.	*Umbellularia californica*	CA Bay Laurel	X	13	Fair	X
1639.	*Citrus limon*	Lemon		13	Fair	X
1640.	***Pittosporum eugenioides***	**Pittosporum**		**30,22,22, 18 ****	**Fair**	**X**
1641.	*Diospyros kaki*	Persimmon		20	Fair	X
1642.	*Ligustrum lucidum*	Privet		9	Fair	
1643.	*Ligustrum lucidum*	Privet		19	Fair	
1644.	*Ligustrum lucidum*	Privet		25,25	Fair	
1645.	*Citrus paradisi*	Grapefruit		19	Fair	
1646.	*Ligustrum lucidum*	Privet		13	Fair	
1647.	*Prunus armeniaca*	Apricot		27	Fair	
1648.	*Prunus laurocerasus*	English Laurel		50	Poor	
1649.	*Pittosporum eugenioides*	Pittosporum		15,13,13	Poor	
1650.	***Prunus laurocerasus***	**English Laurel**		**13,13,6,6, 6,6,6,3,3, 3,3,3,3****	**Fair**	
1651.	*Pittosporum eugenioides*	Pittosporum		19,16	Poor	
1652.	*Pittosporum eugenioides*	Pittosporum		20,16,16	Fair	
1653.	*Prunus laurocerasus*	English Laurel		13,13,6,6	Poor	
1654.	*Prunus laurocerasus*	English Laurel		13,13,13	Fair	
1655.	***Prunus laurocerasus***	**English Laurel**		**25,24,22, 22,17 ****	**Fair**	**X**
1656.	***Cedrus atlantica***	**Blue Atlas Cedar**		**143**	**Fair**	**X**
1657.		unknown		35	Fair	X
1658.	***Eucalyptus globulus***	**Blue Gum Eucalyptus**		**113**	**Fair**	
1659.	***Eucalyptus globulus***	**Blue Gum Eucalyptus**		**77**	**Fair**	

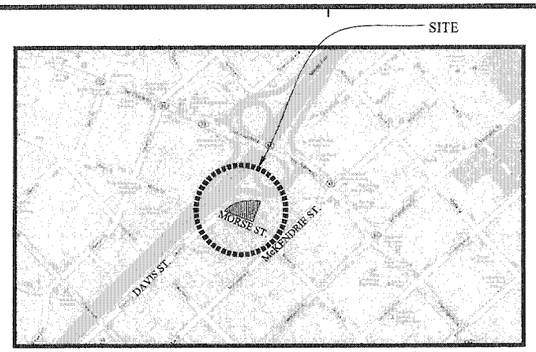
Note: Some trees may have multiple stems from a single trunk. Ordinance-sized trees are shown in **bold**.

* Circumference at 2 feet above ground.

** Combined total represents an Ordinance-sized tree.

Y = Native Tree.

X = To be Removed.



2 LOCATION MAP SCALE : 1" = 20'-0"

1 LAND USE PLAN SCALE : 3/32" = 1'-0"

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DIRECT: 408-938-6350
CELL: 408-590-0571

Consultant:

Revisions:

MORSE STREET COURTHOMES
980 MORSE STREET, SAN JOSE, CA
APN: 230-44-010, PDC11-010

LAND USE PLAN

Date: MAY 03, 2011
Scale: AS NOTED
Drawn by: RJH
Job #: 10-9143

Sheet
PDZ-2

1. Exact location and dimensions of the subject property.
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
2. Exact location of the following components of the plan:
a. All lots
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
b. All buildings and structures
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
c. All public and private open space.
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.

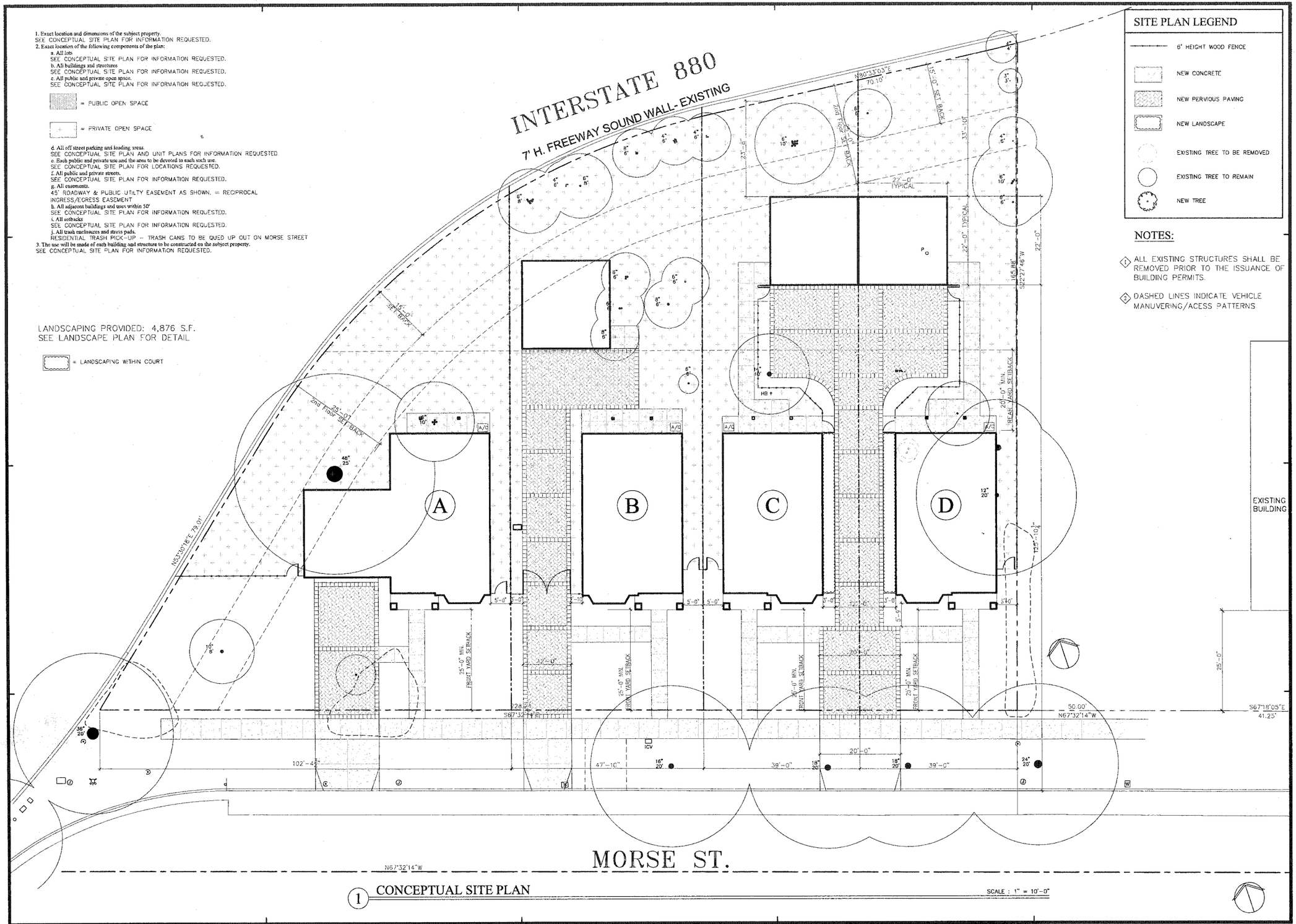
= PUBLIC OPEN SPACE

= PRIVATE OPEN SPACE

d. All off street parking and loading areas.
SEE CONCEPTUAL SITE PLAN AND UNIT PLANS FOR INFORMATION REQUESTED.
e. Each public and private use and the area to be devoted to each such use.
SEE CONCEPTUAL SITE PLAN FOR LOCATIONS REQUESTED.
f. All public and private streets.
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
g. All easements.
45' ROADWAY & PUBLIC UTILTY EASEMENT AS SHOWN. = RECIPROCAL INGRESS/EGRESS EASEMENT
h. All adjacent buildings and uses within 50'
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
i. All setbacks
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.
j. All trash enclosures and strorm pads.
RESIDENTIAL TRASH PICK-UP – TRASH CANS TO BE QUED UP OUT ON MORSE STREET
3. The use will be made of each building and structure to be constructed on the subject property.
SEE CONCEPTUAL SITE PLAN FOR INFORMATION REQUESTED.

LANDSCAPING PROVIDED: 4,876 S.F.
SEE LANDSCAPE PLAN FOR DETAIL

= LANDSCAPING WITHIN COURT



1 CONCEPTUAL SITE PLAN — SCALE : 1" = 10'-0"

SITE PLAN LEGEND

- 6' HEIGHT WOOD FENCE
- NEW CONCRETE
- NEW PERVIOUS PAVING
- NEW LANDSCAPE
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- NEW TREE

NOTES:

1. ALL EXISTING STRUCTURES SHALL BE REMOVED PRIOR TO THE ISSUANCE OF BUILDING PERMITS.
2. DASHED LINES INDICATE VEHICLE MANUVERING/ACESS PATTERNS

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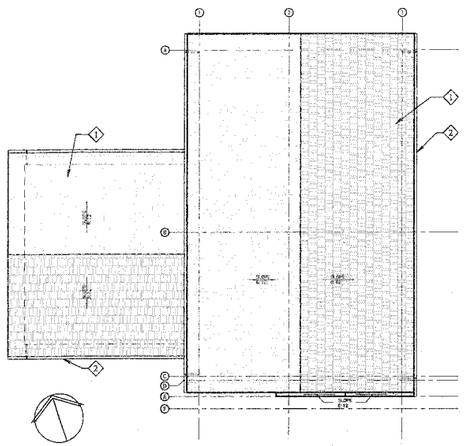
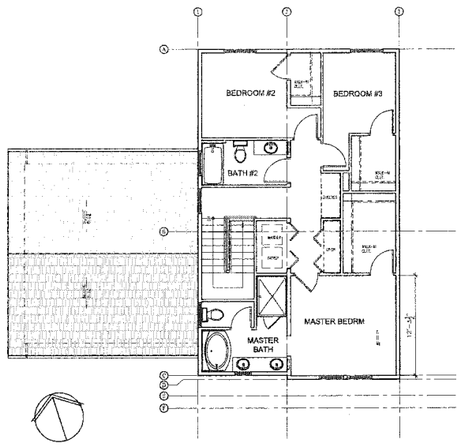
CONCEPTUAL SITE PLAN

Date: MAY 03, 2011
Scale: AS NOTED
Drawn by: RJH
Job #: 10-9143

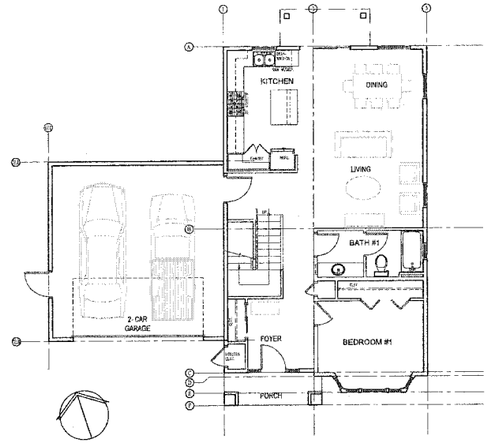
Sheet: PDZ-3



3 CONCEPTUAL ROOF PLAN
SCALE : 1/8" = 1'-0"
LOT A



2 CONCEPTUAL SECOND FLOOR PLAN
SCALE : 1/8" = 1'-0"
LOT A



1 CONCEPTUAL FIRST FLOOR PLAN
SCALE : 1/8" = 1'-0"
LOT A

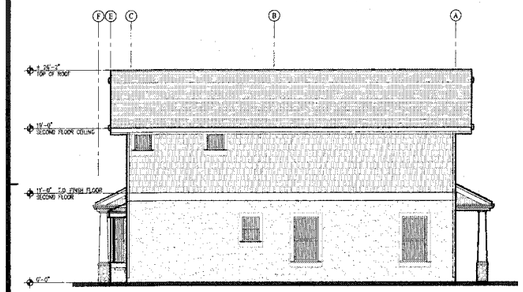
ELEVATION KEY NOTES

1. COMPOSITION ROOFING
2. PAINTED METAL GUTTER
3. VINYL WINDOWS
4. PAINTED 2X FACIA
5. CEMENT PLASTER
6. DECORATIVE WOOD BRACKETS
7. SAND FLOAT STUCCO BELLY BAND
8. PAINTED WOOD CASING/TRIM
9. PAINTED WOOD COLUMN (SMOOTH FINISH)
10. HARDIE OR EQUAL CEMENT SHINGLE
11. PAINTED WINDOWS SHUTTERS
12. SUNBURST
13. STONE BASE
14. GABLE VENT
15. FIBER CEMENT BELLY BAND
16. PAINTED METAL DOWNSPOUT

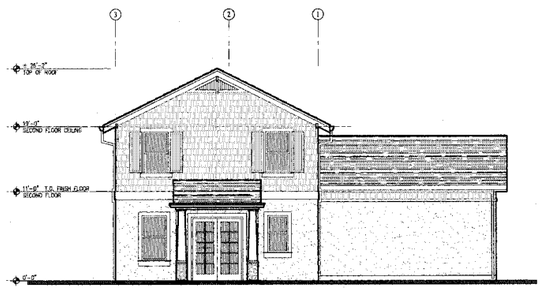
FIRST FLOOR:
LIVING AREA: 1,025 S.F.
GARAGE: 474 S.F.
PORCH AREA: 98 S.F.
TOTAL: 1,597 S.F.

SECOND FLOOR:
FLOOR AREA: 1,007 S.F.

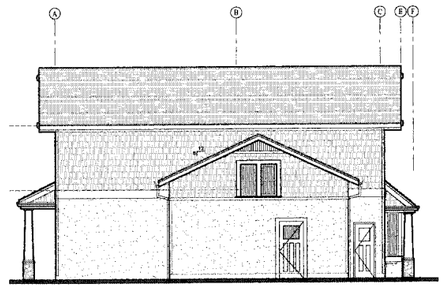
TOTAL LIVING AREA: 2,032 S.F.



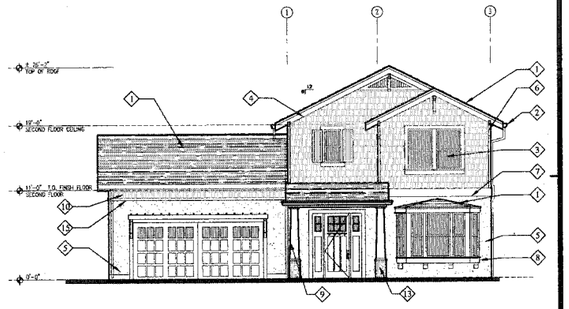
7 CONCEPTUAL ELEVATION
SCALE : 1/8" = 1'-0"
LOT A



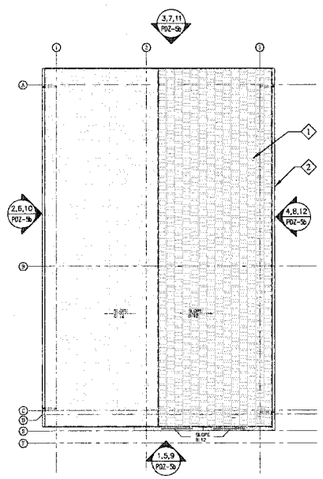
6 CONCEPTUAL ELEVATION
SCALE : 1/8" = 1'-0"
LOT A



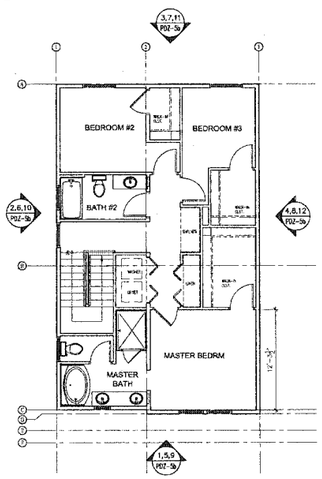
5 CONCEPTUAL ELEVATION
SCALE : 1/8" = 1'-0"
LOT A



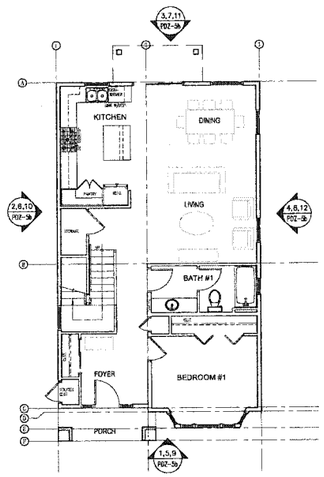
4 CONCEPTUAL ELEVATION
SCALE : 1/8" = 1'-0"
LOT A



10 CONCEPTUAL ROOF PLAN
SCALE : 1/8" = 1'-0"
LOT B, C & D



9 CONCEPTUAL 2ND FLOOR PLAN
SCALE : 1/8" = 1'-0"
LOT B, C & D



8 CONCEPTUAL 1ST FLOOR PLAN
SCALE : 1/8" = 1'-0"
LOT B, C & D

FIRST FLOOR:
LIVING AREA: 1,025 S.F.
GARAGE: 474 S.F.
PORCH AREA: 98 S.F.
TOTAL: 1,597 S.F.

SECOND FLOOR:
FLOOR AREA: 1,007 S.F.

TOTAL LIVING AREA: 2,032 S.F.

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Consultant:

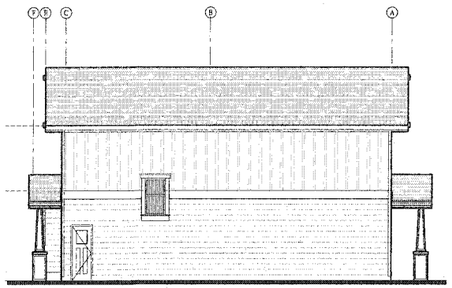
Revisions:

MORSE STREET COURTHOMES
980 MORSE STREET, SAN JOSE, CA
APN: 230-44-040, PDC11-010

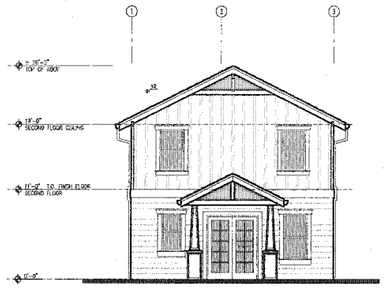
CONCEPTUAL FLOOR PLANS & ELEVATIONS -

Date: MAY 03, 2011
Scale: AS NOTED
Drawn by: RJH
Job #: 10-9143

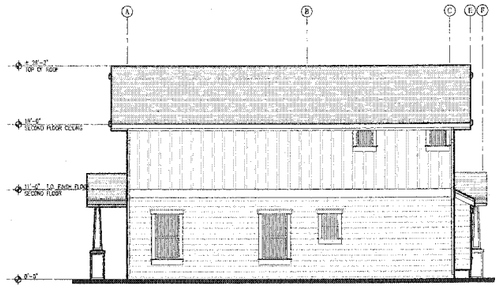
Sheet
PDZ-5a



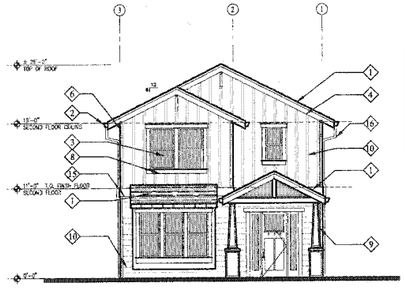
4 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



3 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



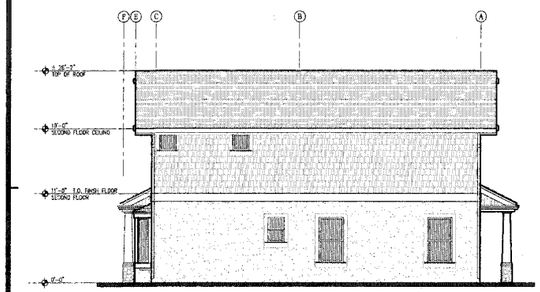
2 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



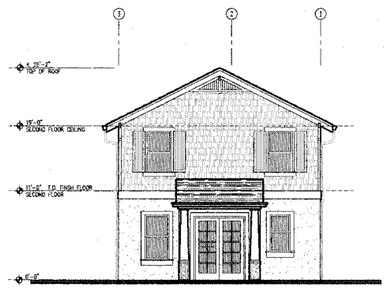
1 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B

ELEVATION KEY NOTES

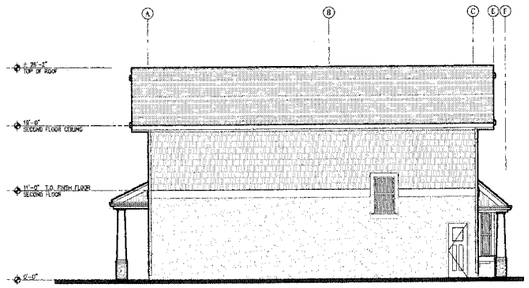
1. COMPOSITION ROOFING
2. PAINTED METAL GUTTER
3. VINYL WINDOWS
4. PAINTED 2X FACIA
5. CEMENT PLASTER
6. DECORATIVE WOOD BRACKETS
7. SAND FLOAT STUCCO BELLY BAND
8. PAINTED WOOD CASING/TRIM
9. PAINTED WOOD COLUMN (SMOOTH FINISH)
10. HARDIE OR EQUAL CEMENT SHINGLE
11. PAINTED WINDOWS SHUTTERS
12. SUNBURST
13. STONE BASE
14. GABLE VENT
15. FIBER CEMENT BELLY BAND
16. PAINTED METAL DOWNSPOUT



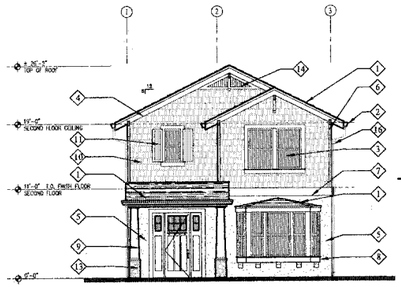
8 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C



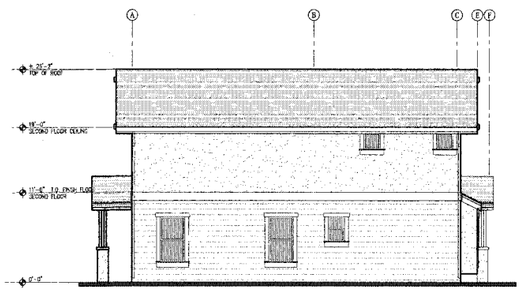
7 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C



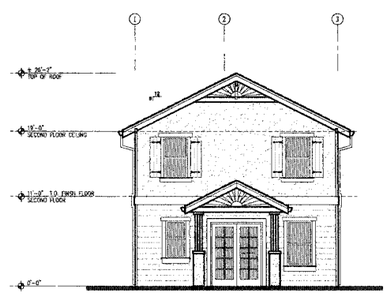
6 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C



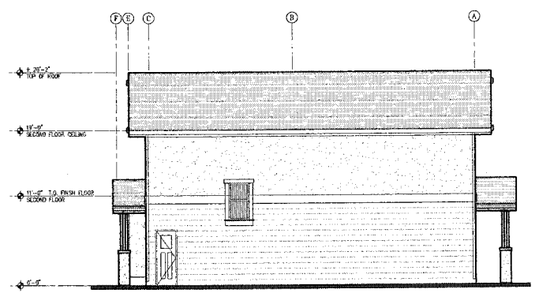
5 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C



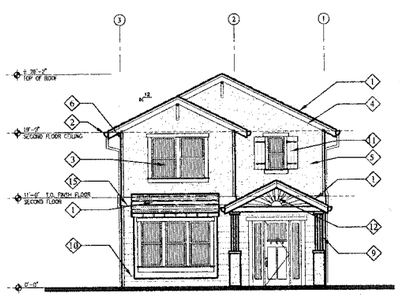
12 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT D



11 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT D



10 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT D



9 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT D

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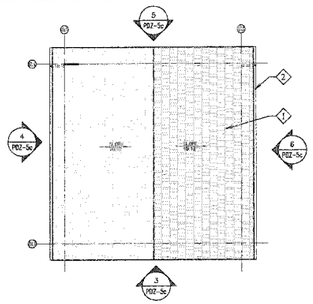
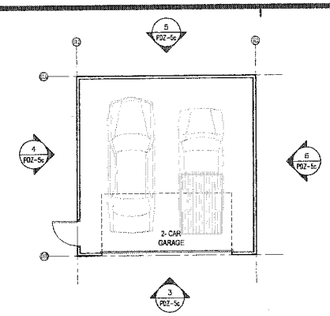
CONCEPTUAL ELEVATIONS -
LOT B, C & D

Date:
MAY 03, 2011
Scale:
AS NOTED
Drawn by:
RJH
Job #:
10-9143

Sheet
PDZ-5b



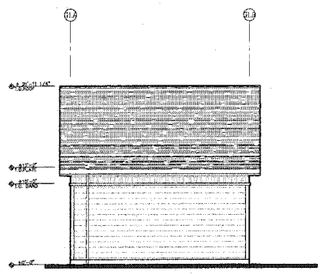
2 CONCEPTUAL GARAGE ROOF PLAN SCALE : 1/8" = 1'-0"
LOT B



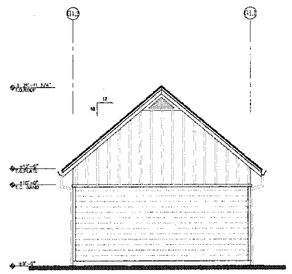
1 CONCEPTUAL GARAGE PLAN SCALE : 1/8" = 1'-0"
LOT B

ELEVATION KEY NOTES

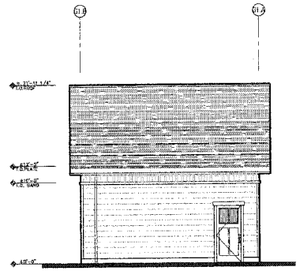
1	COMPOSITION ROOFING
2	PAINTED METAL GUTTER
3	VINYL WINDOWS
4	PAINTED 2X FACIA
5	CEMENT PLASTER
6	DECORATIVE WOOD BRACKETS
7	SAND FLOAT STUCCO BELLY BAND
8	PAINTED WOOD CASING/TRIM
9	PAINTED WOOD COLUMN (SMOOTH FINISH)
10	HARDIE OR EQUAL CEMENT SHINGLE
11	PAINTED WINDOWS SHUTTERS
12	SUNBURST
13	STONE BASE
14	GABLE VENT
15	FIBER CEMENT BELLY BAND
16	PAINTED METAL DOWNSPOUT



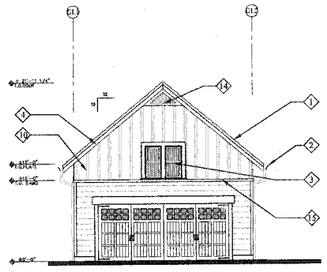
6 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



5 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



4 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT B



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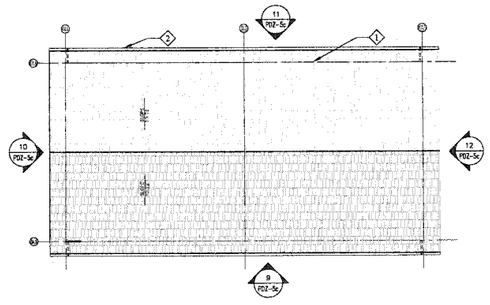
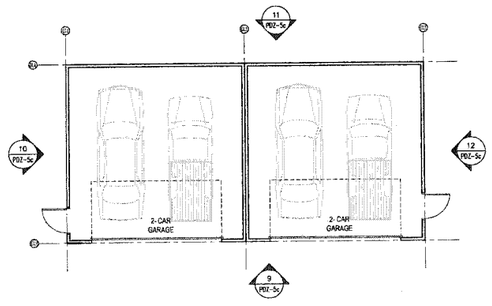
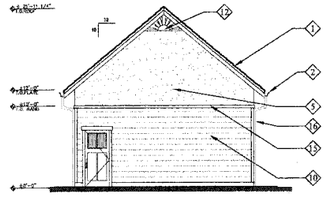
LOT B



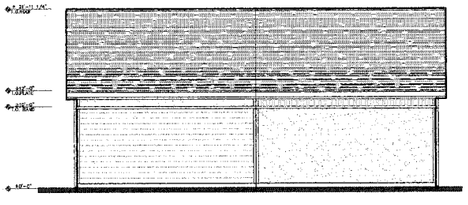
8 CONCEPTUAL GARAGE ROOF PLAN SCALE : 1/8" = 1'-0"
LOT C & D



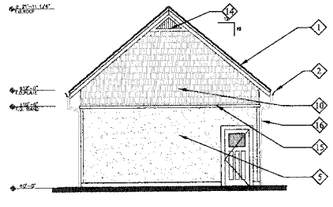
7 CONCEPTUAL GARAGE PLAN SCALE : 1/8" = 1'-0"
LOT C & D



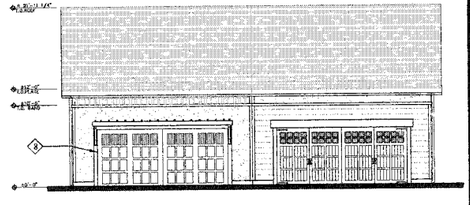
12 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C & D



11 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C & D



10 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C & D



9 CONCEPTUAL ELEVATION SCALE : 1/8" = 1'-0"
LOT C & D

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DIRECT: 408-938-6350
CELL: 408-593-0571

Consultant:

Revisions:

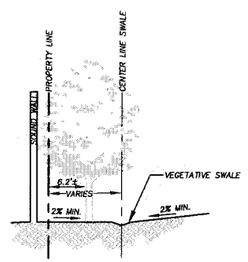
MORSE STREET COURTHOMES
980 MORSE STREET, SAN JOSE, CA
APN: 230-44-040, PDC11-010

CONCEPTUAL GARAGE PLANS & ELEVATIONS - LOT B, C & D

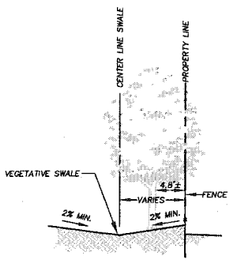
Date: MAY 03, 2011
Scale: AS NOTED
Drawn by: RJH
Job #: 10-9143

Sheet
PDZ-5c

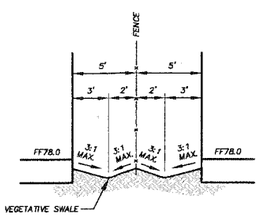
1	Name & Location of Receiving Water Body	Guadalupe River
2	Pollutants & pollutant source areas, including loading docks, food service areas, refuse areas, outdoor processes and storage, vehicle cleaning, repair or maintenance, fuel dispensing.	No other source areas on site.
3	Existing natural hydrologic features (depressions, names of watercourses, etc.) and significant natural resources.	None.
6	Project within flood elevation?	Flood Zone D is an unstudied area where flood hazards are undetermined, but flooding is possible. There are no City floodplain requirements for zone D.
7	Existing and proposed trees, specifying size, species, condition and disposition.	See Landscape Plans for information on proposed trees.
8	Drainage flows and overland release flows	See plan for arrows
9	Existing and proposed topographic contours with drainage areas and sub areas delineated and arrows showing flow direction	Spot elevation shown on the plan
10	Types of paving materials.	See plan and also legend
	Details of pervious pavement	Specifications and details will be provided on the improvement plans
11	Separate drainage areas depending on complexity of drainage network.	See plan
12	For each drainage area, specify types of impervious area (roof, plaza, sidewalk, streets, parking, etc.) and area of each.	See Pervious & Impervious Surfaces Comparison chart on this sheet.
13	Location, size, and identification of types of source control measures, water quality treatment control measures and best management practices	SCMs include non-stormwater discharges, waste handling & disposal, building & grounds maintenance, parking maintenance, housekeeping practices, pool maintenance, landscape maintenance, drainage system maintenance as decribed in SWPPP
14	Detailed maintenance plan and maintenance schedule for all proposed SCMs and TCMs.	BMPs are to be regularly maintained (mowed and cleared of debris) monthly; area drains inspected and cleared at least once per year, prior to the commencement of rainy season (October 15th). SCM's daily construction, will be described in SWPPP.
15	Details of all proposed water quality treatment measures.	Treatment will be 100% landscaping including green roof. Details will be on the Improvement Plans
16	Location, size, and identification of proposed landscaping/plant material	See plan and also legend for location/size of planting areas. See Landscape Plans for information on proposed plant material.
17	Ensure consistency with Grading & Drainage Plan & Landscape Plan	done
18	Calculations illustrating water quality treatment control measures meet numerical standards set forth in Post-Construction Urban Runoff Management Policy No. 6-29.	See Table on this Sheet.
19	Licensed certification that the specific TCMs meet the requirements in Post-Construction Urban Runoff Management Policy 6-29	Plan is stamped by licensed civil engineer.



SECTION A-A



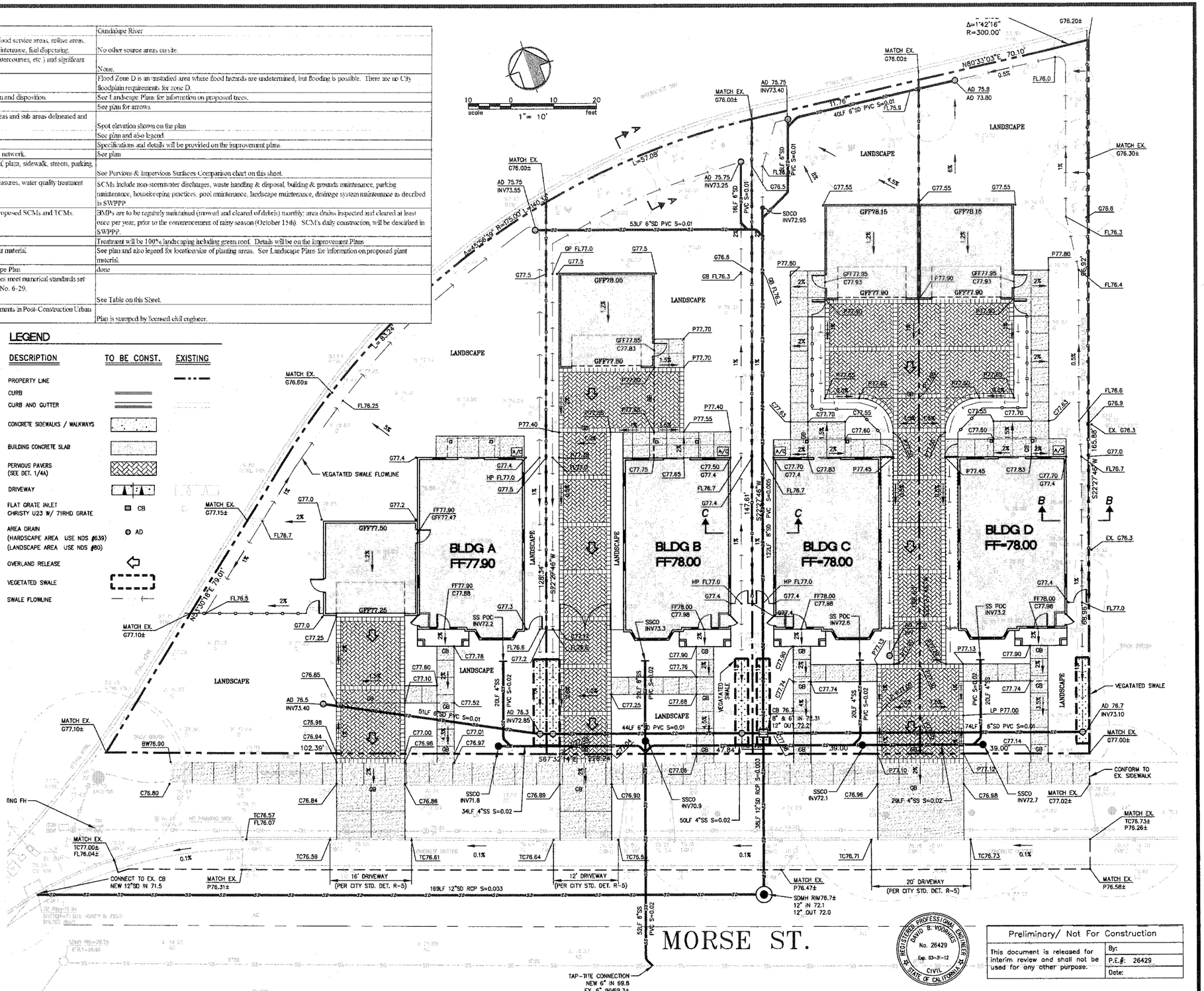
SECTION B-B



SECTION C-C

LEGEND

DESCRIPTION	TO BE CONST.	EXISTING
PROPERTY LINE		
CURB		
CURB AND GUTTER		
CONCRETE SIDEWALKS / WALKWAYS		
BUILDING CONCRETE SLAB		
PERVOUS PAVERS (SEE DET. 1/4A)		
DRIVEWAY		
FLAT GRATE INLET CHRISTY U23 W/ 71RHD GRATE	CB	
AREA DRAIN (HARDSCAPE AREA USE NDS #6.39) (LANDSCAPE AREA USE NDS #80)	AD	
OVERLAND RELEASE		
VEGETATED SWALE		
SWALE FLOWLINE		



REGISTERED PROFESSIONAL ENGINEER DAVID B. VOORHEES No. 26429 Exp. 03-31-12 CIVIL STATE OF CALIFORNIA

Preliminary/ Not For Construction	
This document is released for interim review and shall not be used for any other purpose.	By:
	P.E.#: 26429
	Date:

#	DESC.	DATE
	REVISIONS	

U&R UNDERWOOD & ROSENBLUM, INC.
civil engineers and surveyors
950 Charter Road Ste. 214 San Jose, CA 95121
Tel No. (408) 453-1220 Fax No. (408) 453-1669

MORSE STREET COURTHOMES
980 MORSE STREET
SAN JOSE CALIFORNIA

GENERAL DEVELOPMENT PLAN
EXHIBIT "A"
CONCEPTUAL GRADING AND DRAINAGE PLAN

Date: 08-12-11
Scale: 1"=10'
Design By: DV
Job: J11007
Sheet
PD4

Figure 17

PERVIOUS AND IMPERVIOUS SURFACES COMPARISON TABLE			
		PROJECT PHASE NUMBER:	ONE (1)
TOTAL SITE (ACRES):	0.626	TOTAL AREA OF SITE DISTURBED (ACRES):	0.626
IMPERVIOUS SURFACES	EXISTING CONDITION OF SITE AREA DISTURBED (SQUARE FEET)	PROPOSED CONDITION OF SITE AREA DISTURBED (SQUARE FEET)	
		REPLACED	NEW
ROOF AREA(S)	4,749	2,145	4,081
PARKING	2,007	—0—	—0—
SIDEWALKS, PATIOS, PATHS, ETC	1,011	500	1,131
STREETS (PUBLIC)	—0—	—0—	—0—
STREETS (PRIVATE)	—0—	—0—	—0—
TOTAL IMPERVIOUS SURFACES:	7,767	2,645	5,212
PERVIOUS SURFACES			
LANDSCAPED AREAS	18,869	12,222	2,516
PERVIOUS PAVERS	—0—	—0—	4,046
OTHER PERVIOUS SURFACES (GREEN ROOF, ETC.)	—0—	—0—	—0—
TOTAL PERVIOUS SURFACES:	18,869	12,222	6,562
	TOTAL PROPOSED REPLACED + NEW IMPERVIOUS SURFACES:		7,858
	TOTAL PROPOSED REPLACED + NEW PERVIOUS SURFACES:		18,784

AREA CALCULATION									TREATMENT AREA	
ID AREA	LANDSCAPE AREA (SF)	ROOF AREA (SF)	PERVIOUS PAVERS STREETS (PRIVATE) AREA (SF)	IMPERVIOUS SIDEWALK/WALKWAY AREA (SF)	TOTAL AREA (SF)	TOTAL AREA (ACRE)	C	C.3 BMP Q	TYPE BMP	BMP (SF)
A1	5,417	1,557	513	233	7,720	0.177	0.22	0.007	1	126
A2	3,400	1,557	1,333	377	6,667	0.153	0.20	0.005	1	SEE A3
A3	2,770	1,557	1,100	506	5,933	0.136	0.18	0.004	1	201
A4	3,151	1,557	1,100	515	6,323	0.145	0.19	0.005	1	SEE A3
TOTAL AREA	14,738	7,785	4,046	1,631	26,643	0.611	0.22	0.023		

BMP-1 FLOW BASED VEGETATED SWALE

BMP-2 PERVIOUS PAVERS (SEE DETAIL 1)

BMP-3 ROOF LEADERS SPLASH TO LANDSCAPE TYPICAL

BMP-4 EROSION CONTROL NOT SHOWN

ABBREVIATION

IMP	IMPERVIOUS
PER PAV	PERVIOUS PAVEMENT
PER	PERVIOUS
SF	SQUARE FEET

Stormwater Treatment Requirements Worksheets

IV. Simplified Method for Sizing Flow-Based Treatment Measures

California BMP Handbook Flow Approach

The design rainfall intensity (I) is twice the 85th percentile value. The 85th percentile hourly rainfall intensity for San Jose Airport rain gauge is 0.087 in/hr. Therefore, the design rainfall intensity that is equivalent to twice the 85th percentile storm event for the San Jose Airport rain gauge is **0.17 in/hr.**

The intensity represents the rate of rainfall (a depth per hour) and needs to be converted to a flow of runoff from the drainage area to the BMP.

The flow is calculated using the rational formula $Q = CIA$, where:

- Q = the flow in cubic feet per second (cfs),
- C = the runoff coefficient of the drainage area to the BMP
- I = the design intensity adjusted for project location (**0.17 in/hr**), and
- A = the area draining to the BMP (acres)

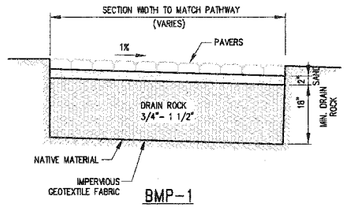
Calculation for area A1 :

Step 1. Determine the drainage area (A) for the BMP in acres.
A = 7,720 sf / 43560 = **0.177 acres**

Step 2. Determine the amount of impervious area draining to the BMP (acres):
Imp = 1,557 sf / 43560 = **0.036 acres**

Step 3. Determine the impervious ratio, *i:* (not the same as "I", the rainfall intensity)
i = (percent imperviousness of drainage area for BMP)/100
– OR –
i = amount of impervious area (acres) drainage area for the BMP (A) (acres)
i = *Imp/A = 0.272/0.484 = 0.562*
= **0.290** (range will be from 0-1)

Step 4. Determine the runoff coefficient, C, using **Table 3** below **OR** the following equation, where *i* = impervious ratio from **Step 3.**
C = $0.858i^3 - 0.78i^2 + 0.774i + 0.04$
= $0.858\ (0.83)^3 - 0.78\ (0.83)^2 + 0.774\ (0.83) + 0.04$
= **0.22**



1 IMPLEMENTING PERVIOUS PAVEMENT
SCALE: N.T.S.

FLOW–BASED TREATMENT CALCULATION:

Area 1:

Q = CIA = (Runoff Coefficient) x (Rainfall Intensity) x (Correction Factor) x (Drainage Area to BMP)
= 0.22 x 0.17 in/hr x 1 x 0.177 acres
= 0.007 cfs

Determine storage/detention area flow to accommodate added discharge.
Note: a safety factor of 1.5 is included in this equation

D = Proposed depth of Lawn/Grass/Vegetated Area (D = 2 in = 0.1666 ft)
Tc = Detention time = 10 minutes = 600 seconds
V = Volume = Area x D

A1 req = (1.5 Q Tc)/D
= 1.5 (0.007 cfs)(600 sec) / 0.1666 ft =
A1 req = 38 sf **Vegetated Area = 3 X 20 = 60 sf**

A2 req = (1.5 Q Tc)/D
= 1.5 (0.005 cfs)(600 sec) / 0.1666 ft =
A2 req = 27 sf **Vegetated Area = 3 X 20 = 60 sf**

A3 req = (1.5 Q Tc)/D
= 1.5 (0.004 cfs)(600 sec) / 0.1666 ft =
A3 req = 22 sf **Vegetated Area = 3 X 20 = 60 sf**

A2 req = (1.5 Q Tc)/D
= 1.5 (0.005 cfs)(600 sec) / 0.1666 ft =
A4 req = 27 sf **Vegetated Area = 3 X 20 = 60 sf**

UNDERWOOD & ROSENBLUM, INC.
civil engineers and surveyors
1016 The Alameda, San Jose, CA 95126
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#	DESC.	DATE
	REVISIONS	

MORSE STREET COURTHOMES
980 MORSE STREET
SAN JOSE CALIFORNIA

GENERAL DEVELOPMENT PLAN
EXHIBIT "C"
CONCEPTUAL STORMWATER CONTROL PLAN

Date: 08-16-11
Scale: 1"=10'
Design By: DV
Job: J11007
Sheet
PDP4A

REGISTERED PROFESSIONAL ENGINEER
DAVID B. VOORHIES
No. 26429
Exp. 03-31-12
CIVIL
STATE OF CALIFORNIA

Preliminary/ Not For Construction

This document is released for interim review and shall not be used for any other purpose.

By:
P.E.#: 26429
Date:

Plant Legend

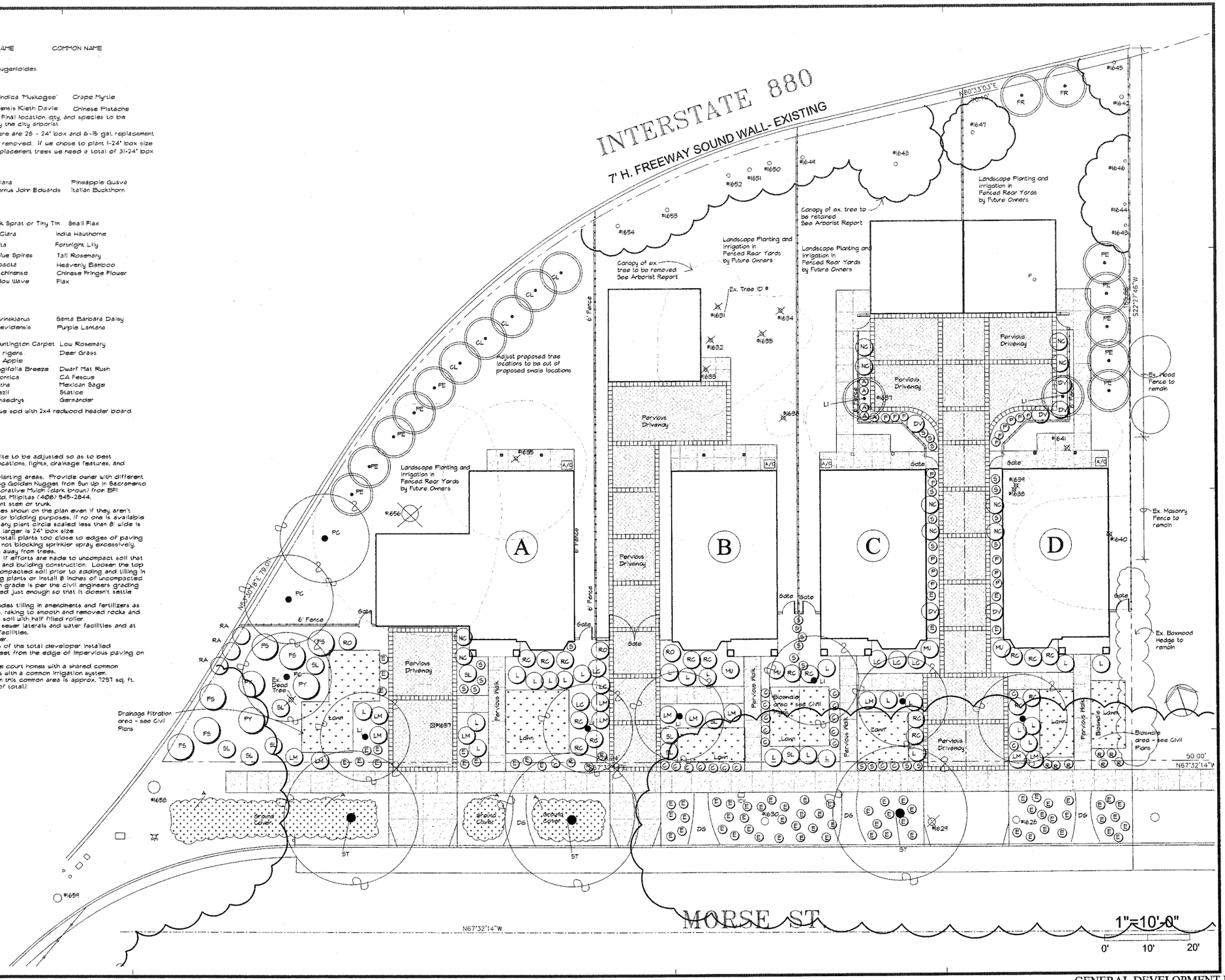
KEY	SIZE	water use	BOTANICAL NAME	COMMON NAME
TREES				
PE	24"	Med	Pittosporum eugenioides	
CL	24"	Med	Citrus	
FR	24"	Med	Apple	
LI	24"	Low	Lagerstremia indica 'Muskogee'	Crape Myrtle
PC	24"	Low	Pistachia chinensis 'Keith Davis'	Chinese Pistachs
ST	24"	Low	Street Tree - Final location, qty, and species to be determined by the city arborist	

As per the Arborist report there are 28 - 24" box and 6-15 gal. replacement trees for trees that are being removed. If we chose to plant 1-24" box size tree for each 2-15 gal. size replacement trees we need a total of 31-24" box size replacement trees.

TALL SHRUBS/SMALL TREES				
FS	5 and 15	Low	Feijoa sellowiana	Pineapple Guave
RA	5 and 15	Low	Rhamnus alaternus 'John Edwards'	Italian Buckthorn
MEDIUM SHRUBS				
P	5	Low	Phormium 'Jack Sprat' or 'Tiny Tim'	Small Flax
RC	5	Low	Raphiolepis Clara	India Hawthorne
DV	5	Low	Dietes vegeta	Fortnight Lily
RO	5	Low	Rosmarinus 'Blue Spires'	Tall Rosemary
NC	5	Low	Nandina compacta	Heavenly Bamboo
LC	5	Low	Loropetalum chinense	Chinese Fringe Flower
PT	5	Low	Phormium 'Yellow Wave'	Flax
GROUND COVER				
E	1	Low	Erigeron karvinskianus	Santa Barbara Daisy
LM	1	Low	Lantana montevidensis	Purple Lantana
R	1	Low	Rosmarinus 'Huntington Carpet'	Low Rosemary
MU	1	Low	Muhlenbergia rigens	Deer Grass
A	1	Low	Aptenia 'Red Apple'	
L	1	Low	Lomandra longifolia 'Breeze'	Dwarf Mat Rush
F	1	Low	Festuca californica	CA Fescue
SL	1	Low	Salvia leucantha	Mexican Sage
S	1	Low	Limonium perezii	Statice
G	1	Low	Teucrium chamaedrys	Germander
Lawn	sod	high	Turf tall fescus sod with 2x4 redwood header board	

Planting Notes

1) See details and specs.
2) Exact location of plants on site to be adjusted so as to best coordinate with sprinkler head locations, lights, drainage features, and swales.
3) Use 2 inch deep mulch in all planting areas. Provide owner with different mulch samples and prices including Golden Nugget from Sun Up in Sacramento (800) 222-2551 or Pro-Chip Decorative Mulch (dark brown) from BFI Organics - 1601 Dixon Landing Rd. Milpitas (408) 945-2844. Pull mulch 4 inches back from plant stem or trunk.
4) Install plants for all plant circles shown on the plan even if they aren't labeled. Call for clarification. For bidding purposes, if no one is available to answer questions, assume that any plant circle scaled less than 8' wide is 5 gal. size and any circle scaled larger is 24" box size
5) The plan is schematic. Don't install plants too close to edges of paving or buildings. Be sure plants are not blocking sprinkler spray excessively. Keep valves and quick couplers away from trees.
6) The plants will do much better if efforts are made to uncompact soil that has been compacted during site and building construction. Loosen the top 8 inches of any undisturbed or compacted soil prior to adding and tilling in other soil amendments or installing plants or install 8 inches of uncompacted topsoil in a way so that the finish grade is per the civil engineers grading plan. Top soil is to be compacted just enough so that it doesn't settle alot later.
7) Soil prep. for sod areas includes tilling in amendments and fertilizers as recommended by soil test results, raking to smooth and removed rocks and clods from surface, and compact soil with half filled roller.
8) Trees to be at least 10' from sewer laterals and water facilities and at least 5 feet from electric dept. facilities.
9) Irrigation will be potable water.
10) Lawn areas are less than 25% of the total developer installed landscape. They are at least 2 feet from the edge of impervious paving on slopes less than 5%.
11) Residences A, B, C, and D are court homes with a shared common landscape area in the front yards with a common irrigation system. Developer installed landscape in this common area is approx. 7297 sq. ft. including 1102 sq.ft. of lawn (15% of total).



BSB DESIGN

BARRY SWENSON BUILDER
A DIVISION OF GREEN VALLEY CORP.
777 North First Street
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San Jose, Ca 95112
tel: (408) 287-0246
fax: (408) 287-2356

Consultant:
Gregory Lewis
Landscape Architect
#2176
736 Park Way
Santa Cruz, CA 95065
(831) 425-4747
lewislandscape@sbcglobal.net

Revisions:
8/25/11 Site Plan, Planting Plan Tree Protection and Mitigation

Morse Street Courthomes

980 Morse Street, San Jose, CA
APN: 230-44-040 PDC 11-010 PD 11-015

PLANTING PLAN

LICENSED LANDSCAPE ARCHITECT
GREGORY LEWIS
No. 2176
Renewal 4/30/2012
STATE OF CALIFORNIA

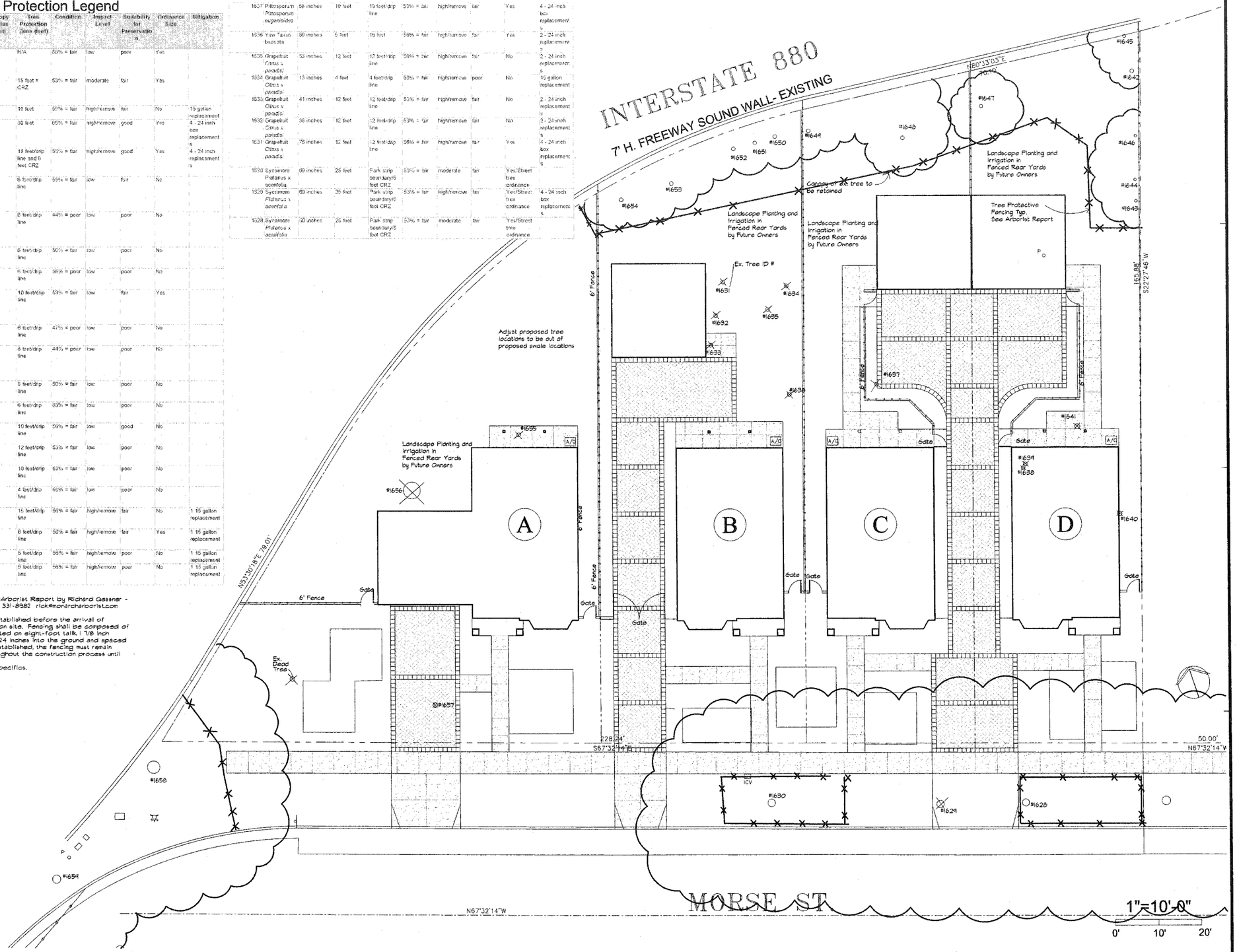
Date: 31 MARCH 2011
Scale:
Drawn by: Greg
Job #: 9139-71-110
Sheet: PDZ-6a

Tree Inventory and Protection Legend

Tree Number	Tree Species	Circumference at 2 feet above grade (inches)	Canopy Radius (feet)	Tree Protection Zone (feet)	Condition	Impact Level	Suitability for Preservation	Ordinance Size	Mitigation
1659	Blue Gum *Eucalyptus Eucalyptus globulus*	77 inches	29 feet	N/A	50% = fair	low	poor	Yes	
1658	Blue Gum *Eucalyptus Eucalyptus globulus*	113 inches	30 feet	15 feet = CRZ	53% = fair	moderate	fair	Yes	
1657	Unknown	35 inches	10 feet	10 feet	50% = fair	high/remove	fair	No	15 gallon replacement
1656	Blue Atlas Cedar *Cedrus atlantica*	140 inches	30 feet	30 feet	65% = fair	high/remove	good	Yes	4 - 24 inch box replacements
1655	English Laurel *Prunus laurocerasus*	110 inches	14 feet	18 feet/drip line and 8 feet CRZ	55% = fair	high/remove	good	Yes	4 - 24 inch replacements
1654	English Laurel *Prunus laurocerasus*	38 inches	6 feet	6 feet/drip line	55% = fair	low	fair	No	
1653	English Laurel *Prunus laurocerasus*	38 inches	6 feet	6 feet/drip line	44% = poor	low	poor	No	
1652	Pittosporum *Pittosporum eugenioides*	52 inches	6 feet	6 feet/drip line	50% = fair	low	poor	No	
1651	Pittosporum *Pittosporum eugenioides*	39 inches	6 feet	6 feet/drip line	38% = poor	low	poor	No	
1650	English Laurel *Prunus laurocerasus*	75 inches	10 feet	10 feet/drip line	63% = fair	low	fair	Yes	
1649	Pittosporum *Pittosporum eugenioides*	41 inches	6 feet	6 feet/drip line	47% = poor	low	poor	No	
1648	English Laurel *Prunus laurocerasus*	50 inches	8 feet	8 feet/drip line	44% = poor	low	poor	No	
1647	Apricot *Prunus armeniaca*	27 inches	8 feet	8 feet/drip line	50% = fair	low	poor	No	
1646	Privet *Ligustrum lucidum*	13 inches	6 feet	6 feet/drip line	63% = fair	low	poor	No	
1645	Grapefruit *Citrus x paradisi*	19 inches	10 feet	10 feet/drip line	69% = fair	low	good	No	
1644	Privet *Ligustrum lucidum*	50 inches	12 feet	12 feet/drip line	53% = fair	low	poor	No	
1643	Privet *Ligustrum lucidum*	19 inches	10 feet	10 feet/drip line	63% = fair	low	poor	No	
1642	Privet *Ligustrum lucidum*	9 inches	4 feet	4 feet/drip line	69% = fair	low	poor	No	
1641	Pam ramon *Diospyros kaki*	20 inches	10 feet	15 feet/drip line	50% = fair	high/remove	fair	No	1 15 gallon replacement
1640	Pittosporum *Pittosporum eugenioides*	30 inches	25 feet	8 feet/drip line	50% = fair	high/remove	fair	Yes	1 15 gallon replacement
1639	Lemon Citrus *limon*	13 inches	5 feet	5 feet/drip line	38% = fair	high/remove	poor	No	1 15 gallon replacement
1638	Bay Laurel *Umbellularia californica*	13 inches	5 feet	5 feet/drip line	56% = fair	high/remove	poor	No	1 15 gallon replacement
1637	Pittosporum *Pittosporum eugenioides*	56 inches	19 feet	19 feet/drip line	53% = fair	high/remove	fair	Yes	4 - 24 inch box replacements
1636	Yew Taxus *baccata*	80 inches	6 feet	15 feet	56% = fair	high/remove	fair	Yes	2 - 24 inch replacements
1635	Grapefruit *Citrus x paradisi*	53 inches	12 feet	12 feet/drip line	69% = fair	high/remove	fair	No	2 - 24 inch replacements
1634	Grapefruit *Citrus x paradisi*	13 inches	4 feet	4 feet/drip line	50% = fair	high/remove	poor	No	15 gallon replacement
1633	Grapefruit *Citrus x paradisi*	41 inches	12 feet	12 feet/drip line	53% = fair	high/remove	fair	No	2 - 24 inch replacements
1632	Grapefruit *Citrus x paradisi*	38 inches	12 feet	12 feet/drip line	63% = fair	high/remove	fair	No	2 - 24 inch replacements
1631	Grapefruit *Citrus x paradisi*	75 inches	12 feet	12 feet/drip line	56% = fair	high/remove	fair	Yes	4 - 24 inch box replacements
1630	Sycamore *Platanus x acerifolia*	69 inches	25 feet	Park strip boundary/6 foot CRZ	53% = fair	moderate	fair	Yes/Street tree ordinance	
1629	Sycamore *Platanus x acerifolia*	63 inches	25 feet	Park strip boundary/6 foot CRZ	63% = fair	high/remove	fair	Yes/Street tree ordinance	4 - 24 inch box replacements
1628	Sycamore *Platanus x acerifolia*	38 inches	25 feet	Park strip boundary/6 foot CRZ	63% = fair	moderate	fair	Yes/Street tree ordinance	

See the most current version of the Arborist Report by Richard Gessner - Monarch Consulting Arborists - (831) 331-8982 rick@monarcharborist.com

"Tree Protection Fencing shall be established before the arrival of construction equipment or materials on site. Fencing shall be composed of six-foot high chain link fencing mounted on eight-foot tall, 7/8 inch diameter galvanized posts, driven 24 inches into the ground and spaced no more than 10 feet apart. Once established, the fencing must remain undisturbed and be maintained throughout the construction process until final inspection."
See the Arborist Report for more specifics.



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Revisions:
8/25/11 Site Plan, Planting Plan Tree Protection and Mitigation

Morse Street Courthomes
980 Morse Street, San Jose, CA
APN: 230-44-040 PDC 11-010 PD 11-015

TREE INVENTORY and PROTECTION PLAN

LEONARD GREGORY LEWIS RLA No. 2176 4/30/2012 STATE OF CALIFORNIA

Date: 31 MARCH 2011
Scale:
Drawn by: Greg
Job #: 9139-71-110
Sheet: PDZ-6e

Raptors and Other Migratory Birds

The Federal Migratory Bird Treaty Act prohibits killing, possessing or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This Act encompasses whole birds, parts of birds and bird nests and eggs. All raptors (i.e., eagles, hawks and owls) and their nests are protected under both Federal and State regulations. Birds of prey are protected in California under the State Fish and Game Code. Section 3503.5 states that it is "*unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.*" Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "taking" by the CDFG. Any loss of fertile eggs or any activities resulting in nest abandonment would constitute a significant impact. Construction activities such as tree removal, site grading, construction etc., that disturb a nest onsite or immediately adjacent to the site constitute a significant impact.

The project site contains trees that may provide suitable habitat for tree-nesting raptors and other migratory birds; however, no nests are currently known to exist on the site. The site does not provide suitable habitat for burrowing owls.

Habitat Conservation Plan / Natural Community Conservation Plan (HCP/NCCP)

To promote the recovery of endangered species while accommodating planned development, infrastructure and maintenance activities, the Local Partners, consisting of the City of San Jose, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, Santa Clara County and the cities of Gilroy and Morgan Hill, are preparing a joint Habitat Conservation Plan/Natural Community Conservation Plan. The Santa Clara Valley Habitat Plan is being developed in association with the U.S. Fish & Wildlife Service (USFWS), the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS) and in consultation with stakeholder groups and the general public to protect and enhance ecological diversity and function within more than 500,000 acres of southern Santa Clara County. The final HCP/NCCP s currently expected to be completed by the end of 2011.

The Santa Clara Habitat Plan Planning Agreement outlines the Interim Project Process to ensure coordination of projects approved or initiated in the Planning Area before completion of the Habitat Plan to help achieve the preliminary conservation objectives of the Plan, and not preclude important conservation planning options or connectivity between areas of high habitat values. The Interim Project Referral Process requires the local participating agencies to notify the wildlife agencies (CDFG and USFWS) of projects that have the potential to adversely impact covered species or natural communities, or conflict with the preliminary conservation objectives of the Habitat Plan. The wildlife agencies' comments on Interim Projects should recommend

mitigation measures or project alternatives that would help achieve the preliminary conservation objectives of the Habitat Plan.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
4. BIOLOGICAL RESOURCES. Would the project:					
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?		**X**			25,40,41
b. Have a substantial adverse effect on any aquatic, wetland, or riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				**X**	25,43
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?				**X**	25
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?				**X**	25
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			**X**		29,42,100
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?				**X**	25,29

The project site does not include riparian habitat, wetlands or any other sensitive habitat; nor is the site adjacent to any wetlands, waterway or other sensitive habitat. No sensitive plant or animal species are known or expected to inhabit the site. The project site does not contain sensitive wildlife habitat or any wildlife nursery sites, nor will its development affect any migratory corridor; and it does not meet the criteria for Interim Habitat Conservation Plan Referral.

Trees

There are 32 trees on the project site, ranging in circumference from 9 to 143 inches. Seventeen (17) trees are currently planned to be retained with the project, as shown on the Conceptual Site Plan, Figure 13. Fifteen (15) trees, one of which is native, are planned to be removed with the project, as indicated by an "X" on the preceding Existing Trees table. Six (6) of the trees to be removed exceed 56 inches in circumference and come under the review of the City's Tree Ordinance, which requires approval for the removal of any tree with a 56-inch circumference or greater. The removal of 10 or more native Ordinance-sized trees and/or the removal of 20 or more non-native Ordinance-sized trees would be considered a significant impact.

Additional street trees will be planted along Morse Street. Any tree that is removed will be replaced with the addition of a new tree(s) at the ratios shown in the Tree Replacement Ratios table that follows. Replacement trees are in addition to normal landscaping and required street trees. If sufficient area is not available onsite within the project for all of the replacement trees, a contribution would be made to Our City Forest where the funds would be used to plant trees within the City.

Trees to remain will be safeguarded before and during construction by a Tree Protection Plan developed by a consulting arborist, and implemented with measures such as the storage of oil, gasoline, chemicals, etc. away from trees; grading around trees or root pruning only as approved, and prevention of drying out of exposed soil where cuts are made; any additional tree pruning needed for clearance performed or supervised by an arborist; application of supplemental irrigation as determined by the consulting arborist; no dumping of liquid or solid wastes in the dripline or uphill from any tree; and construction of barricades around the dripline of the trees until all grading and construction is completed, as outlined in the City's Tree Ordinance.

Wildlife

The project requires the removal of 15 of the trees and all of the vegetation on the site. The birds and small mammals would diminish during the initial construction, but as the new urban landscaping matures, birds and small mammals that have adapted to the urban environment would return.

Raptors and Other Migratory Birds

The project site provides potentially suitable habitat for tree-nesting raptors and other migratory birds, although the site does not currently contain any known nests. If a raptor or other migratory bird were to nest on or immediately adjacent to the site prior to construction, development-related activities could result in the abandonment of active nests or direct mortality to these birds, which would constitute a violation of state and federal laws and be considered a significant impact. Pre-construction surveys for nesting raptors and other migratory birds should be conducted.

Trees

- Any tree that is removed will be replaced with the addition of a new tree(s) at the ratios shown in the following Tree Replacement Ratios table.

Table 4. Tree Replacement Ratios

Diameter of Tree to be Removed	Type of Tree to be Removed			Minimum Size of Each Replacement Tree
	Native	Non-Native	Orchard	
18 inches or greater	5:1	4:1	3:1	24-inch box
12 to <18 inches	3:1	2:1	None	24-inch box
<12 inches	1:1	1:1	None	15-gallon container

x:x = tree replacement to tree loss ratio

Note: Trees greater that 18" diameter will not be removed unless a Tree Removal Permit, or equivalent, has been approved for the removal of such trees.

- The species and exact number of trees to be planted on the site will be determined at the development permit stage, in consultation with the City Arborist and the Department of Planning, Building and Code Enforcement.

- Replacement trees are to be above and beyond standard landscaping; required street trees do not count as replacement trees.

- In the event the project site does not have sufficient area to accommodate the required tree mitigation, one or more of the following measures will be implemented, to the satisfaction of the Director of Planning, Building and Code Enforcement, at the development permit stage:
  - The size of a 15-gallon replacement tree may be increased to 24-inch box and count as two replacement trees.
  - An alternative site(s) will be identified for additional tree planting. Alternative sites may include local parks or schools or installation of trees on adjacent properties for screening purposes to the satisfaction of the Director of the Department of Planning, Building and Code Enforcement. Contact Jaime Ruiz, Parks, Recreation and Neighborhood Services Landscape Maintenance Manager, at 975-7214 or jaime.ruiz@sanjoseca.gov for specific park locations in need of trees.
  - A donation of $300.00 per mitigation tree will be paid to Our City Forest for in-lieu offsite tree planting in the community. These funds will be used for tree planting and maintenance of planted trees for approximately three years. Contact Rhonda Berry, Our City Forest, at (408) 998-7337 x106 to make a donation. A donation receipt for offsite tree planting will be provided to the Planning Project Manager prior to issuance of a development permit.

- The following tree protection measures will also be included in the project in order to protect trees to be retained during construction:

Pre-construction Treatments

- The applicant will retain a consulting arborist. The construction superintendent will meet with the consulting arborist before beginning work to discuss work procedures and tree protection.
- Fence all trees to be retained to completely enclose the tree protection zone prior to demolition, grubbing or grading. Fences will be 6-foot chain link or equivalent as approved by consulting arborist. Fences are to remain until all grading and construction are completed.
- Prune trees to be preserved to clean the crown and to provide clearance. All pruning will be completed or supervised by a Certified Arborist and adhere to the Best Management Practices for Pruning of the International Society of Arboriculture.

During Construction

- No grading, construction, demolition or other work will occur within the tree protection zone. Any modifications must be approved and monitored by the consulting arborist
- Any root pruning required for construction purposes will receive the prior approval of, and be supervised by, the consulting arborist.
- Supplemental irrigation will be applied as determined by the consulting arborist.
- If injury should occur to any tree during construction, it will be evaluated as soon as possible by the consulting arborist so that appropriate treatments can be applied.
- No excess soil, chemicals debris, equipment or other materials will be dumped or stored within the tree protection zone.
- Any additional tree pruning needed for clearance during construction must be performed or supervised by an Arborist and not by construction personnel.
- As trees withdraw water from the soil, expansive soils may shrink within the root area. Therefore, foundations, footings and pavements on expansive soils near trees will be designed to withstand differential displacement.

MITIGATION MEASURES INCLUDED IN THE PROJECT

Raptors and Other Migratory Birds

- If possible, construction should be scheduled between October and December (inclusive) to avoid the nesting season. If this is not possible, pre-construction surveys for nesting raptors and other migratory breeding birds shall be conducted by a qualified ornithologist to identify active nests that may be disturbed during project implementation. Between January and April (inclusive) pre-construction surveys shall be conducted no more than 14 days prior to the initiation of construction activities or tree relocation or removal. Between May and August (inclusive), pre-construction surveys shall be conducted no more than thirty (30) days prior to the initiation of these activities. The surveying ornithologist shall inspect all trees in and immediately adjacent to the construction area for nests. If an active nest is found in or close enough to the construction area to be disturbed by these activities, the ornithologist shall, in consultation with the California Department of Fish and Game, designate a

construction-free buffer zone (typically 250 feet for raptors and 100 feet for other birds) around the nest, which shall be maintained until after the breeding season has ended and/or a qualified ornithologist has determined that the young birds have fledged. The applicant shall submit a report indicating the results of the survey and any designated buffer zones to the satisfaction of the Director of Planning, Building and Code Enforcement prior to the issuance of any grading or building permit.

CONCLUSION

The implementation of the above standard measures and mitigation measure would reduce the project's impact on biological resources to a **less-than-significant impact with mitigation**.

5. CULTURAL RESOURCES

Archaeological Resource Management conducted an architectural and historical evaluation dated August 31, 2011 that is included in the Technical Appendix.

SETTING

Prehistoric Cultural Resources

The project site is not located within a sensitive archaeological resource area as outlined on the maps on file at the City of San Jose Planning Division. There are no known cultural sites on the project site, nor does the site have any natural features of significant scenic value or with rare or unique characteristics.

Historic Cultural Resources

An historical and architectural evaluation of the existing structure(s) the project site was conducted to determine their significance, if any.

Historic Evaluation

The property at 980 Morse Street made up a portion of Lots 6, 7 and 8 of Block 5, as shown on the map entitled "Map of the Survey of the Chapman & Davis Tract" filed on February 1, 1877. The existing residence was constructed in 1959. At that time, the property was owned by James E. McKenna. James McKenna died on February 3, 1972, and the property passed to Evelyn M. McKenna and Margaret L. McKenna. Margaret McKenna died in 2002, leaving Evelyn McKenna as the sole owner. The property was sold to Martin G. Quintana in 2004; however, the property was granted via trustee's deed to HSBC Bank USA in 2010. The property changed hands again in January, 2011 when it was sold to the current owners, Green Valley Corporation.

Architectural Evaluation

The residence at 980 Morse Street is a single story, Ranch style home in good condition. The roof is hipped and surfaced with composition shingles. A single large gabled bay juts from the center of the front façade. The eaves are broad and open, with exposed rafters, typical of the Ranch style. The exterior walls are surfaced with stucco, with a low cut-stone runner along the front façade. The windows are aluminum framed, in a combination of sliding and casement configurations. The rear of the residence is characterized by patios with broad overhanging awnings, covered by corrugated metal sheeting. The area between the main house and the garage consists of an enclosed breezeway, with a darkened glass panel door and flanking windows towards the front façade.

Also present on the property is a small storage shed, surfaced with corrugated metal sheeting. The storage shed is in poor condition.

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
5. CULTURAL RESOURCES. Would the project:					
a. Cause a substantial adverse change in the significance of an historical resource as defined in CEQA Guidelines §15064.5?			X		25, 45,46,101
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines §15064.5?			X		27,44
c. Directly or indirectly destroy a unique paleontological resource or site, or unique geologic feature?				X	27,47
d. Disturb any human remains, including those interred outside of formal cemeteries?			X		27

Prehistoric Cultural Resources and Native American Burials

The project site is not located within a sensitive archaeological resource area and there is no basis to warrant subsurface investigations or monitoring during construction at this time; therefore, the project would not have a significant impact on known archaeological resources. Although they are not expected to be found at this location, Native American burials are protected by State law.

Historic Cultural Resources

The McKenna property was evaluated using the criteria or standards of the City of San Jose Historic Preservation Ordinance and those of the California Register of Historic Resources and National Register of Historic Places.

Prior to considering the architectural quality, a property is evaluated to determine if it retains architectural integrity and is representative of a style or age of which there are few or very limited representations in San Jose. To consider the attributes of a candidate property, it is necessary to define the historical context and the period of significance. The significant era for context evaluation was the Post-War Era. The home is not associated with any known significant historical events or persons. Although it is an example of the Ranch style, it is not an exceptional or fine example of that style.

The City of San Jose's criteria for historical significance are described in the report in the Technical Appendix. Based on these criteria, the San Jose Historical Landmarks Commission has established a process by which historical resources are evaluated for significance and a numerical value is assigned. Scores of 32 or less are not eligible for a category of significance. Scores above 33 are to be evaluated for Landmark Status and California Register of Historic Resources eligibility. The property and structures received 16.8 points under the City of San

Jose Historic Evaluation criteria and are not eligible for a category of significance. The historic evaluation tally forms are included in the Technical Appendix.

The National Register of Historic Places has established standards for evaluating the significance of resources that are important in the heritage of the nation. The criteria for listing historical resources in the California Register of Historic Resources are consistent with those developed by the National Park Service for listing resources in the National Register of Historic Places, but have been modified for State use in order to include a range of historical resources that better reflect the history of California. The property does not meet the levels of significance for listing in the National Register and does not appear to qualify for the California Register. Demolition of the building would not appear to create a significant effect on the environment because the property does not appear to qualify for the California Register.

STANDARD MEASURES INCLUDED IN THE PROJECT

Prehistoric Cultural Resources

- In the unlikely event that evidence of unknown prehistoric cultural resources (darker than surrounding soils containing evidence of fire – ash, charcoal, fire affected rock or earth; concentrations of stone, bone or freshwater shellfish; artifacts of these materials; and burials, both animal and human) is discovered during construction, work within 50 feet of the find will be stopped to allow adequate time for evaluation and mitigation, and a qualified professional archaeologist called in to make an evaluation; the material will be evaluated; and if significant, a mitigation program including collection and analysis of the materials prior to the resumption of grading, preparation of a report and curation of the materials at a recognized storage facility will be developed and implemented to the satisfaction of the Director of Planning, Building and Code Enforcement, who will receive a copy of the report.

Native American Burials

- Pursuant to Section 7050.5 of the Health and Safety Code, and Section 5097.94 of the Public Resources Code of the State of California: In the event of the discovery of human remains during construction, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains. The Santa Clara County Coroner will be notified by the developer and will make a determination as to whether the remains are Native American. If the Coroner determines that the remains are not subject to his authority, he will notify the Native American Heritage Commission, who will attempt to identify descendants of the deceased Native American. If no satisfactory agreement can be reached as to the disposition of the remains pursuant to this State law, then the landowner will reinter the human remains and items associated with Native American burials on the property in a location not subject to further subsurface disturbance.

- Any Native American human remains that are discovered and would be subject to disturbance will be removed and analyzed, a report will be prepared, and the remains will be

reburied in consultation and agreement with the Native American Most Likely Descendant designated by the Native American Heritage Commission. Prior to obtaining a Certificate of Occupancy, a copy of the report will be submitted to the satisfaction of the Director of Planning, Building and Code Enforcement.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would reduce the project's impact on cultural resources to a **less-than-significant impact**.

6. GEOLOGY AND SOILS

Cornerstone Earth Group conducted a geotechnical investigation dated September 13, 2011 that is included in the Technical Appendix.

SETTING

Topography

The project site has a uniform southerly slope of approximately one-half percent. Elevations on the site range from approximately 76 feet above sea level along the southerly boundary to approximately 77 feet above sea level at the northerly boundary. There are no significant topographical features on the site.

Geology

The project site is underlain by Quaternary alluvium (Qal), which consists of unconsolidated to weakly consolidated silt, sand and gravel. Quaternary alluvium includes Holocene and late Pleistocene alluvium and minor amounts of beach and dune sand and marine terrace deposits.

Geologic Hazard Zone

The project site is not located in a geologic hazard zone as mapped by the City of San Jose in accordance with the Geologic Hazards Ordinance.

Soils

The project site is underlain by the alluvial soils of the Yolo association as classified by the U.S. Department of Agriculture, Soil Conservation Service. Sunnyvale silty clay, drained (Sv) is the specific soil type identified at the site. Sunnyvale silty clay, drained is characterized by a dark gray, granular, hard, slightly calcareous surface layer approximately 11 to 18 inches thick; moderately good natural drainage; slow subsoil permeability; ponded surface runoff; no erosion hazard; high inherent fertility (Class II); and a high shrink/swell capacity.

The site is mapped within a hazard zone for liquefaction on the State's *Seismic Hazard Zones* maps. According to Cooper-Clark and Associates' *San Jose Geotechnical Investigation*, the site is mapped as having a moderately high ground failure potential, weak soil layers and lenses occurring at random locations and depths, highly expansive soils, no erosion potential, and no susceptibility to landslides. The liquefaction potential is considered to warrant further geologic study at the environmental review stage. The remainder of the soils conditions can be managed using standard engineering measures and do not require further geologic study at this time as part of the environmental review process, but may require further analysis prior to the issuance of a grading or building permit.

Faulting

There are no identified earthquake faults mapped on the site, and the site is not mapped within a designated Alquist-Priolo Earthquake Fault Zone (formerly Special Studies Zone) or within a City of San Jose Fault Hazard Zone. The nearest active fault zones are the Hayward and Calaveras Faults, which are mapped approximately 7.8 and 9.1 miles respectively to the northeast, and the San Andreas Fault, which is mapped approximately 10.8 miles to the southwest.

Geotechnical Investigation

The geotechnical investigation consisted of field and laboratory programs to evaluate the physical and engineering properties of the subsurface soils and an engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls and pavements. The investigation included a site reconnaissance, advancement of two Cone Penetration Test (CPT) borings and one hand-auger boring to analyze subsurface soils, laboratory testing of selected soil samples, analysis of the data, and formulation of conclusions and recommendations.

Field Investigation

A surface reconnaissance of the site was performed on August 29, 2011. Two CPT borings were advanced on the site to a maximum depth of 50 feet below the existing ground surface (bgs). The approximate locations and logs of the CPT tests are included in the report in the Technical Appendix. The site is underlain by predominantly medium stiff to very stiff clay to the maximum depth explored. The clay is interbedded with silty and sandy soils; those strata range from less than one foot to about 12 feet, and are generally located at depths of approximately 23 and 40 feet. Groundwater was estimated to be at depths of approximately 15 to 20 feet; however, seasonal and/or historical high groundwater on the order of about 13 feet below the ground surface could be expected for the site vicinity.

Laboratory Testing

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. Two Plasticity Index tests were performed. The results of the laboratory testing program, which are included in the report in the Technical Appendix, indicate that the surficial clayey soil is highly expansive.

Investigative Conclusions

The project site is considered suitable from a geotechnical perspective for construction of the proposed development, providing the report recommendations are incorporated into the project plans and specifications. The primary geotechnical concerns are seismic shaking and the presence of the highly expansive clayey soil blanketing the site.

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
6. GEOLOGY AND SOILS. Would the project:					
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: 1) Rupture of a known earthquake fault, as described 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.)				X	50, 53,54,102
2) Strong seismic ground shaking?			X		27,52,102
3) Seismic-related ground failure, including liquefaction?			X		31, 52,56,102
4) Landslides?				X	50,56
b. Result in substantial soil erosion or the loss of topsoil?			X		51,52
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?			X		52,102
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?			X		51,52,102
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X	28

The site is mapped as having weak soil layers and lenses occurring at random locations and depths, no erosion potential, and no susceptibility to landslides. The site is not subject to tsunamis or seiches.

General

All earthwork and foundation plans and specifications will comply with the recommendations of the geotechnical investigation by Cornerstone Earth Group. The geotechnical report lists approximately 45 recommendations that are included in the project for earthwork, utility trenches, drainage, foundations, slabs-on-grade, vehicular pavement design, and retaining walls, most of which reflect standard engineering practices that are required for similar projects. Site-specific conditions are described below.

Expansive Soils

Expansive soils shrink and swell as a result of moisture changes. The surface soils on the site pose a hazard to building foundations because of their high shrink/swell potential. Measures for buildings on expansive soils include drainage control and the use of special foundations. Drainage will be controlled and directed away from the structure and pavements. To reduce the potential for damage to the planned structures, foundation footings will extend below the zone of seasonal moisture fluctuation and slab-on grades will be underlain by a non-expansive fill layer.

Erosion

Development of the project site may subject the soils to accelerated erosion. In order to minimize erosion, erosion control measures such as those described in the Association of Bay Area Governments (ABAG) *Manual of Standards for Erosion & Sediment Control Measures* will be incorporated into the project.

Seismic Hazards

Ground Rupture

Ground rupture (surface faulting) tends to occur along lines of previous faulting. As the site is not located within a State of California Earthquake Fault Hazard Zone and there are no known active faults on the site, the potential for ground rupture due to an earthquake is low.

Seismic Shaking

The maximum seismic event occurring on the site would probably be from effects originating from the Hayward, Calaveras, or San Andreas fault systems. Ground shaking effects can be expected in the area during a major earthquake originating along any of the active faults within the Bay Area. At present, it is not possible to predict when or where movement will occur on these faults. It must be assumed, however, that movement along one or more of these faults will result in a moderate or major earthquake during the lifetime of any construction on this site. The effects on development would depend on the distance to the earthquake epicenter, duration, magnitude of shaking, design and quality of construction, and geologic character of materials underlying foundations.

The maximum credible earthquake, which is defined as *"the maximum earthquake that appears capable of occurring under the presently known framework"*, for the San Andreas Fault ranges from magnitude 8.0 to 8.3; and from magnitude 7.0 to 7.5 for either the Hayward or Calaveras Faults. The maximum probable earthquake, which is defined as *"the maximum earthquake that is likely to occur during a 100-year interval"*, for the San Andreas Fault ranges from magnitude 7.5 to 8.5; from magnitude 6.75 to 7.5 for the Hayward Fault; and from magnitude 6.5 to 7.0 for the Calaveras Fault.

Structural damage from ground shaking is caused by the transmission of earthquake vibrations from the ground into the structure. Ground shaking is apparently the only significant threat to structures built on the site; however, it is important to note that well-designed and constructed

structures that take into account the ground response of the soil or rock in their design usually exhibit minor damage during earthquake shaking.

The proposed structures on the site will be designed and constructed in conformance with the Uniform Building Code Guidelines for Seismic Zone 4 to avoid or minimize potential damage from seismic shaking on the site.

Liquefaction

Soil liquefaction is a phenomenon in which saturated, cohesionless soil layers located close to the ground surface lose strength during cyclic loading, such as imposed by earthquakes. During the loss of strength, the soil acquires a "mobility" sufficient to permit both horizontal and vertical movements. Soils that are most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained sands. The conditions at this site are such that the potential for this phenomenon to occur is considered to be low.

Other Secondary Seismic Effects

Based on the topographic and lithologic data, the risk of lateral spreading, sand boils and/or seismic settlement is considered low at the site.

STANDARD MEASURES INCLUDED IN THE PROJECT

Erosion

- A City-approved Erosion Control Plan shall be developed prior to approval of a grading permit or Public Works clearance with such measures as: 1) the timing of grading activities during the dry months, if feasible; 2) temporary and permanent planting of exposed soil; 3) temporary check dams; 4) temporary sediment basins and traps; and/or 5) temporary silt fences. The provisions of the Erosion Control Plan shall be implemented to the satisfaction of the Director of Planning, Building and Code Enforcement.

Seismic Shaking

- The proposed structures on the site will be designed and constructed in conformance with the Uniform Building Code Guidelines for Seismic Zone 4 to avoid or minimize potential damage from seismic shaking on the site.

Liquefaction

- The geotechnical investigation addressing the potential hazard of liquefaction will be submitted to, and reviewed and approved by, the City Geologist prior to issuance of a grading permit or Public Works clearance. The investigation should be consistent with the guidelines published by the State of California (CDMG Special Publication 117) and the Southern California Earthquake Center ("SCEC") report.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would reduce the project's impact on geology and soils to a **less-than-significant impact**.

7. GREENHOUSE GAS EMISSIONS

SETTING

Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs has been implicated as a driving force for global climate change. Definitions of climate change vary between and across regulatory authorities and the scientific community, but in general can be described as the changing of the earth's climate caused by natural fluctuations and anthropogenic activities which alter the composition of the global atmosphere.

California State law defines greenhouse gases as including, but not limited to:

Carbon Dioxide (CO_2)	Hydrofluorocarbons
Methane (CH_4)	Perfluorocarbons
Nitrous Oxide (N_2O)	Sulfur Hexafluoride

The overall approach to the GHG discussion is based upon the technical advisory of the Governor's Office of Planning and Research (OPR) embodied in the document *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*. According to the Governor's OPR, the most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide. The last three of the six identified GHGs are primarily emitted by industrial facilities. For this discussion, only carbon dioxide, methane and nitrous oxide emissions are considered. These primary greenhouse gases are described below.

Carbon dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent. Carbon dioxide is the most widely emitted GHG and is the reference gas [Global Warming Potential (GPW) of 1] for determining GWPs for other GHGs.

Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation. Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 21.

Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.

Greenhouse Gas Effects

There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming, although there is uncertainty concerning the magnitude and rate of the warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

Greenhouse Gas Regulations

Federal

In September, 2009, the EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

In April, 2009, EPA published their Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding) in the Federal Register. The Administrator proposed the finding that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CCA. The final finding was released on December 7, 2009. The findings do not, in and of themselves, impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed earlier this year for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation.

State

State greenhouse gas regulations consist of:

- Assembly Bill (AB) 1493 (2002), that required ARB to develop and adopt regulations that achieve "*the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state*";
- AB 32 (2006) California Global Warming Solutions Act, which required CARB to design and implement emission limits, regulations and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020 (representing a 25 percent reduction in emissions);
- AB 32 Climate Change Scoping Plan (2008), which was adopted by CARB to meet the 2020 greenhouse gas reduction limits outlined in AB 32. In order to meet these goals, California must reduce its greenhouse gases by 30 percent below projected 2020 levels, or about 10 percent from today's levels;
- SB 97 (2007), which acknowledged climate change is a prominent environmental issue that requires analysis under CEQA and directed the Governor's Office of Planning and

Research (OPR) to prepare, develop and transmit guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA;

- SB 375 (2008), which aligned regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation;
- Executive Order S-3-05 (2005), which, in recognition of California's vulnerability to the effects of climate change, set forth a series of target dates by which statewide emission of GHGs would be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The executive order also directed the Secretary of the California EPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels;
- Executive Order S-13-08 (2008), which directed California to develop methods for adapting to climate change (sea level rise) through preparation of a statewide plan; and
- Executive Order S-1-07 (2007), which proclaimed the transportation sector as the main source of GHG emissions in California (over 40 percent of statewide GHG emissions) and established a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

Regional

The Bay Area Air Quality Management District (BAAQMD) has established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the Bay Area. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local government and other interested parties, and promotion of collaborative efforts among stakeholders.

Local

The Green Building Policy for Private Sector New Construction (Policy 6-32), which was adopted by the City Council in 2008, demonstrates the City's commitment to environmental, economic and social stewardship, to yield cost savings through reduced operating costs, to provide healthy work environments, and to contribute to the City's goals of protecting, conserving and enhancing the region's environmental resources. The Policy uses third-party Green Building Certification levels of Leadership in Energy and Environmental Design (LEED) or Build It Green (BIG) as green building standards. Adherence to these standards would result in energy efficiency levels from 10 to 15 percent better than those achieved with the 2009 Title 24 California Efficiency Standards.

Sources of Greenhouse Gas Emissions

Anthropogenic GHG emissions worldwide as of 2005 totaled approximately 30,800 CO_2 equivalent million metric tons ($MMTCO_2E$). The United States was the top producer of greenhouse gas emissions as of 2005. The primary greenhouse gas emitted by human activities

in the United States was CO_2, representing approximately 84 percent of total GHG emissions. Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 80 percent of US GHG emissions

The primary contributors to GHG emissions in California are transportation, electric power production from both in-state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions are presented in the following table.

Table 5. Greenhouse Gas Sources in California, 2004

Source	Annual GHG Emissions ($MMTCO_2E$)	Percent of Total
Agriculture	27.9	5.8
Commercial Uses	12.8	2.6
Electricity Generation	119.8	24.7
Forestry (*Excluding Sinks**)	0.2	0.0
Industrial Uses	96.2	19.9
Residential Uses	29.1	6.0
Transportation	182.4	37.7
Other	16.0	3.3
Total	484.4	100.0

* *Emissions are for the forestry industry. Forests, themselves, are a sink for carbon dioxide, as photosynthesis removes carbon dioxide from the atmosphere.*

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
7. GREENHOUSE GAS EMISSIONS. Would the project:					
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X		29,39
b. Conflict with an applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?			X		26,29,39

Standards

The BAAQMD adopted *CEQA Guidelines* significance thresholds for GHG emissions that include quantitative thresholds of significance for GHG emissions. The *Guidelines* provide that a development project, other than a stationary source, would have a significant cumulative impact unless:

- The project can be shown to be in compliance with a qualified Climate Action Plan; or

- Project emissions of CO_2 equivalent GHGs (CO_2e) are less than 1,100 metric tons per year; or
- Project emissions of CO_2 equivalent GHGs are less than 4.6 metric tons per year per service population (residents plus employees).

Greenhouse Gases and Climate Change

The project's incremental increases in GHG emissions associated with traffic increases and direct and indirect energy use would contribute to regional and global increases in GHG emissions and associated climate change effects. The City of San Jose does not currently have a qualified Climate Action Plan. According to the BAAQMD's *CEQA Guidelines*, projects below the applicable screening criteria (single family residential – 56 du's) would not exceed the 1,100 metric tons per year of CO_2-eq GHG threshold of significance. Therefore, the proposed 4-unit single family residential development would not have a significant impact on GHG emissions.

Green Design

The Green Building Policy for Private Sector New Construction (Policy 6-32) demonstrates the City's commitment to environmental, economic and social stewardship, to yield cost savings through reduced operating costs, to provide healthy work environments, and to contribute to the City's goals of protecting, conserving and enhancing the region's environmental resources. The Policy uses third-party Green Building Certification levels of Leadership in Energy and Environmental Design (LEED) or Build It Green (BIG) as green building standards. Adherence to these standards would result in energy efficiency levels from 10 to 15 percent better than those achieved with the 2009 Title 24 California Efficiency Standards. The project will be designed to be consistent with the Green Building Policy.

In addition the California Building Standards Commission (CBSC) recently adopted statewide green building standards. Known as CALGREEN, the regulations went into effect on January 1, 2011. The 2010 Green Building Standards Code require:

- 20 percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35 and 40 percent reductions;
- Separate water meters for non-residential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects;
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects;
- Mandatory inspections of energy systems (i.e., heat furnace, air conditioner, mechanical equipment) for non-residential buildings over 10,000 square feet; and
- Low-pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring and particle board.

STANDARD MEASURES INCLUDED IN THE PROJECT

Green Design

- The project will be reviewed for conformance to the Green Building Policy (Policy 6-32) at the PD Permit stage.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measure would ensure the project will have a **less-than-significant impact** on greenhouse gas emissions.

8. HAZARDS AND HAZARDOUS MATERIALS

SETTING

Wells
There are no known existing active or abandoned water wells located on the project site.

Pesticides
There are no known pesticides currently used on the site for either agricultural production or landscape maintenance operation.

Hazardous Materials
The project site area has been part of a residential subdivision since 1876 with no agricultural activities and there are no known hazardous materials currently being used as a part of a present business operating on the site.

Service Station
The project site has never been occupied by a gas station and/or auto repair facility.

Underground Storage Tank
The project site does not have underground storage of chemicals and has not used underground storage tanks.

The project site is not listed on any local, State and/or Federal regulatory database due to hazardous materials contamination (i.e., leaking underground storage tanks database, etc.).

Soil/Groundwater Testing / Remediation
No known soils/groundwater tests have ever been performed on the project site in relation to potential hazardous materials contamination. No known remediation of hazardous materials has ever been performed on the project site.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
8. HAZARDS AND HAZARDOUS MATERIALS. Would the project:					
a. Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?			X		26,27,28
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X	28

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
8. HAZARDS AND HAZARDOUS MATERIALS (Cont.). Would the project:					
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?				X	27,28
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?				X	58
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?				X	27,71
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?				X	27,71
g. Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?				X	27
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?				X	25, 27,61,62

The project site is not located within the Santa Clara County Airport Land Use Commission (ALUC) jurisdiction, nor is it on one of the City's designated evacuation routes. The site also is not located within an area subject to wildfires.

Demolition

The project proposes the demolition of a structure(s) that may contain hazards such as asbestos-containing materials (ACM) or lead based paint (LBP). The structures to be removed should be surveyed for the presence of ACM and/or LBP. If any suspect ACM are present, they should be sampled prior to demolition and removed in accordance with National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Cal-OSHA requirements, if warranted. Notification must also be made to the Bay Area Air Quality Management District (BAAQMD). If any suspect LBP is present, it should be sampled prior to demolition and removed in accordance with EPA, OSHA and BAAQMD requirements, if warranted.

STANDARD MEASURES INCLUDED IN THE PROJECT

Asbestos-Containing Materials

- The structure(s) to be removed will be surveyed for the presence of asbestos-containing materials (ACM) at the demolition permit stage; and if any suspect ACM are present, they will be sampled prior to demolition in accordance with NESHAP guidelines, and all potentially friable ACM will be removed prior to building demolition and disposed of by offsite burial at a permitted facility in accordance with NESHAP, Cal-OSHA and BAAQMD requirements.

Lead Based Paint

- The structure(s) to be removed will be surveyed for the presence of lead based paint (LBP) at the demolition permit stage; and if any suspect LBP is present, it will be sampled prior to demolition, and all potential LBP will be removed prior to building demolition and disposed of by offsite burial at a permitted facility in accordance with EPA and OSHA requirements.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would reduce the project's impact on hazards and hazardous materials to a **less-than-significant impact**.

9. HYDROLOGY AND WATER QUALITY

SETTING

Waterways

There are no waterways on the project site or within 300 feet of the project site.

Flooding

The project site is not within an area of historic flooding, and according to the Federal Emergency Management Agency's (FEMA) *Flood Insurance Rate Maps*, the site is within Zone D, an area with undetermined flooding, but flooding is possible.

Water Quality

Stormwater runoff flows from the project site to the Guadalupe River via the City's storm drainage system, and then north to the San Francisco Bay.

The project site is currently covered with a single family detached house, driveway, patio, walkways and a shed, and is approximately 29 percent impervious surfaces.

Nonpoint Sources

The discharge of stormwater from the City's municipal storm sewer system is regulated primarily under the federal Clean Water Act and California's Porter-Cologne Water Quality Control Act. The San Francisco Bay Regional Water Quality Control Board (RWQCB) implements these regulations at the regional level. New construction in San Jose is subject to the conditions of the City's National Pollutant Discharge Elimination System (NPDES) Permit, which was reissued by the RWQCB in February, 2001. Additional water quality control measures were approved in October, 2001 (revised in 2005), when the RWQCB adopted an amendment to the NPDES Permit for Santa Clara County. This amendment, which is commonly referred to as "C3", requires all new and redevelopment projects that result in the addition or replacement of impervious surfaces totaling 10,000 square feet or more to: 1) include stormwater treatment measures; 2) ensure that the treatment measures be designed to treat an optimal volume or flow of stormwater runoff from the project site; and 3) ensure that stormwater treatment measures are properly installed, operated and maintained. On October 14, 2009, the RWQCB adopted the Municipal Regional Stormwater NPDES Permit No. CAS612008 for the San Francisco Bay Region; this Permit replaces current countywide municipal stormwater permits with a Municipal Regional Permit (MRP) for all 76 Bay Area municipalities in an effort to standardize stormwater requirements in the region.

The City has developed a policy that implements Provision C.3 of the NPDES Permit, requiring new development projects to include specific construction and post-construction measures for improving the water quality of urban runoff to the maximum extent feasible. The City's Post-Construction Urban Runoff Management Policy (6-29) established general guidelines and minimum Best Management Practices (BMPs) for specified land uses, and includes the

requirement of regular maintenance to ensure their effectiveness. Later, the City adopted the Post-Construction Hydromodification Management Policy (8-14) to manage development-related increases in peak runoff flow, volume and duration, where such hydromodification is likely to cause increased erosion, silt pollutant generation or other impacts to local rivers, streams and creeks. Implementation of these Policies will reduce potential water quality impacts to less-than-significant levels.

The project site is exempt from the NPDES hydromodification requirements because it is located within a subwatershed or catchment area that is greater than or equal to 65 percent impervious, based on the *Santa Clara Permittees Hydromodification Management Applicability Map.*

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
9. HYDROLOGY AND WATER QUALITY. Would the project:					
a. Violate any water quality standards or waste discharge requirements?			X		28,64,84
b. 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)?				X	25,27
c. Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			X		25,26
d. 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 that would result in flooding on- or off-site?			X		25,26
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X		26,28
f. Otherwise substantially degrade water quality?			X		26,28

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
9. HYDROLOGY AND WATER QUALITY (Cont.). Would the project:					
g. 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?				X	26,27,63
h. Place within a 100-year flood hazard area structures that would impede or redirect flood flows?				X	26,27,63
i. 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?				X	27,28
j. Be subject to inundation by seiche, tsunami or mudflow?				X	27

Flooding

The project site is not within the limits of potential inundation with the occurrence of a one percent flood and would, therefore, have no impact on 100-year flood flows. The project would not expose people to flood hazards associated with the 100-year flood. The site is not subject to seiche or tsunami. There are no existing City of San Jose storm drainage facilities in Morse Street northwesterly of McKendrie Street. The project would include an onsite underground collection system that would connect to a new 12-inch City storm drainage line that would be constructed along the Morse Street frontage. Any excess flows beyond the design capacity would pond onsite.

Erosion

The approximately 0.3 percent (90 square feet) increase in impervious surface on the site would result in a very slight increase in runoff. Increased flow and duration can contribute to downstream streambank erosion. The project would not have a direct outfall into any stream. As described above, project flows would drain through the existing storm drainage system to the Guadalupe River, which is approximately 1.2 miles northeasterly.

Water Quality

The primary impact on water quality would result from the addition of impervious surfaces, such as rooftop, driveway and street runoff. Particulates, oils, greases, toxic heavy metals, pesticides and organic materials are typically found in urban storm runoff. The project's contribution would have a potentially significant impact on water quality. Stormwater runoff could increase under project conditions as the amount of impervious surfaces (buildings and pavement) would increase by approximately 90 square feet, as shown in the following table. The proposed increase in impervious surfaces could increase the amount of stormwater discharged into the storm drainage system and the Guadalupe River. In addition, temporary construction-related activities such as clearing, grading, or excavation could result in potentially significant impacts to water quality.

Table 6. Pervious and Impervious Surfaces Comparison

Total Site: 0.626 acres* 26,642 sf		Total Disturbed Area: 0.626 acres 26,642 sf	
Area	Existing Condition of Site Area Disturbed - sf	Proposed Condition of Site Area Disturbed - sf	
		Replaced (or Remain)	New
Impervious Surfaces			
Roof Area(s)	4,749	2,145	4,081
Parking/Private Drive (paved)	2,007	0	0
Sidewalks, Patios, Paths, etc.	1,011	500	1,131
Streets (Public)	0	0	0
Streets (Private)	0	0	0
Total Impervious Surfaces	**7,767**	**2,645**	**5,212**
Pervious Surfaces			
Landscape Areas	18,869	12,222	2,516
Pervious Pavers	0	0	4,046
Other Pervious Surfaces (green roof, etc.)	0	0	0
Total Pervious Surfaces	**18,869**	**12,222**	**6,562**
Total Proposed Replaced + New Impervious Surfaces:			**7,858**
Total Proposed Replaced + New Pervious Surfaces:			**18,784**

Stormwater runoff and pollution would be reduced by the use of bioswales, pervious paving and disconnected roof drains, as shown on the Conceptual Stormwater Control Plan, Figure 18. Bioswales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream points. They both reduce the quantity and improve the quality of runoff. Bioswales would be used within some of the landscaping areas. Pervious paving will reduce runoff by allowing a portion of the water to filter into the natural ground. Roof drains that are not connected to the storm drainage system divert runoff to landscaped areas via splash blocks or pop-up drainage emitters. These measures would also provide some flow control benefit in conformance with HMP Policy provisions.

STANDARD MEASURES INCLUDED IN THE PROJECT

Water Quality

Construction

- Prior to the commencement of any clearing, grading or excavation, the project will comply with the State Water Resources Control Board's National Pollutant Discharge Elimination System (NPDES) General Construction Activities Permit, to the satisfaction of the Director of Public Works, as follows:

- The applicant will develop, implement and maintain a Storm Water Pollution Prevention Plan (SWPPP) to control the discharge of stormwater pollutants including sediments associated with construction activities; and
- The applicant will file a Notice of Intent (NOI) with the State Water Resources Control Board (SWRCB).

- The project will incorporate Best Management Practices (BMPs) into the project to control the discharge of stormwater pollutants including sediments associated with construction activities.

- The project applicant will comply with the City of San Jose Grading Ordinance, including erosion and dust control during site preparation and with the City of San Jose Zoning Ordinance requirements for keeping adjacent streets free of dirt and mud during construction. The following specific BMPs will be implemented to prevent stormwater pollution and minimize potential sedimentation during construction:
  - Restriction of grading to the dry season (April 15 through October 15) or meet City requirements for grading during the rainy season;
  - Utilize onsite sediment control BMPs to retain sediment on the project site;
  - Utilize stabilized construction entrances and/or wash racks;
  - Implement damp street sweeping;
  - Provide temporary cover of disturbed surfaces to help control erosion during construction; and
  - Provide permanent cover to stabilize the disturbed surfaces after construction has been completed.

Post-Construction

- Prior to the issuance of a Planned Development Permit, the applicant must provide details of specific BMPs including, but not limited to, bioswales, disconnected downspouts, landscaping to reduce impervious surface area, and inlets stenciled "No Dumping – Flows to Bay" to the satisfaction of the Director of Planning, Building and Code Enforcement.

- The project will comply with the Municipal Regional Stormwater NPDES Permit No. CAS612008, which provides enhanced performance standards for the management of stormwater of new development.

- The project will comply with applicable provisions of the following City Policies – 1) Post-Construction Urban Runoff Management Policy (6-29) which establishes guidelines and minimum BMPs and numerically-sized (or hydraulically-sized) Treatment Control Measures (TCMs) for all projects; and 2) Post-Construction Hydromodification Management Policy (8-14) which provides for hydromodification measures.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would ensure the project will have a **less-than-significant impact** on hydrology and water quality.

10. LAND USE AND PLANNING

SETTING

General Plan

The land use designation for the project site on the *Envision San Jose 2040 General Plan* Land Use/ Transportation Diagram is Residential Neighborhood, as shown on the preceding General Plan Map, Figure 5.

Special Areas

The project site is not located within any of the following special areas:

- Midtown Planned Community and Specific Plan Area
- Jackson – Taylor Planned Residential Community
- Communications Hill Planned Residential Community
- Evergreen Planned Residential Community
- Berryessa Planned Residential Community
- Silver Creek Planned Residential Community
- Alviso Master Plan Area
- Tamien Specific Plan Area
- Downtown Strategy Plan Area
- North San Jose (Rincon de Los Esteros Redevelopment Area)
- Edenvale Redevelopment Area
- Martha Gardens Planned Community

Zoning

The project site is currently zoned R-1-8, Single Family Residence District, as shown on the preceding Zoning Map, Figure 6. The project is an application to rezone the site to A(PD) Planned Development District in accordance with the proposed General Development Plan.

Existing and Surrounding Uses

The project site is currently single family residential (1 house). Previous uses of the site are unknown. Land uses surrounding (within 500 feet of) the project site include: Interstate 880 (I-880) freeway and/or ramps to the north and east; single family detached residential to the south; and single family detached residential and a church to the west.

Habitat Conservation Plan / Natural Community Conservation Plan (HCP/NCCP)

As discussed in the preceding Biological Resources section, the City of San Jose, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, Santa Clara County and the cities of Gilroy and Morgan Hill are preparing a joint Habitat Conservation Plan/Natural Community Conservation Plan. The Habitat Plan is being developed in association with the USFWS, CDFG and NMFS and in consultation with stakeholder groups and the general public to protect and enhance ecological diversity and function within more than 500,000 acres of southern Santa Clara County. The Interim Project Referral Process requires the local participating agencies to notify the wildlife agencies (CDFG and USFWS) of projects that have the potential to adversely impact covered species or natural communities, or conflict with the preliminary conservation objectives of the Habitat Plan.

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
10. LAND USE AND PLANNING. Would the project:					
a. Physically divide an established community?				X	25,26
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?			X		29,68
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?				X	25,26,28

Projects that have the potential to physically divide an established community include new freeways and highways, major arterial streets, and railroad lines. The proposed project will not physically divide an established community.

General Plan

The project conforms to the Residential Neighborhood land use designation for the project site on the *Envision San Jose 2040 General Plan* Land Use/Transportation Diagram. It is consistent with the prevailing neighborhood character in density, lot size and shape, massing, form and pattern and is close to the typical 8 DU/AC density called for in this designation with a density of 7.7 DU/AC.

Compatibility

The project would change the land use on the site from one single family detached residential unit to a 4-unit single family detached residential development in accordance with the General Plan land use designation. Residential use is compatible with the surrounding area. Development of the project site would introduce three new homes to the area. These uses would change the view of the site and would generate increases in traffic, noise and air pollution in the area that would not be significant.

The proposed project will be subject to architectural and site design review by the City at the Planned Development Permit stage. Such review will include conformance with the City's adopted Residential Design Guidelines. The Guidelines are intended to ensure that new development is compatible with existing neighborhood character and does not adversely impact neighboring residential uses. A less-than-significant impact would occur as a result of the project.

Habitat Conservation Plan / Natural Community Conservation Plan (HCP/NCCP)
The project site does not meet the threshold that requires an interim Habitat Conservation Plan project referral.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The proposed project would have a **less-than-significant impact** on land use and planning

11. MINERAL RESOURCES

SETTING

Extractive resources known to exist in and near the Santa Clara Valley include cement, sand, gravel, crushed rock, clay and limestone. Santa Clara County has also supplied a significant portion of the nation's mercury over the past century. Pursuant to the mandate of the Surface Mining and Reclamation Act of 1975 (SMARA), the State Mining and Geology Board has designated the Communications Hill Area, bounded generally by the Southern Pacific Railroad, Curtner Avenue, State Route 87 and Hillsdale Avenue, as the only area in San Jose containing mineral deposits that are of regional significance as a source of construction aggregate materials.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
11. MINERAL RESOURCES. Would the project:					
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?				X	27,29,47
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?				X	27,29,47

Since the project site is outside of the Communications Hill area, there will be no impact on any known important mineral resource.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The proposed project would have **no impact** on mineral resources.

12. NOISE

Edward L. Pack Associates, Inc. conducted a traffic noise assessment study dated October 24, 2011 that is included in the Technical Appendix.

SETTING

Existing Noise Sources

Noise intrusion over the site originates primarily from vehicular traffic sources on Interstate 880 (I-880), which carries an Average Daily Traffic (ADT) volume of 153,000 vehicles along the site. I-880 is approximately 17 feet below the elevation of the site. The site is relatively flat and at-grade with Morse Street; noise from traffic on Morse Street does not impact the site.

ALUC Noise Zone

The project site is not located within an Airport Land Use Commission (ALUC) Noise Zone (65 dB CNEL).

Measurements

Noise levels are described in terms of the Day-Night Sound Level (DNL), which is the 24-hour noise descriptor used by the City of San Jose to define acceptable noise levels. These values are calculated from the energy equivalent level (L_{eq}) as outlined in the noise assessment in the Technical Appendix.

To obtain the L_{eq} values, continuous sound level recordings were taken at a location 144 feet from the centerline of I-880, 25 feet from the existing soundwall near the property line of Morse Street. The measurements were made on October 12-14, 2011 for a continuous 48-hour period. Calculations, which included the L_{max}, L_1, L_{10}, L_{50}, L_{90}, L_{min} and L_{eq}, result in a DNL value of 62 to 64 dB at the most impacted dwelling (Lot A) along I-880.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
12. NOISE. Would the project result in:					
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?		X			26,29, 68,70,103
b. Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?				X	25,27
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X		25,26,28

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
12. NOISE (Cont.). Would the project result in:					
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X		25,26,28
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?				X	27,71
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?				X	27,71

Standards

Noise criteria that apply to the project are included in the City of San Jose General Plan, which establishes a policy of requiring noise mitigation from transportation noise for residential land use where the exterior level exceeds 60 dB DNL and/or the interior level exceeds 45 dB DNL. It is recognized, however, that attainment of the exterior noise quality levels in the vicinity of San Jose International Airport, the Downtown Core Area and along major roadways may not be achieved within the time frame of the General Plan. In these areas, an exterior noise goal of 65 dB DNL is acceptable where it is not feasible to reduce the exterior noise level to 60 dB DNL.

Equipment-Generated Noise

The San Jose Zoning Ordinance contains performance standards for the generation of noise at adjacent properties. In summary, noise generation is limited to 55 dB at residential property lines and 60 dB at commercial property lines.

Exterior Noise Exposures

Onsite measurements and calculations determined that the maximum DNL for the most impacted dwelling (Lot A) along I-880 under existing traffic conditions is 62 to 64 dB.

To fully assess the impact of traffic noise on the project, future traffic levels must also be considered. Future traffic volumes on I-880 along the site are not available; however, projected increases, as described in the report in the Technical Appendix, estimate an ADT of 157,107 vehicles in the year 2029. The future year 2029 noise exposure along I-880 is calculated to yield a less than 0.5 dB increase in traffic noise levels, which is negligible. Thus, the existing and future 62 to 64 dB DNL at the most impacted dwelling (Lot A) along I-880 would exceed the City of San Jose policy level but would be within the acceptable 65 dB DNL along major

roadways due to the infeasibility of increasing the height of the existing noise barrier along the freeway right-of-way.

Interior Noise Exposures

To determine the interior DNL values, a 25 dB attenuation factor was applied to the measured exterior exposure. This factor represents an annual average condition; i.e., assuming that windows with 1/2-inch dual-pane thermal insulating glass are kept closed all the time and 100 percent mechanical ventilation is provided. Interior noise exposures in the most impacted second floor living spaces (Lot A) would be up to 47 dB DNL under existing and projected future (2029) traffic conditions. Thus, the interior exposure would be up to 2 dB in excess of the 45 dB interior limit of the General Plan.

Project Traffic Noise

As described in the following Transportation / Traffic section, the proposed project would generate approximately 30 net new average daily trips. As traffic would normally have to double to create a significant noise impact, traffic generated by this project is not expected to substantially increase noise levels in the project area.

Equipment Generated Noise

The project should incorporate measures to reduce noise from air conditioning units and other stationary equipment to acceptable levels. These measures, which may include equipment selection and location and, if necessary, equipment enclosures, will be determined during the design phase.

Temporary Construction Noise

During construction, the site preparation and construction phase would generate temporary sound levels ranging from approximately 70 to 90 dBA at 50 foot distances from heavy equipment and vehicles. These construction vehicles and equipment are generally diesel powered, and produce a characteristic noise that is primarily concentrated in the lower frequencies.

The powered equipment and vehicles act as point sources of sound, which would diminish with distance over open terrain at the rate of 6 dBA for each doubling of the distance from the noise source. For example, the 70 to 90 dBA equipment peak noise range at 50 feet would reduce to 64 to 84 dBA at 100 feet, and to 58 to 78 dBA at 200 feet. Therefore, during the construction operations, sound level increases of 20 to 40 dBA due to these sources could occur near the project boundary.

Since construction is carried out in several reasonably discrete phases, each has its own mix of equipment and consequently its own noise characteristics. Generally, the short-term site preparation phase, which requires the use of heavy equipment such as concrete crushers, bulldozers, scrapers, trenchers, trucks, etc., would be the noisiest. The ensuing building

construction and equipment installation phases would be quieter and on completion of the project, the area's sound levels would revert essentially to the traffic levels.

STANDARD MEASURES INCLUDED IN THE PROJECT

Interior Noise

- Mechanical ventilation will be provided in accordance with Uniform Building Code requirements when windows are to be closed for noise control, to the satisfaction of the Chief Building Inspector.

Equipment Generated Noise

- Post-construction mechanical equipment will conform to the City's General Plan limitation of 55 dB DNL at residential property lines and 60 dB DNL at commercial property lines by utilizing measures such as equipment selection and location and, if necessary, equipment enclosures.

Temporary Construction Noise

- Construction activities will be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any onsite or offsite work within 500 feet of any residential unit. Construction outside of these hours may be approved through a development permit based on a site-specific construction noise mitigation plan and a finding by the Director of Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- The contractor will use "new technology" power construction equipment with state-of-the-art noise shielding and muffling devices. All internal combustion engines used on the project site will be equipped with adequate mufflers and will be in good mechanical condition to minimize noise created by faulty or poorly maintained engines or other components.

- Stationary noise-generating equipment will be located as far as possible from sensitive receptors. Staging areas will be located a minimum of 200 feet from noise-sensitive receptors, such as residential uses.

MITIGATION MEASURES INCLUDED IN THE PROJECT

Mitigation measure details and specifications are included in the noise assessment.

Exterior Noise

None required.

Interior Noise

- STC 32 or higher rated windows shall be installed at all second floor living spaces on the west, north and south sides of the home on Lot A.

- The unit on Lot A shall be equipped with a forced air ventilation system to allow the occupants the option of maintaining the windows closed to control noise, and maintain an interior noise level of 45 dB DNL.

- Prior to issuance of building permits, the developer shall retain a qualified acoustical consultant to check the building plans for all units to ensure that interior noise levels will be attenuated to 45 dB DNL to the satisfaction of the Director of Planning, Building and Code Enforcement.

CONCLUSION

The implementation of the above standard measures and mitigation measures would reduce the project's impact on noise to a **less-than-significant impact with mitigation**.

13. POPULATION AND HOUSING

SETTING

The population of the City of San Jose is approximately 945,942 (March, 2010). The project site is located in Census Tract 5004.00, which has a population of approximately 2,352 (2000 Census). There is one housing unit currently on the project site.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
13. POPULATION AND HOUSING. Would the project:					
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)?			X		25,26,28
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?			X		25,26
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?			X		25,26

The project would displace 1 existing housing unit with an estimated population of 4 persons. The project would add 4 housing units that would add approximately 14 people to the City of San Jose for a net increase of 3 housing units and approximately 10 people, which would not be a substantial increase to the City's population.

In addition, the proposed project would not result in substantial population growth because its net density of 7.7 du/ac is consistent with the *San Jose 2020 General Plan* Land Use/ Transportation Diagram designation of Medium Low Density Residential (8 DU/AC).

Growth Inducement

Direct growth inducing impacts include the construction of streets and utilities that would provide access to or capacity for additional undeveloped land. The site is bordered by developed residential and transportation uses. The project would not have a direct growth inducing impact. Indirect growth inducing impacts include increases in population and economic impacts. There would be short-term increases in employment in the construction industry. The project would not have a significant indirect growth inducing impact.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The proposed project would have **a less-than-significant impact** on population and housing.

14. PUBLIC SERVICES

SETTING

Schools

The project site is in the San Jose Unified School District (K-12). Students from the project are expected to attend:

School	Address	Approx. Distance *(miles)*	Enrollment
Trace Elementary	651 Dana Avenue	1.0	1,012
Hoover Middle	1635 Park Avenue	0.9	1,075
Lincoln High	555 Dana Avenue	1.2	1,760

None of the schools is at or over capacity; however, Trace Elementary School is close.

The District also includes several magnet schools, which offer educational options to students with special interests, talents, career goals or instructional needs; actual school attendance would also be determined by magnet and/or other school requests.

Parks

There are no developed City of San Jose neighborhood parks within walking distance (3/4 mile) of the project site. However, the 5.5-acre Municipal Rose Garden, with its lawns, pathways and benches, is located at Dana and Naglee avenues, approximately 0.9 mile to the southwest.

Fire Protection

The project site is in the service area of the San Jose Fire Department. The closest fire station is Station No. 7, located at 800 Emory Street, approximately 0.7 mile easterly of the site.

Police Protection

The project site is served by the San Jose Police Department (SJPD). The project site is within the Western Division of the SJPD's service area.

Libraries

The project site is served by the San Jose Public Library System. The closest branch library is the Rose Garden Branch, located at 1580 Naglee Avenue, approximately 0.9 mile southerly of the site.

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
14. PUBLIC SERVICES. Would the project:					
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the 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: Fire protection?			X		28
Police protection?			X		28
Schools?			X		3,28
Parks?			X		28
Other Public Facilities?			X		28

Schools

The project would add additional students to the San Jose Unified School District, as follows:

School	Enrollment	Generation Factor	Number of Students
Trace Elementary	1,012	0.173/du	1
Hoover Middle	1,075	0.099/du	1
Lincoln High	1,760	0.111/du	1

Based on the district generation factors listed above, the project would generate a total of up to 3 students. This is not considered to have a significant physical effect on the environment.

The State School Facilities Act provides for school district impaction fees for elementary and high schools and related facilities as a condition of approval to offset the increased demands on school facilities caused by residential projects. The San Jose Unified District has implemented such a fee. The one-time fee, which is based on the square footage of new habitable residential construction, would be paid prior to the issuance of a building permit.

Parks

The City of San Jose provides parks and recreation facilities within the city. Project residents would increase the demand for public park facilities; however, there is currently no City neighborhood park within the 3/4-mile reasonable walking distance standard.

Parkland Dedications

The City has established a Parkland Dedication Ordinance that requires dedication of land and/or payment of fees for neighborhood and community park or recreational purposes in accordance with the Services and Facilities and the Parks and Recreation Goals and Policies of the General Plan. There are currently no plans to dedicate land for park purposes with the project. Fees would be paid to improve park features in the area.

Fire Protection

The San Jose Fire Department provides fire protection for the city. No additional fire personnel or equipment are expected to be necessary to serve the project.

Police Protection

The San Jose Police Department provides police protection for the city. No additional police personnel or equipment are expected to be necessary to serve the project.

Libraries

The San Jose Public Library System provides library services for the city. No additional library facilities or personnel are expected to be necessary to serve the project.

STANDARD MEASURES INCLUDED IN THE PROJECT

Schools

- A school impact fee will be paid to the San Jose Unified School District to offset the increased demands on school facilities caused by the proposed project, in accordance with California Government Code Section 65996.

Parks

- The project will conform to the City's Park Impact Ordinance (PIO) and/or Parkland Dedication Ordinance (PDO) (Municipal Code Chapters 14.25 and 19.38, respectively).

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measures would ensure the project will have a **less-than-significant impact** on public services.

15. RECREATION

SETTING

There are no developed City of San Jose neighborhood parks within walking distance (3/4 mile) of the project site. However, the 5.5-acre Municipal Rose Garden, with its lawns, pathways and benches, is located at Dana and Naglee avenues, approximately 0.9 mile to the southwest.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
15. RECREATION.					
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?			X		72,73
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X	26,28

The City of San Jose provides parks and recreation facilities within the city. Project residents would increase the demand for public park facilities; however, there is currently no City neighborhood park within the 3/4-mile reasonable walking distance standard.

STANDARD MEASURES INCLUDED IN THE PROJECT

Recreation

- The project will conform to the City's Park Impact Ordinance (PIO) and/or Parkland Dedication Ordinance (PDO) (Municipal Code Chapters 14.25 and 19.38, respectively).

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The implementation of the above standard measure would ensure the project will have a **less-than-significant impact** on recreation.

16. TRANSPORTATION / TRAFFIC

SETTING

Street System

Access to the project site is provided by Morse Street, which is a 2-lane residential street that provides access to The Alameda via McKendrie Street or Hedding Street. The Alameda, in turn, provides access to Interstate 880 (I-880) to the north and to Downtown San Jose (as Santa Clara Street) to the southeast.

Public Transit

Public transit in the project area is provided by the Santa Clara Valley Transportation Authority. Local bus route 22 (Palo Alto Transit Center to Eastridge Transit Center via El Camino) and rapid bus route 522 (Palo Alto Transit Center to Eastridge Transit Center) operate along The Alameda with stops at Hedding Street. The project site is not located within 2,000 feet of a light rail station.

Congestion Management Program Analysis

A Congestion Management Program (CMP) analysis was not performed because the Santa Clara County Congestion Management Agency, which monitors regional traffic issues, does not require an analysis for small projects of less than 100 peak hour trips.

Freeway Segment Analysis

A freeway level of service analysis was not performed since project trips on freeway segments would not be greater than one percent of the capacity of the segments.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
16. TRANSPORTATION/TRAFFIC. Would the project:					
a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			X		78
b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?			X		80

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
16. TRANSPORTATION/TRAFFIC (Cont.). Would the project:					
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?				X	27,28
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible land uses (e.g., farm equipment)?				X	26,28
e. Result in inadequate emergency access?				X	26,28
f. Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				X	26,29

Trip Generation

The project traffic generation is estimated in the following table.

Table 7. Project Trip Generation

Land Use	Units/ Size	Trip Rate	Daily Trips	A.M. Peak Hour Trips In (35%)	A.M. Peak Hour Trips Out (65%)	A.M. Peak Hour Trips Total	P.M. Peak Hour Trips In (65%)	P.M. Peak Hour Trips Out (35%)	P.M. Peak Hour Trips Total
Proposed Use									
SFD Residential	4	9.9	40	1	3	4	3	1	4
Existing Use									
SFD Residential	1	9.9	10	0	1	1	1	0	1
Net New Trips			**30**	**1**	**2**	**3**	**2**	**1**	**3**

Project Impacts

The proposed project would generate a net increase of approximately 30 daily trips, with 3 a.m. and 3 p.m. net peak hour trips. This would not result in a significant impact.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The project's impact on transportation / traffic would be a **less-than-significant impact.**

17. UTILITIES AND SERVICE SYSTEMS

SETTING

Sanitary Sewers

There is an existing 8-inch City of San Jose sanitary sewer in Morse Street. Extensions within the project would be required.

Wastewater Treatment

Wastewater treatment for the City of San Jose is provided by the San Jose-Santa Clara Water Pollution Control Plant (WPCP). Capacity is expected to be available to serve the project based on the current capacity of 167 million gallons per day (MGD). The Water Pollution Control Plant is currently operating under a 120 MGD dry weather flow trigger. This requirement is based upon the State Water Resources Board and the Regional Water Quality Control Board (RWQCB) concerns over the effects of additional freshwater discharges on the saltwater marsh habitat, and pollutants loading to the South Bay from the WPCP. A Growth Management System regulates new development to assure that the capacity is not exceeded. There are programs and services in place to help minimize flows to the Plant and, while plans are in place to ensure Plant compliance with the 120 mgd trigger, those plans call for conservation and water recycling as strategies for ongoing compliance.

Water Supply

There is an existing 4-inch San Jose Water Company water line in Morse Street. Extensions within the project would be required.

Storm Drainage Facilities

There are no City of San Jose storm drainage facilities adjacent to the project site. The site currently drains via overland flow to an existing 12-inch City storm drainage line in the intersection of Morse and McKendrie streets. Extensions within the project would be required.

Solid Waste / Recycling

Residential solid waste disposal service for the project site is provided by the City of San Jose, using Garden City Sanitation, Inc. and/or California Waste Solutions. They are currently using the Newby Island sanitary landfill disposal site operated by International Disposal Company. The landfill area has an estimated service life based on remaining capacity and contractual commitments to 2023. An unlimited residential recycling program in the City currently results in an approximately 50 percent reduction in residential solid waste that typically required disposal in a landfill.

Gas and Electric Service

Natural gas and electric services for San Jose are provided by Pacific Gas and Electric Company. There are existing services in the area.

Telephone Service

Residential telephone service for the project site is provided by AT&T. There is existing service in the area.

IMPACT AND MITIGATION

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT	SOURCES
17. UTILITIES AND SERVICE SYSTEMS. Would the project:					
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X		28,84
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X		28
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X		28
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			X		28
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?			X		28
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X		28
g. Comply with federal, state and local statutes and regulations related to solid waste?			X		28

Sanitary Sewers

Sanitary sewer service for the project site is provided by the City of San Jose. The existing sanitary sewer line in Morse Street is available and adequate to serve the project. Extensions within the project would be provided.

Wastewater Treatment

Wastewater treatment for the City of San Jose is provided by the San Jose-Santa Clara Water Pollution Control Plant. The project is estimated to generate an average of approximately 950 gallons per day (0.001 MGD) of effluent, based on the Growth Management System's land use/effluent coefficient of 237 gallons per day per single family detached residential unit. High

energy efficiency appliances (e.g., Energy Star Certified clothes washers, dishwashers, etc.) would be provided with the project.

Water Supply

Water for the project site is provided by the San Jose Water Company. The existing water line in Morse Street is available and adequate to serve the project. Extensions within the project would be provided. The project is estimated to require approximately 1,800 gallons of water per day, based on 130 gallons per person per day. The project incorporates built-in water savings devices such as shower heads with flow control devices and low flush toilets to reduce water usage.

Storm Drainage Facilities

An increase in impervious surfaces associated with project development would cause an increase in stormwater runoff. Storm drainage service for the project area is provided by the City of San Jose. An onsite underground collection system would be included in the project, which would connect to a new 12-inch City storm drainage line that would be constructed in Morse Street.

Solid Waste / Recycling

Residential solid waste disposal service for the project site is provided by the City of San Jose. The project is estimated to generate up to approximately 8 tons of solid waste per year, based on 3.0 pounds per person per day; however, with recycling, the amount disposed of in a landfill could be reduced to approximately 4 tons per year.

Construction / Demolition Debris

The project is also subject to mandatory construction and demolition debris recycling. At least 50 percent of the debris generated from the project must be recycled.

Gas and Electric Service

There are existing Pacific Gas and Electric Company gas and electric services in the area that would be extended as required to serve the project. There is sufficient capacity in this utility system to provide adequate project service.

Telephone Service

There are existing AT&T telephone facilities in the area that would be extended as required to serve the project. There is sufficient capacity in this utility system to provide adequate project service.

MITIGATION MEASURES INCLUDED IN THE PROJECT

None required.

CONCLUSION

The project's impact on utilities and service systems would be a **less-than-significant impact**.

18. MANDATORY FINDINGS OF SIGNIFICANCE

ISSUES	POTENTIALLY SIGNIFICANT IMPACT	LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED	LESS THAN SIGNIFICANT IMPACT	NO IMPACT
18. MANDATORY FINDINGS OF SIGNIFICANCE.				
a. Does the project have the potential to (1) degrade the quality of the environment, (2) substantially reduce the habitat of a fish or wildlife species, (3) cause a fish or wildlife population to drop below self-sustaining levels, (4) threaten to eliminate a plant or animal community, (5) reduce the number or restrict the range of a rare or endangered plant or animal or (6) eliminate important examples of the major periods of California history or prehistory?		X		
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.			X	
c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

Impact Summary

As discussed in previous sections, the proposed project would have environmental effects that could cause substantial adverse effects on human beings, either directly or indirectly, with respect to air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, and noise. With the implementation of the previously listed Standard Measures and/or Mitigation Measures Included in the Project, these impacts would be reduced to less-than-significant impacts with mitigation.

APPENDIX

Authors and Consultants

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INITIAL STUDY / EIR

DISCLOSURE STATEMENT

APPLICANT Barry Swenson Builder

PROJECT TITLE Morse Street Homes
PDC11-010

PROJECT LOCATION East side of Morse Street, approximately 320 feet north of McKendrie Street (980 Morse Street)

Mindigo & Associates has prepared the above Initial Study or Draft Environmental Impact Report, doing business as:

An Individual

The above-named, now has or will have the following direct or indirect economic interest or interests in the development of, or, after its completion, the operation of the project for which the attached Initial Study or Draft EIR has been submitted:

None, Except Fees For The Preparation Of Environmental Studies

I/We declare, under penalty of perjury, that the statements furnished above pertaining to the environmental effects of a proposed project and to my/our economic interest or interests in that project are complete, true and correct to the best of my/our knowledge and belief.

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In order to achieve maximum objectivity in the Environmental Review process, the City requires persons, including individuals, firms, associations, partnerships, trusts, corporations, or companies, who submit to the City applications for Environmental Clearance, or who submit to the City a proposed Draft EIR, to disclose any economic interest in the project which they have derived or will or might derive from the development of, or, after its completion, the operation of the project. This application shall apply to consultants and subcontracted consultants who prepare all, or portions of, the Environmental Clearance document or the proposed Draft EIR. Each proponent, consultant, and subcontracted consultant shall prepare a disclosure statement as presented in this application.

You have an indirect economic interest in the project if your spouse or dependent child or agent acting on your behalf owns or otherwise has an economic interest in the site upon which the project is to be developed or if your spouse or dependent child or agent acting on your behalf has a present or future economic interest in the development of, or, after its completion, operation of the project. Briefly but specifically describe each of your direct and indirect economic interests in the project. You need but disclose the nature of your economic interest in the project, not the amount of said interest. If you have no interest, simply write "none" in the space provided.

Persons and Organizations Consulted

1. **Bob Hightower, AIA**, Project Manager, Barry Swenson Builder
2. **Dave Voorhies**, Civil Engineer, Underwood & Rosenblum, Inc.
3. **Ben Huynh**, Assistant Engineer, Underwood & Rosenblum, Inc.
4. **Bob Gonzales**, Director, Student Assignment, San Jose Unified School District
5. **Karen Mack**, Principal Engineering Technician, Transportation Department, City of San Jose
6. **Amy Nguyen**, Engineering Department, San Jose Water Company
7. **Gas and Electrical Mapping Departments**, Pacific Gas and Electric Company

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101. **Historic Evaluation of the Property at 980 Morse Street in the City of San Jose**, Archaeological Resource Management, August 31, 2011

102. **Geotechnical Investigation, Morse Street Courthomes, 980 Morse Street, San Jose, California**, Cornerstone Earth Group, September 13, 2011

103. **Revised Traffic Noise Assessment Study for the Planned Single-Family Development, 980 Morse Street, San Jose**, Edward L. Pack Associates, Inc., October 24, 2011

TECHNICAL APPENDIX

TECHNICAL APPENDIX

Copies of the following consultants' reports, which were prepared for Morse Street Homes and are summarized in this Initial Study, are included in this Technical Appendix or in the CD attached to the back cover of this document. Copies are on file at the City of San Jose Planning Division. In accordance with the State CEQA Guidelines, these reports are incorporated by reference and not reproduced in the body of the Initial Study in order to reduce the size and number of pages.

Tree Protection and Assessment, 980 Morse Street, San Jose, CA 95126, Monarch Consulting Arborists LLC, September 15, 2011

Historic Evaluation of the Property at 980 Morse Street in the City of San Jose, Archaeological Resource Management, August 31, 2011

Geotechnical Investigation, Morse Street Courthomes, 980 Morse Street, San Jose, California, Cornerstone Earth Group, September 13, 2011

Revised Traffic Noise Assessment Study for the Planned Single-Family Development, 980 Morse Street, San Jose, Edward L. Pack Associates, Inc., October 24, 2011

980 Morse Street
San Jose, CA 95126

Tree Protection and Assessment

Prepared for:
Bob Hightower
Barry Swenson Builder
Architectural

September 15, 2011

Report Prepared By:

Richard Gessner
Registered Consulting Arborist ® #496
Board Certified Master Arborist WE-4341B
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Table of Contents

Summary

The site is located at 980 Morse Street, San Jose, CA 95126. There are twelve trees on the site that are considered protected by the City of San Jose (Appendix C: Tree Photographs). All the ordinance sized trees are in fair condition overall. Eight of twelve trees can be preserved with proper protection guidelines and are located outside the footprint of the proposed buildings. In total there are 32 trees within the project area and 15 trees are to be removed, seven of which are ordinance size.

Introduction

Background

I was contacted by Bob Hightower of Barry Swenson Builder Architectural on March 25, 2011 and asked if I could provide a tree survey for the property located at 980 Morse Street, San Jose, CA 95126. I agreed to evaluate the trees and perform the inventory on March 29, 2011.

Assignment

- Create tree protection guidelines and specifications for all trees to be retained within the project area.
- Provide tree inventory and table within the report that includes tree number, species, circumference at 2 feet above grade, suitability for preservation, impact level rating, condition, tree protection zones and critical root zones, average canopy spread. (trees will be tagged in the field with corresponding numbers)
- Indicate tree protecting fencing locations on provided map along with drip line locations to scale.
- Provide a written report outlining findings and recommendations.

Limits of the assignment

- The information in this report is limited to the condition of the trees during my inspection on March 29, 2011.
- No aerial inspection, trenching or resistance drilling was performed, only a visual inspection from the ground.
- No biological tests were performed.
- No tree risk assessments were performed.

Purpose and use of the report

The report is intended to identify all trees within the proposed construction area that could be affected by the project. This report will create guidelines and instructions to protect trees throughout the construction process.

Observations

Tree Observations

The site contains 32 trees in total with 12 of those trees being ordinance size. There are two blue gum Eucalyptus *Eucalyptus globulous* (6%), one unknown (3%), one blue atlas cedar *Cedrus atlantica* (3%), five English laurel *Prunus laurocerasus* (16%), five Pittosporum *Pittosporum eugenioides* (16%), one apricot *Prunus armeniaca* (3%), four privet *Ligustrum lucidum* (13%), six grapefruit *Citrus x paradisi* (19%), one persimmon *Diospyros kaki* (3%), one lemon *Citrus limon* (3%), one bay laurel *Umbellularia californica* (3%), one yew *Taxus baccata* (3%), and three sycamore *Platanus x acerifolia* (9%). See "Appendix B:Tree Inventory Table" for individual tree detail.

Site Observations

The site is located at 980 Morse Street, San Jose, CA 95126 and boarders the 880 freeway off ramp to back of the property (Appendix A: Site Overview). The property has three sycamore street trees located in front. There are overhead high voltage power lines in front of the property with the sycamore trees located underneath. The lot currently has one single story house and a small shed in the backyard.

Analysis

No biological tests or technical analysis were performed.

Discussion

Tree Inventory

The tree inventory lists trees that are considered protected by the City of San Jose. In San Jose all trees along the park strip and trees with a trunk circumference of 56 inches or greater at 2 feet above grade are considered protected. The tree circumferences were measured at two feet above grade (24 inches) on the high side of the trees. The circumferences of multi-stem trees were calculated by adding the sum of all the stems. Tree locations are documented on the "Tree Inventory and Protection Map" (Appendix D).

Within the project area there are twelve trees inventoried and identified as protected trees. The total number of trees inventoried on site is thirty two.

The tree inventory lists tree number, species, trunk circumference, canopy spread, condition, suitability for preservation, and impact level and tree protection zone (Appendix B: Tree Inventory Table).

Suitability for Preservation

A tree's suitability for preservation is determined on the basis of its health, structure, age, species characteristics, and longevity using a scale of good, fair, or poor. The following list defines the rating scale:

- Good = Trees with good health, structural stability and longevity.
- Fair = Trees with moderate health or structural defects that can be mitigated through treatment.
- Poor = Trees in poor health with significant structural defects that cannot be mitigated and will continue to decline.

There are 14 trees ranked poor, 15 fair, and 3 good.

Condition Rating

Tree condition is based on a scale of good, fair, and poor and is calculated using the analysis of condition factors provided in the *Guide for Plant Appraisal, 9th Edition, 2000.*

A tree's condition percentage is a determination of its overall health and structure based on five aspects: Roots, trunk, scaffold branches, twigs, and foliage. Each aspect is rated using the following point scale:

- 4= No apparent problems
- 3= Minor problems
- 2= Major problems
- 1= Extreme problems

Tree roots, trunk, and scaffold branches are rated on both health and structure whereas twigs and foliage are based solely on health (ISA, 2000). The points are totaled for each tree and converted to a percentage.

The following scale defines the condition rating from the "condition" percentages:

- Good = 75%-100%
- Fair = 50%-74%
- Poor = > 49%

There are no trees considered to be in good condition. There are four trees in poor condition and twenty eight that ranked fair.

Impact Level

Impact level defines how a tree may be influenced by construction activity and its proximity to the tree, and is described as low, moderate, or high. The following scale defines the impact rating:

- Low = The construction activity will have little impact on the tree.
- Moderate = The construction may cause future health or structural problems, and steps must be taken to protect the tree to reduce future problems.
- High = Tree structure and health will be compromised and removal is recommended, or other actions must be taken for the tree to remain.

Most of the trees will not be highly influenced by the construction since they are outside the footprint of the newly proposed structures, these trees can be preserved. There are five grapefruit, one yew, two Pittosporum, one unknown, one bay, one persimmon, one lemon, one blue atlas cedar, one English laurel, and one sycamore that are within the footprint of the newly proposed buildings or are too close to be preserved.

Tree Protection

Tree protection focuses on protecting trees from damage to the roots, stem, or scaffold branches from heavy equipment. Two zones of protection need to be determined to protect the trees health and structure, the **tree protection zone (TPZ)** and the **critical root zone (CRZ)**.

The tree protection zone (TPZ) is the defined area in which certain activities are prohibited in order to minimize potential injury to the tree. The TPZ for this project will effectively be the drip line of the trees.

The critical root zone (CRZ) is the area of soil around the trunk of a tree where roots are located that provide stability and uptake of water and nutrients required for the tree's survival. The CRZ is the minimum distance from the trunk that trenching or root cutting can occur and will be defined by the trunk diameter as a distance of three times the DBH in feet, and preferably, five times (Smiley, Fraedrich and Hendrickson, 2007). For example if the tree is two feet in diameter, the minimum CRZ distance would be six feet from the stem on one side of the tree.

Conclusion

The site has 32 trees in total with 15 trees that will be impacted by the proposed construction and need to be removed. Seven of the trees that will need to be removed are of ordinance size. The remaining ordinance size trees on the site can be adequately protected following the protection guidelines and recommendations.

Recommendations

Individual Tree Protection Guidelines

See Appendix D: Tree Protection and Inventory Map for details.

I recommend staking the protection fencing prior to contractor fence installation.

Tree number 1658 should have fencing placed at a distance of 15 feet from the main stem to the east of the tree located in the west corner of the lot. If more room is needed then I recommend placing 4 inches of bark or wood chips over the soil area under the tree along with 3/4 inch plywood over the top of the mulch to reduce compaction and allow for traffic within the TPZ. The fencing can be temporarily removed and then put back into place under the supervision of the project arborist.

Tree numbers 1654 to 1647 should be fenced as a group against the back wall at a distance of 12 feet to the south, east, and west sides.

Tree numbers 1646 to 1642 should be fenced as a group against the east fence at a distance of 12 feet running parallel to the existing fence.

Tree numbers 1630 and 1628 should be fenced at the curb, sidewalk, and driveway entrance and a minimum distance of 6 feet where the new driveway is to be installed. If the sidewalk is going to be removed other protection measures will need to occur or removal and replacement should be explored. Use techniques and materials that will minimize the impact on the tree and help prevent future damage to the new hard-scape. *Reducing Infrastructure Damage by Tree Roots: A compendium of Strategies* (Costello and Jones, 2003) outlines several different construction techniques and materials that can be used to minimize damage to the existing trees.

Pruning specification for trees to be retained

Clean trees to remove all dead, broken and interfering branches 1 inch diameter and greater to reduce risk and improve health and appearance.
Thin approximately 15% of live branches to help improve light and air penetration and to reduce weight on branch ends. (Thinning cuts .5" to 2" diameter branches).
Raise 10-13 feet to help provide clearance for vehicles.

Trees to be removed

The current plan will require that ordinance size trees 1656, 1655, 1640, 1637, 1636, 1631, and 1629 will need to be removed. Fifteen trees in total (seven ordinance and eight non ordinance).

Tree Protection Specifications

Pre-Construction Meeting With the Project Arborist

Prior to beginning work, all contractors involved with the project shall attend a pre construction meeting with the project arborist to review the tree protection guidelines. Access routes, storage areas, and work procedures will be discussed.

Tree Protection Zones and Fencing

Tree protection fencing shall be established before the arrival of construction equipment or materials on site. Fencing shall be composed of six-foot high chain link fencing mounted on eight-foot tall, 1 7/8-inch diameter galvanized posts, driven 24 inches into the ground and spaced no more than 10 feet apart. Once established, the fencing must remain undisturbed and be maintained throughout the construction process until final inspection.

Tree Protection Signs

All sections of fencing shall be clearly marked with signs stating that all areas within the fencing are Tree Protection Zones and that disturbance is prohibited. Text on the signs should be in both English and Spanish (Appendix E).

Restrictions Within the Tree Protection Zone

No storage of construction materials, debris, or excess soil will be allowed within the Tree Protection Zone. Spoils from the trenching shall not be placed within the tree protection zone either temporarily or permanently.

Root Pruning

When roots over two inches in diameter are encountered they should be pruned by hand with loppers, handsaw, reciprocating saw, or chain saw rather than left crushed or torn. Roots should be cut beyond sinker roots or outside root branch junctions and be supervised by the project arborist. When completed, exposed roots should be kept moist with burlap or backfilled within one hour.

Timing

If the construction is to occur during the summer months supplemental watering treatments should be applied to help ensure survival during and after construction.

Tree Pruning and Removal Operations

All tree pruning or removals shall be performed by a qualified arborist with a C-61/D-49 California Contractors License. Tree pruning shall be according to ANSI A-300A pruning standards and adhere to ANSI Z133.1 safety standards. Trees that need to be removed or pruned shall be identified in the pre-construction walk through.

Monitoring

Any trenching, construction or demolition that is expected to damage or encounter tree roots should be monitored by the project arborist or a qualified ISA Certified Arborist and should be documented.

The site should be evaluated by the project arborist or a qualified ISA Certified Arborist after during and after construction is complete, and any necessary remedial work that needs to be performed should be noted.

Need for Future Inspections

It shall be the responsibility of the client to ensure that future tree risk assessment inspections are conducted, by a qualified arborist, annually, or after any major weather event, to monitor and evaluate any changes in the condition or the risk associated with the trees on the property.

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Glossary of Terms

Critical root zone (CRZ): Area of soil around a tree where the majority of roots are located and that provide stability as well as uptake water and minerals. CRZ determination is sometimes based on the drip line or multiple of DBH, but because root growth is often asymmetric due to site conditions, on-site investigation is preferred.

Tree protection zone (TPZ): Defined area within which certain activities are prohibited or restricted to prevent or minimize potential injury to designated trees, especially during construction or development.

Appendix A: Site Overview

Appendix B: Tree Inventory Table

Tree Number	Tree Species	Circumference at 2 feet above grade (inches)	Canopy Radius (feet)	Tree Protection Zone (feet)	Condition	Impact Level	Suitability for Preservation	Ordinance Size	Mitigation
1659	*Blue Gum Eucalyptus Eucalyptus globulus*	77 inches	20 feet	N/A	56% = fair	low	poor	Yes	
1658	Blue Gum Eucalyptus *Eucalyptus globulus*	113 inches	30 feet	15 feet = CRZ	53% = fair	moderate	fair	Yes	
1657	Unknown	35 inches	10 feet	10 feet	59% = fair	high/remove	fair	No	15 gallon replacement
1656	Blue Atlas Cedar Cedrus atlantica	143 inches	30 feet	30 feet	65% = fair	high/remove	good	Yes	4 - 24 inch box replacements
1655	English Laurel Prunus laurocerasus	110 inches/ multi-stem = 25, 24, 22,17, 22	18 feet	18 feet/drip line and 8 feet CRZ	56% = fair	high/remove	good	Yes	4 - 24 inch replacements
1654	English Laurel *Prunus laurocerasus*	38 inches/ multi-stem = 12.7, 12.7, 12.7	6 feet	6 feet/drip line	56% = fair	low	fair	No	
1653	English Laurel *Prunus laurocerasus*	38 inches/ multi-stem = 6.3, 6.3, 12.5, 12.5	6 feet	6 feet/drip line	44% = poor	low	poor	No	
1652	Pittosporum Pittosporum eugenioides	52 inches/ multi-stem = 15.7, 15.7, 20.4	6 feet	6 feet/drip line	50% = fair	low	poor	No	

Tree Number	Tree Species	Circumference at 2 feet above grade (inches)	Canopy Radius (feet)	Tree Protection Zone (feet)	Condition	Impact Level	Suitability for Preservation	Ordinance Size	Mitigation
1651	Pittosporum *Pittosporum eugenioides*	35 inches / multi-stem = 15.7, 18.8	6 feet	6 feet/drip line	38% = poor	low	poor	No	
1650	English Laurel *Prunus laurocerasus*	75 inches/ multi-stem = 6.28, 6.28, 6.28, 6.28, 6.28, 3.14, 3.14, 3.14, 3.14, 3.14, 12.56, 12.56	10 feet	10 feet/drip line	53% = fair	low	fair	Yes	
1649	Pittosporum *Pittosporum eugenioides*	41 inches/ multi-stem = 15.7, 12.56, 12.56	6 feet	6 feet/drip line	47% = poor	low	poor	No	
1648	English Laurel *Prunus laurocerasus*	50 inches	8 feet	8 feet/drip line	44% = poor	low	poor	No	
1647	Apricot Prunus armeniaca	27 inches	8 feet	8 feet/drip line	50% = fair	low	poor	No	
1646	Privet Ligustrum lucidum	13 inches	6 feet	6 feet/drip line	63% = fair	low	poor	No	
1645	Grapefruit Citrus x paradisi	19 inches	10 feet	10 feet/drip line	56% = fair	low	good	No	
1644	Privet *Ligustrum lucidum*	50 inches/ multi-stem = 25.12, 25.12	12 feet	12 feet/drip line	53% = fair	low	poor	No	

Tree Number	Tree Species	Circumference at 2 feet above grade (inches)	Canopy Radius (feet)	Tree Protection Zone (feet)	Condition	Impact Level	Suitability for Preservation	Ordinance Size	Mitigation
1643	Privet *Ligustrum lucidum*	19 inches	10 feet	10 feet/drip line	53% = fair	low	poor	No	
1642	Privet *Ligustrum lucidum*	9 inches	4 feet	4 feet/drip line	56% = fair	low	poor	No	
1641	Persimmon Diospyros kaki	20 inches	16 feet	16 feet/drip line	56% = fair	high/remove	fair	No	1 15 gallon replacement
1640	Pittosporum *Pittosporum eugenioides*	92 inches/ multi-stem = 22, 22, 18, 30	25 feet	8 feet/drip line	50% = fair	high/remove	fair	Yes	4 - 24 inch box replacements
1639	Lemon Citrus limon	13 inches	5 feet	5 feet/drip line	56% = fair	high/remove	poor	No	1 15 gallon replacement
1638	Bay Laurel Umbellularia californica	13 inches	5 feet	5 feet/drip line	56% = fair	high/remove	poor	No	1 15 gallon replacement
1637	Pittosporum *Pittosporum eugenioides*	58 inches	19 feet	19 feet/drip line	53% = fair	high/remove	fair	Yes	4 - 24 inch box replacements
1636	Yew Taxus baccata	50 inches	5 feet	16 feet	56% = fair	high/remove	fair	Yes	2 - 24 inch replacements
1635	Grapefruit *Citrus x paradisi*	53 inches/ multi-stem = 18.84, 18.84, 15.7	12 feet	12 feet/drip line	56% = fair	high/remove	fair	No	2 - 24 inch replacements
1634	Grapefruit *Citrus x paradisi*	13 inches	4 feet	4 feet/drip line	50% = fair	high/remove	poor	No	15 gallon replacement
1633	Grapefruit *Citrus x paradisi*	41 inches/ multi-stem = 25.12, 15.7	12 feet	12 feet/drip line	53% = fair	high/remove	fair	No	2 - 24 inch replacements

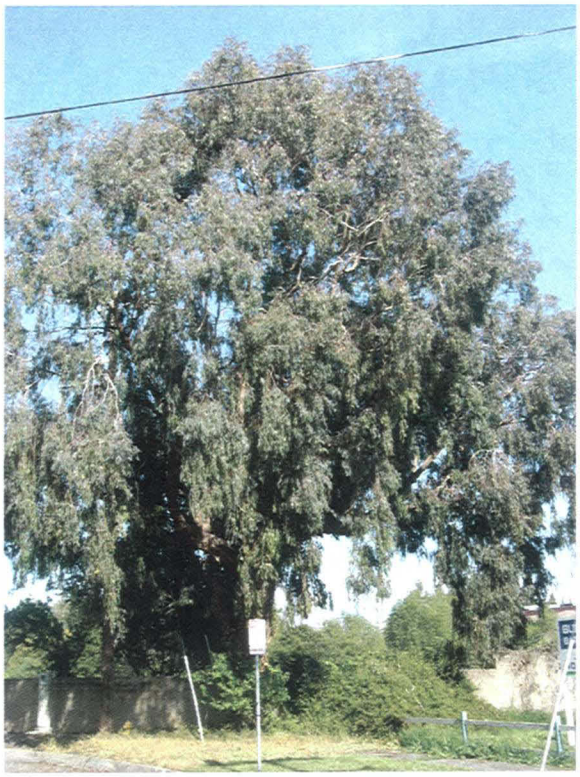
Tree Number	Tree Species	Circumference at 2 feet above grade (inches)	Canopy Radius (feet)	Tree Protection Zone (feet)	Condition	Impact Level	Suitability for Preservation	Ordinance Size	Mitigation
1632	Grapefruit *Citrus x paradisi*	38 inches/ multi stem = 22, 16	12 feet	12 feet/drip line	53% = fair	high/remove	fair	No	2 - 24 inch replacements
1631	Grapefruit *Citrus x paradisi*	75 inches/ multi-stem = 13, 13, 15, 19, 15	12 feet	12 feet/drip line	56% = fair	high/remove	fair	Yes	4 - 24 inch box replacements
1630	Sycamore Platanus x acerifolia	69 inches	25 feet	Park strip boundary/6 foot CRZ	53% = fair	moderate	fair	Yes/Street tree ordinance	
1629	Sycamore *Platanus x acerifolia*	69 inches	25 feet	Park strip boundary/6 foot CRZ	53% = fair	high/remove	fair	Yes/Street tree ordinance	4 - 24 inch box replacements
1628	Sycamore *Platanus x acerifolia*	50 inches	25 feet	Park strip boundary/6 foot CRZ	53% = fair	moderate	fair	Yes/Street tree ordinance	

Appendix C: Photographs

C1: Eucalyptus 1659 and 1658

Tree number 1659 (topped under high voltage lines)

Tree number 1659 at the corner

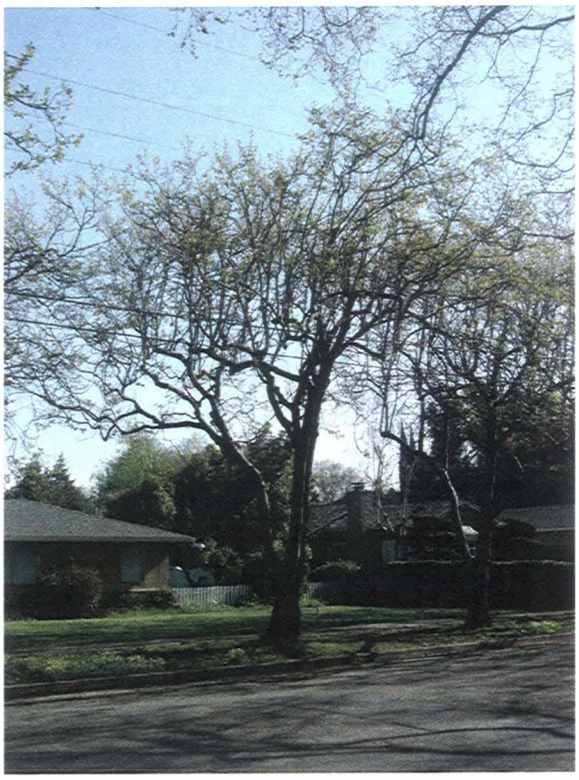


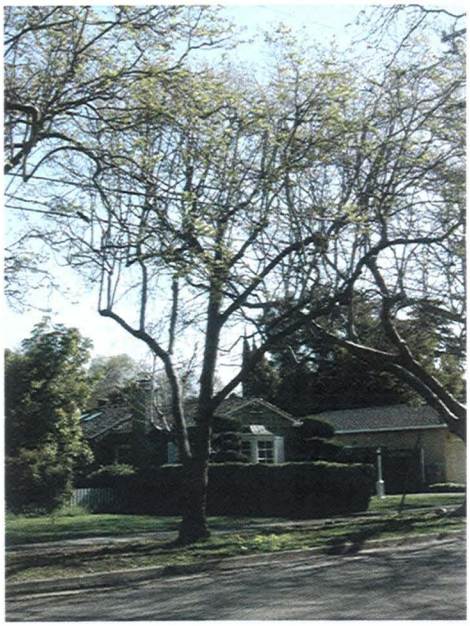
C2: Blue atlas cedar tree number 1656 and Laurel tree number 1655

Tree number 1656 Blue Atlas Cedar in the photo to the left.

Tree number 1655 in the photo to the right

C3: Sycamore trees 1630, 1629 and 1628





Top Left: Number 1630
Top Right: Number 1629
Bottom Left: Number 1628

C4: Pittosporum numbers 1640 and 1637

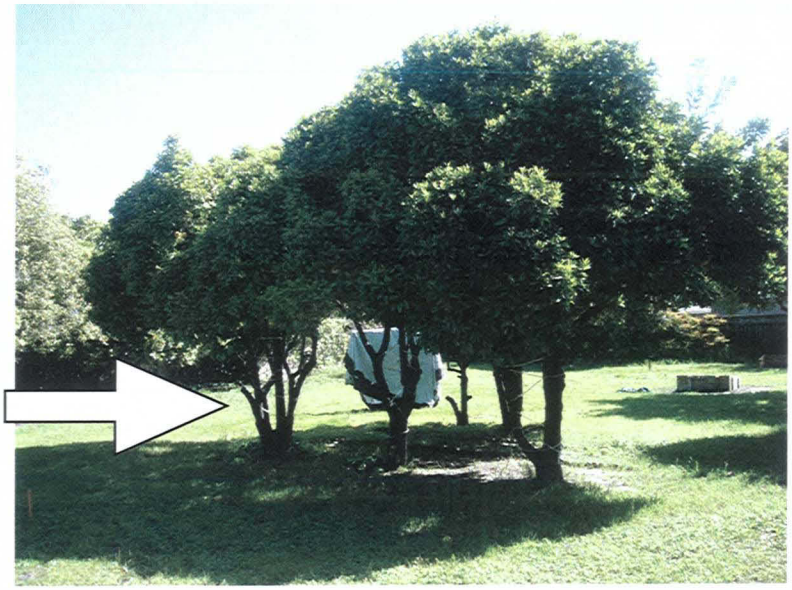
Tree number 1640

Tree number 1637

C5: Yew tree number 1636 and grapefruit number 1631

Above is the Yew number 1636.

The white arrow to the right indicated which grapefruit is over 56 inch circumference.



C6: Laurel number 1650

The white arrow indicates which tree is over 56 inch circumference.

Plant Legend

KEY	SIZE	water use	BOTANICAL NAME	COMMON NAME
TREES				
FE	24"	Med	Pittosporum eugenioides	
CL	24"	Med	Citrus	
PR	24"	Med	Apple	
LI	24"	Low	Lagerstremia Indica Tuskegee	Crape Myrtle
PC	24"	Low	Pistachia chinensis Kiehl Davis	Chinese Pistache
ST	24"	Low	Street Tree - Final location, qty and species to be determined by the city arborist	

As per the Arborist report there are 30 - 24" box replacement trees for trees that are being removed

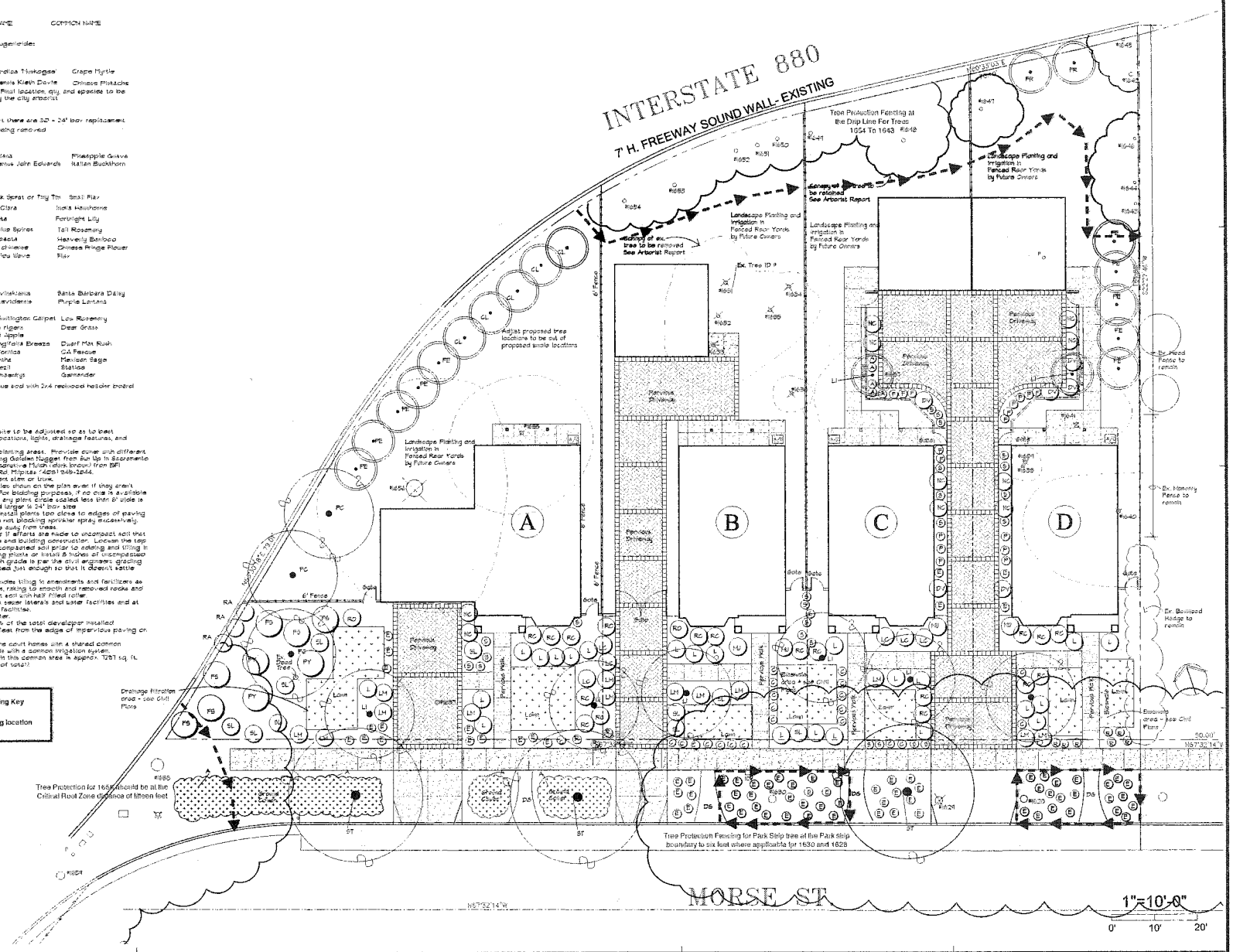
TALL SHRUBS/SMALL TREES				
PB	5 and 15	Low	Feijoa sellowiana	Pineapple Guava
RA	5 and 15	Low	Rhamnus alaternus John Edwards	Italian Buckthorn
MEDIUM SHRUBS				
P	5	Low	Phormium Jack Spratt or Tiny Tim	Small Flax
RC	5	Low	Raphiolepis Clara	Indica Hawthorne
DV	5	Low	Dietes vegeta	Fortnight Lily
RO	5	Low	Rosmarinus Blue Spires	Tall Rosemary
NC	5	Low	Nandina compacta	Heavenly Bamboo
LC	5	Low	Loropetalum chinense	Chinese Fringe Flower
FY	5	Low	Phormium Yellow Wave	Flax
GROUND COVER				
E	1	Low	Erigeron karvinskianus	Santa Barbara Daisy
LM	1	Low	Lamium maniversidens	Purple Lamium
R	1	Low	Rosmarinus Huntington Carpet	Low Rosemary
HJ	1	Low	Hymenocyclis rigens	Deer Grass
A	1	Low	Aptenia Red Apple	
L	1	Low	Lomandra longifolia Breeze	Dwarf Mat Rush
F	1	Low	Festuca californica	CA Fescue
SL	1	Low	Salvia leucantha	Mexican Sage
S	1	Low	Linarium canezii	Statice
C	1	Low	Tetureiser chamaedrys	Germander
Lawn	sod	High	Turf tall fescue sod with 2x4 redwood header board	

Planting Notes

1) See details and specs.
2) Exact location of plants on site to be adjusted so as to best coordinate with sprinkler head locations, lights, drainage features, and trellis.
3) Use 2 inch deep mulch in all planting areas. Provide owner with different mulch samples and prices including Golden Nugget from Bun Up in Sacramento (800) 222-1881 or Pro-Grip Dragonfire Mulch (dark brown) from BFI Organics - 1601 Dixon Landing Rd. Milpitas (408) 946-2844.
Mulch 4 inches back from plant stem or trunk.
4) Install plants for all plant circles shown on the plan even if they aren't labeled. Call for clarification. For bidding purposes, if no one is available to answer questions, assume that any plant circle scaled less than 8' wide is 5 gal. size and any circle scaled larger is 24" box size.
5) The plan is schematic. Don't install plants too close to edges of paving or buildings. Be sure plants are not blocking sprinkler spray excessively. Keep valves and quick couplers away from trees.
6) The plants will do much better if efforts are made to uncompact soil that has been compacted during site and building construction. Loosen the top 4 inches of any undisturbed or compacted soil prior to adding and tilling in other soil amendments or installing plants or install 8 inches of uncompacted topsoil in a way so that the finish grade is per the civil engineers grading plan. Top soil is to be compacted just enough so that it doesn't settle out later.
7) Soil prep for sod areas includes tilling in amendments and fertilizers as recommended by soil tars results, raking to smooth and remove rocks and clods from surface, and compact soil with half filled roller.
8) Trees to be at least 10' from sewer lateral's and water facilities and at least 5 feet from electric dept. facilities.
9) Irrigation will be portable water.
10) Lawn areas are less than 25% of the total developer installed landscape. They are at least 2 feet from the edge of impervious paving on slopes less than 5%.
11) Residences A, B, C, and D are court homes with a shared common landscape area in the front yards with a common irrigation system. Developer installed landscape in this common area is approx. 1261 sq. ft. including (62) each. of lawn (5% of total)

Tree Protection Fencing Key

= Fencing location



GENERAL DEVELOPMENT PLAN - EXHIBIT "C"

BSBA
BARRY SWENSON BUILDER
A DIVISION OF BARRY SWENSON BUILDING CORP.
777 North First Street
Fifth Floor
San Jose, Ca 95112
tel: (408) 287-0245
fax: (408) 287-2386

Consultant
Gregory Lewis
Landscape Architect
#2176
736 Park Way
Santa Cruz, CA 95065
(831) 425-4747
lewislandscape@sbcglobal.net

Revisions
8/25/11 Site Plan Planting Plan

Morse Street Courthomes

980 Morse Street, San Jose, CA

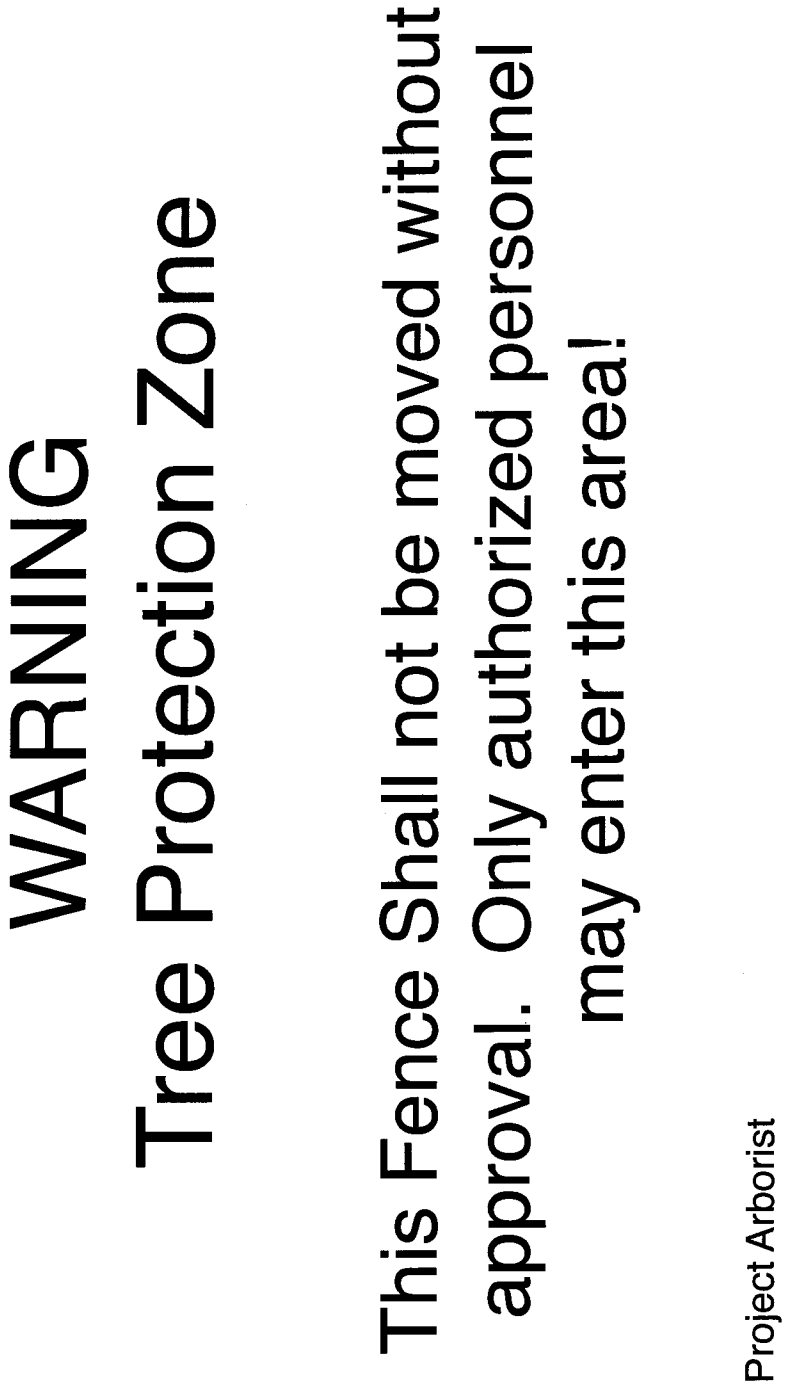
APN: 230-44-040 PDC 11-010 PD 11-015

PLANTING PLAN

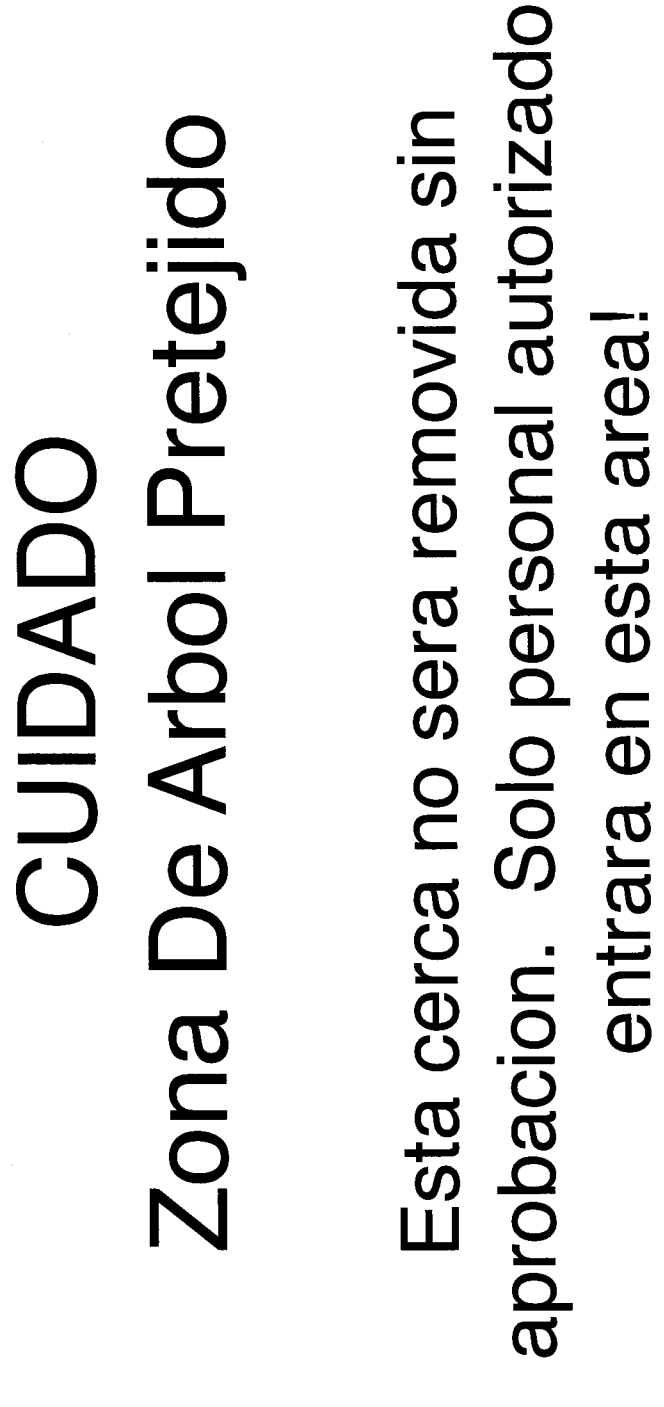
Date: 31 MARCH 2011
Scale:
Drawn by: Greg
Job #: 3138-71-110
Sheet: PDZ-6a

Appendix E: Tree Protection Signs

E1: English



E2: Spanish


CUIDADO
Zona De Arbol Pretejido
Esta cerca no sera removida sin aprobacion. Solo personal autorizado entrara en esta area!
Project Arborist

Qualifications, Assumptions, and Limiting Conditions

Any legal description provided to the consultant is assumed to be correct. Any titles or ownership of properties are assumed to be good and marketable. All property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

All property is presumed to be in conformance with applicable codes, ordinances, statutes, or other regulations.

Care has been taken to obtain information from reliable sources. However, the consultant cannot be responsible for the accuracy of information provided by others.

The consultant shall not be required to give testimony or attend meetings, hearings, conferences, mediations, arbitration, or trials by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.

This report and any appraisal value expressed herein represent the opinion of the consultant, and the consultant's fee is not contingent upon the reporting of a specified appraisal value, a stipulated result, or the occurrence of a subsequent event.

Sketches, drawings, and photographs in this report are intended for use as visual aids, are not necessarily to scale, and should not be construed as engineering or architectural reports or surveys. The reproduction of information generated by architects, engineers, or other consultants on any sketches, drawings, or photographs is only for coordination and ease of reference. Inclusion of said information with any drawings or other documents does not constitute a representation as to the sufficiency or accuracy of said information.

Unless otherwise expressed: a) this report covers only examined items and their condition at the time of inspection; and b) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that structural problems or deficiencies of plants or property may not arise in the future.

Certification of Performance

I Richard Gessner, Certify:

That I have personally inspected the tree(s) and/or the property referred to in this report, and have stated my findings accurately. The extent of the evaluation and/or appraisal is stated in the attached report and Terms of Assignment;

That I have no current or prospective interest in the vegetation or the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved;

That the analysis, opinions and conclusions stated herein are my own;

That my analysis, opinions, and conclusions were developed and this report has been prepared according to commonly accepted Arboricultural practices;

That no one provided significant professional assistance to the consultant, except as indicated within the report.

That my compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any other subsequent events;

I further certify that I am a Registered Consulting Arborist® with the American Society of Consulting Arborists, and that I acknowledge, accept and adhere to the ASCA Standards of Professional Practice. I am an International Society of Arboriculture Board Certified Master Arborist and a Certified Tree Risk Assessor. I have been involved with the practice of Arboriculture and the care and study of trees since 1998.

Richard J. Gessner

ASCA Registered Consulting Arborist® #496
ISA Board Certified Master Arborist WE-4341B
ISA - PNW Certified Tree Risk Assessor #904

Copyright

Archaeological Resource Management

Robert R. Cartier, Ph.D.
496 North 5th Street
San Jose, CA 95112
Telephone (408) 295-1373
Fax (408) 286-2040
email: armcartier@netscape.net

Mr. Robert Hightower
Barry Swenson Builder
777 N. 1st Street, 5th Floor
San Jose, CA 95112

August 31, 2011

RE: HISTORIC EVALUATION OF THE PROPERTY AT 980 MORSE STREET IN THE CITY OF SAN JOSE

Dear Mr. Hightower:

As per your request our firm is submitting the enclosed updated historical evaluation of the property at 980 Morse Street in the City of San Jose. Based upon the requirements of the City of San Jose, a methodology was designed which included the following services:

- an evaluation of the property based on the criteria of the NRHP and CRHR
- an evaluation of the property using the criteria of the City of San Jose Inventory
- a State Historic Resources Evaluation form (DPR 523) for the property

Based upon the results of this investigation, it was determined that the property at 980 Morse Street does not appear to be eligible for listing in the California Register of Historic Resources or the National Register of Historic Places. The home received a score of **16.8** points on the City of San Jose Evaluation tally form, identifying it as a non-significant structure. Therefore, it is determined that the proposed project will have no impact on significant historic resources, and no further recommendations are being made.

Sincerely,

Robert Cartier, Ph.D.
Principal Investigator

RC/dj

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code _____
Other Listings _____
Review Code _____ **Reviewer** _____ **Date** _____

Page 1 **of** 15 **Resource Name or #** 980 Morse Street

P1. Other Identifier: McKenna Residence

P2. Location: ____ **Not for Publication** x **Unrestricted** ***a. County** Santa Clara
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** San Jose West **Date:** 1979 **T** ; **R** ; **1/4 of** **1/4 of Sec** ; **BM**

c. Address: 980 Morse Street **City:** San Jose **Zip:** 95126

d. UTM: 10S 5 95 198mE/41 33 049mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
APN: 230-44-040

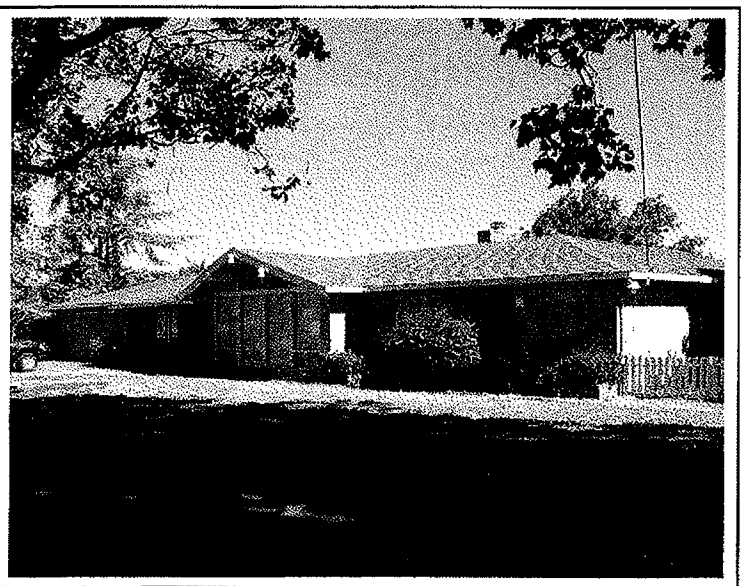
***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)
The residence at 980 Morse Street is a single story Ranch style home in good condition. The roof is hipped and surfaced with composition shingles. A single large gabled bay juts from the center of the front façade. The eaves are broad and open, with exposed rafters, typical of the Ranch style. The exterior walls are surfaced with stucco, painted beige, with a low cut-stone **runner** along the front façade. The windows are aluminum framed, in a combination of sliding and casement configurations. The rear of the residence is characterized by patios with broad overhanging awnings, covered by corrugated metal sheeting.

See Continuation Sheet, Page 4

***P3b. Resource Attributes:** (List attributes and codes.) HP02

***P4. Resources Present:** x Building ___ Structure ___ Object ___ District ___ Element of District ___ Site ___ Other

P5a. Photo or drawing (Photo required for buildings, structures, objects.)



P5b. Description of Photo: (View, date, accession #)
View of the residence at 980 Morse Street from the southeast.

***P6. Date Constructed/Age and Sources**
Historic X Prehistoric Both
Constructed 1959 based upon appraisers documentation.

***P7. Owner and Address:**
Green Valley Corporation
777 N. 1st Street, 5th Floor
San Jose, CA 95112

***P8. Recorded by:**
Robert Cartier
Archaeological Resource Management
496 North 5th Street
San Jose, CA 95112

***P9. Date Recorded:** 8/31/11

***P10. Survey Type:** Intensive

***P11. Report Citation:** (Cite Survey Report and other sources, or enter "none.")
None

* Attachments: ___None x Location Map ___Sketch Map x Continuation Sheet x Building, Structure, and Object Record ___Archaeological Record ___District Record ___Linear Feature Record ___Milling Station Record ___Rock Art Record ___Artifact Record ___Photographic Record ___Other (List):

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
Primary # _____
HRI # _____

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code _____

*Resource Name or # (Assigned by recorder) 980 Morse Street

B1. Historic Name: McKenna Residence

B2. Common Name: 980 Morse Street

B3. Original Use: Residential **B4. Present Use:** Residential

***B5. Architectural Style:** Ranch

***B6. Construction History:** (Construction date, alterations, and date of alterations)

Based upon assessor's records and visual evaluation, the home at 980 Morse Street was constructed in 1959. Since that time it appears that only minor modifications have been made to the residence. These include the addition of the aluminum patio covers in 1981, and re-roofing in 1987.

***B7. Moved?** x **No** ___ **Yes** ___ **Unknown** **Date:** _____ **Original Location:** _____

***B8. Related Features:**

Also present on the property is a small storage shed, surfaced with corrugated metal sheeting. The storage shed is in poor condition.

B9a. Architect: unknown **b. Builder:** unknown

***B10. Significance: Theme** Architecture and Shelter **Area** San Jose

Period of Significance Post-War **Property Type** Residential **Applicable Criteria** N/A

The property at 980 Morse Street made up a portion of Lots 6, 7, and 8 of Block 5, as shown on the map entitled "Map of the Survey of the Chapman & Davis Tract" filed on February 1, 1877 (Book A of Maps, Page 18). Based upon Assessor's records, the residence at 980 Morse Street was constructed in 1959. At that time the property was owned by James E. McKenna. On February 3, 1973 James McKenna died, and the property passed by decree of distribution to Evelyn M. McKenna and Margaret L. McKenna on September 18, 1972. (Book 0025 of Official Records, Page 20). Margaret McKenna died in 2002, and the property passed to Evelyn McKenna as sole owner (Assessors Document #16117260). On June 28, 2004 the property was sold, and ownership passed by grant deed to Martin G. Quintana (Assessor's Document #17868285). On February 24, 2010, the property was granted via trustee's deed to HSBC Bank USA (Assessor's Document #20619437). The property changed hands again on January 4, 2011, when it passed by grant deed to Green Valley Corporation, the current owners.

See Continuation Sheet, Page 4

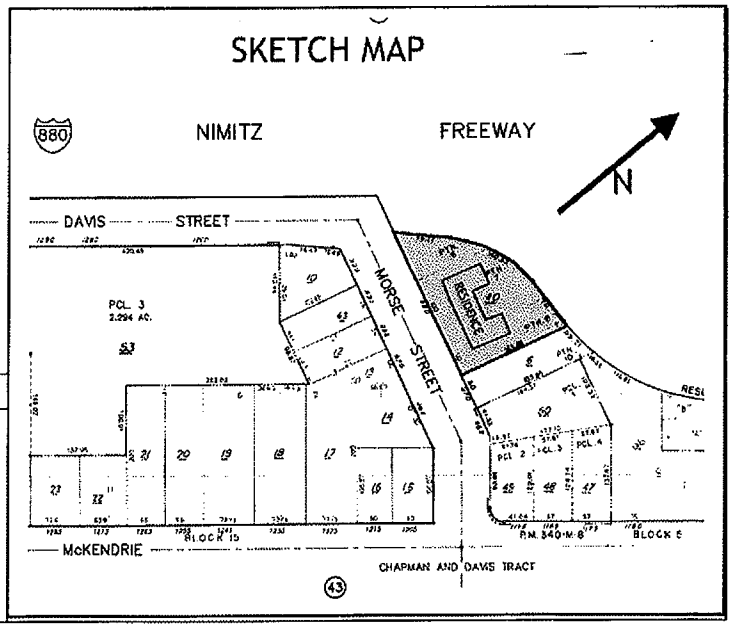
B11. Additional Resource Attributes: (List attributes and codes) N/A

***B12. References:**

See Continuation Sheet, Page 7

B13. Remarks:

SKETCH MAP



***B14. Evaluator:** Robert R. Cartier

***Date of Evaluation:** 8/31/2011

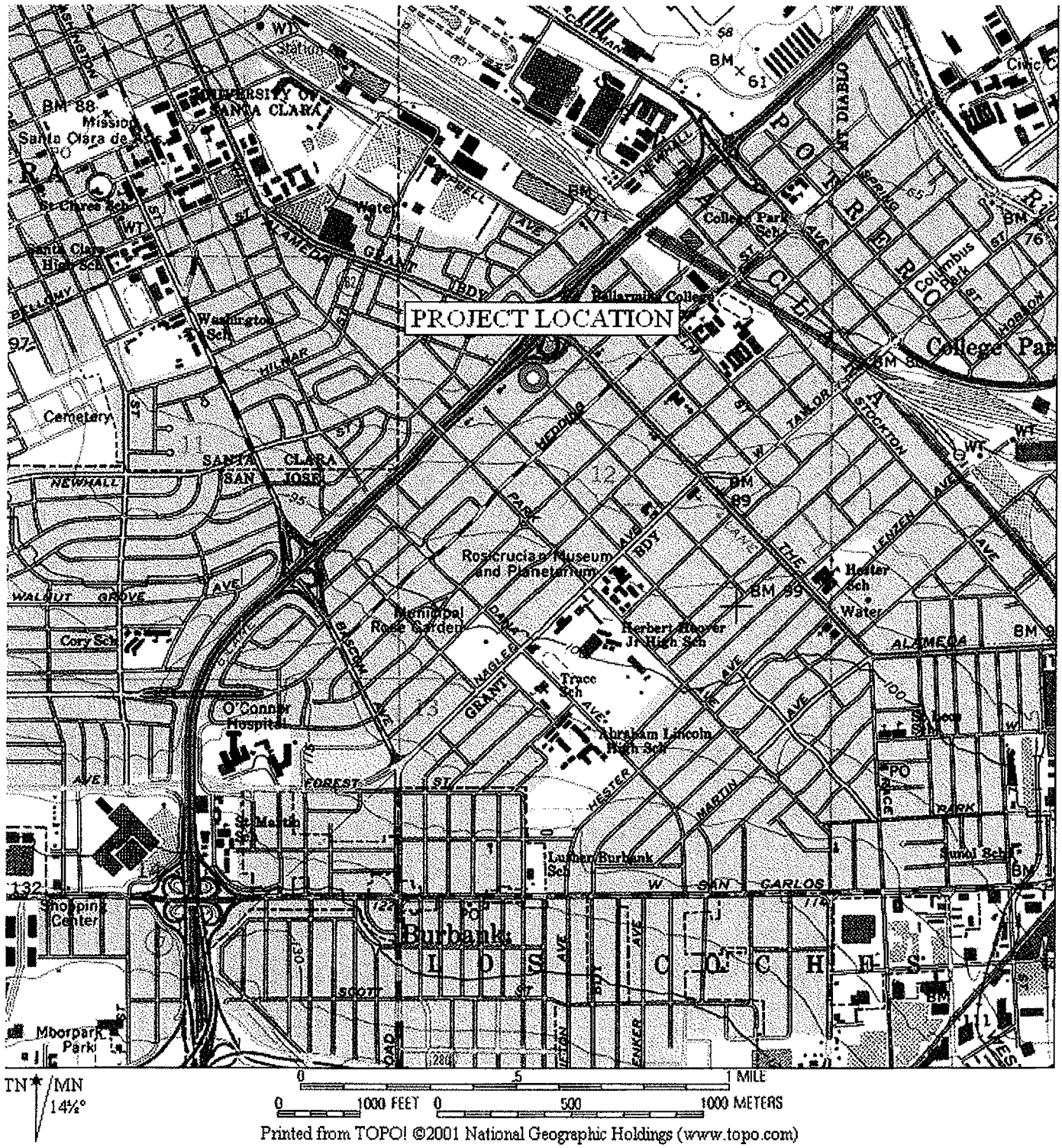
(This space reserved for official comments.)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI # _____
Trinomial _____

Page 3 **of** 15 **Resource Name or #** (Assigned by recorder) 980 Morse Street
***Map Name:** San Jose West ***Scale:** 7.5 Minute ***Date of Map:** 1978



Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

*Required Information

Continued from P3a:

The interior of the residence is in good condition, although somewhat modified from its original state. The kitchen cabinets and countertops appear to be original, although other appliances and fixtures have been replaced. The bathroom fixtures also appear to be non-original. One feature of note in the interior is the modernist asymmetrical cut stone fireplace in the living room. The area between the main house and the garage consists of an enclosed breezeway, with a darkened glass panel door and flanking windows towards the front façade.

Continued from B10:

California Register of Historic Resources Criteria

A cultural resource is considered "significant" if it qualifies as eligible for listing in the California Register of Historic Resources (CRHR). Properties that are eligible for listing in the CRHR must meet one or more of the following criteria:

1. Association with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
2. Association with the lives of persons important to local, California, or national history;
3. Embodying the distinctive characteristics of a type, period, region, or method of construction, or representing the work of a master, or possessing high artistic values; or
4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

A property may be automatically listed in the CRHR if it is formally determined eligible for the National Register of Historic Places. Properties that are formally determined eligible for the NRHP are those that are designated as such through one of the federal preservation programs administered by the California Office of Historic Preservation (i.e., the National Register, Tax Certification, and Section 106 review of federal undertakings). The CRHR interprets the integrity of a cultural resource based upon its physical authenticity. An historic cultural resource must retain its historic character or appearance and thus be recognizable as an historic resource. Integrity is evaluated by examining the subject's location, design, setting, materials, workmanship, feeling, and association. If the subject has retained these qualities, it may be said to have integrity. It is possible that a cultural resource may not retain sufficient integrity to be listed in the National Register of Historic Places yet still be eligible for listing in the CRHR. If a cultural resource retains the potential to convey significant historical/scientific data, it may be said to retain sufficient integrity for potential listing in the CRHR.

The structure at 980 Morse Street is not currently listed on the California Register of Historical Resources. In addition, the structure does not appear to qualify as potentially eligible under any of the criteria listed above. The home is not associated with any known significant historical events, thus it does not appear to qualify as potentially eligible under criterion 1. No historically significant persons appear to have been associated with the property, thus it does not appear to qualify as potentially eligible under criterion 2. Although the home at 980 Morse Street is an example of the Ranch style, is not an exceptional or fine example of this style. Thus it does not appear to qualify as potentially eligible under criterion 3. In addition, the home does not appear to have the potential to yield significant historical information, and thus does not appear eligible under criterion 4.

National Register Criteria

The National Register of Historic Places was first established in 1966, with major revisions in 1976. The register is set forth in 36 CFR 60 which establishes the responsibilities of the State Historic Preservation Officers (SHPO), standards for their staffs and review boards, and describes the statewide survey and planning process for historic preservation. Within this regulation guidelines are set forth concerning the National Register of Historic Places (36 CFR 60.6). In addition, further regulations are found in 36 CFR 63-66, 800, and Bulletin 15 which define procedures for determination of eligibility, identification of historic properties, recovery, reporting, and protection procedures. The National Register of Historic Places was established to recognize resources associated with the accomplishments of all peoples who have contributed to the country's history and heritage. Guidelines were designed for Federal and State agencies in nominating cultural resources to the National Register. These guidelines are based upon integrity and significance of the resource. Integrity applies to specific items such as location, design, setting, materials, workmanship, feeling, and association. Quality of significance in American history, architecture, archaeology, engineering and culture is present in resources that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of the following criteria:

A. That are associated with events that have made a significant contribution to broad patterns of our history:
B. That are associated with the lives of persons significant in our past;
C. That embody distinctive characteristics of type, period, or method of construction, or that represent the work of master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
D. That have yielded, or are likely to yield, information important in prehistory or history.

Integrity is defined in Bulletin 15: How to Apply the National Register Criteria for Evaluation, (U.S. Department of the Interior, National Park Service 1982) as:

> the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period. If a property retains the physical characteristics it possessed in the past then it has the capacity to convey association with historical patterns or persons, architectural or engineering design and technology, or information about a culture or peoples.

There are also seven aspects of integrity which are used. These aspects are:

1. location
2. design
3. setting
4. materials
5. workmanship
6. feeling
7. association

The structure at 980 Morse Street is not currently listed on the National Register of Historic Places. In addition, the property does not appear to be potentially eligible for listing in this register. The home is not associated with significant historic events or persons, thus it does not appear to be potentially eligible for listing under criteria A or B. Although built in the Ranch style, it is not a particularly exceptional or unusual example of this style, thus the structure does not appear to qualify as eligible for the NRHP under criterion C. The property does not appear to be likely to yield information important in prehistory or history, thus it does not appear to qualify as potentially eligible under criterion D.

San Jose Historic Resources Inventory Criteria

The City of San Jose's Historic Preservation Ordinance defines structures of historical value based on any of the following factors:

1. Its character, interest or value as part of the local, regional, state, or national history, heritage or culture;
2. Its location as a site of a significant historic event;
3. Its identification with a person or persons who significantly contributed to the local, regional, state, or national culture and history;
4. Its exemplification of the cultural, economic, social or historic heritage of the City of San Jose;
5. Its portrayal of the environment of a group of people in an era of history characterized by a distinctive architectural style;
6. Its embodiment of distinguishing characteristics of an architectural type or specimen;
7. Its identification as the work of an architect or master builder whose individual work has influenced the development of the City of San Jose;
8. Its embodiment of elements of architectural or engineering design, detail, materials or craftsmanship which represents a significant architectural innovation or which is unique.

The City of San Jose Historic Resource inventory Hierarchy of Significance

Evaluation Tally Sheet Total	Category of Significance
33 +	Potential Historic Resource
0-32	Non-Significant Structure

The structure at 980 Morse Street is not currently listed on the San Jose Historic Resource Inventory; in addition it does not appear to be potentially eligible for listing in this register. The property received a score of 16.8 points on the City of San Jose Historic Evaluation Form, identifying it as a Non-Significant Structure.

Continued from B12:

Arbuckle, C.
1985 *Clyde Arbuckle's History of San Jose*. San Jose: Smith and McKay.

Assessor's Office, County of Santa Clara
2011 Record search of assessed value and associated taxes for the property at 980 Morse Street

Calloway, S. and E. Cromley
1996 *The Elements of Style: A Practical Encyclopedia of Interior Architectural Details from 1485 to the Present, Revised Edition*. New York: Simon & Schuster.

City Directories
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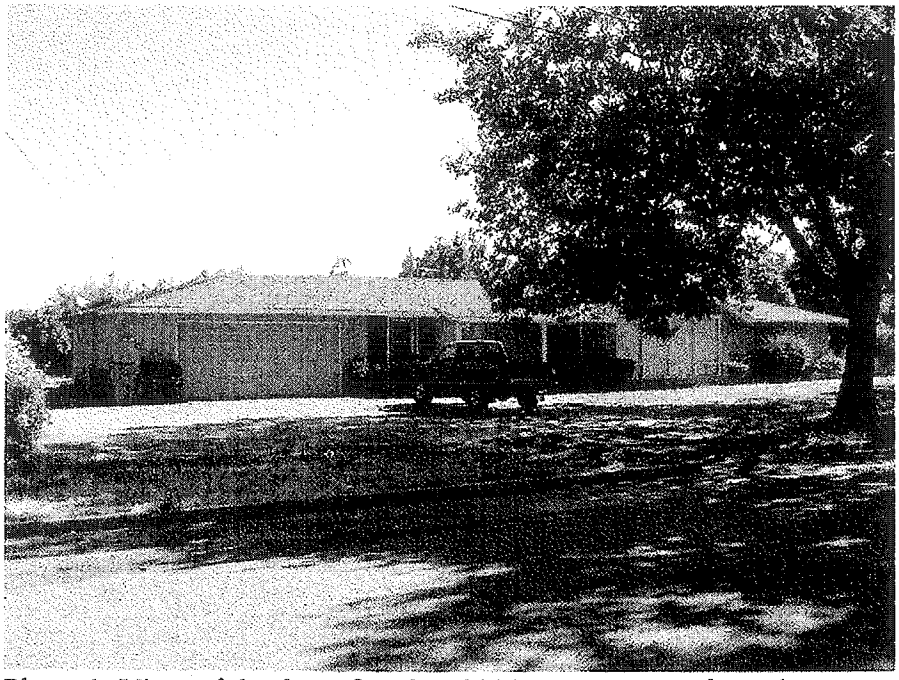


Photo 1: View of the front façade of 980 Morse Street from the east.

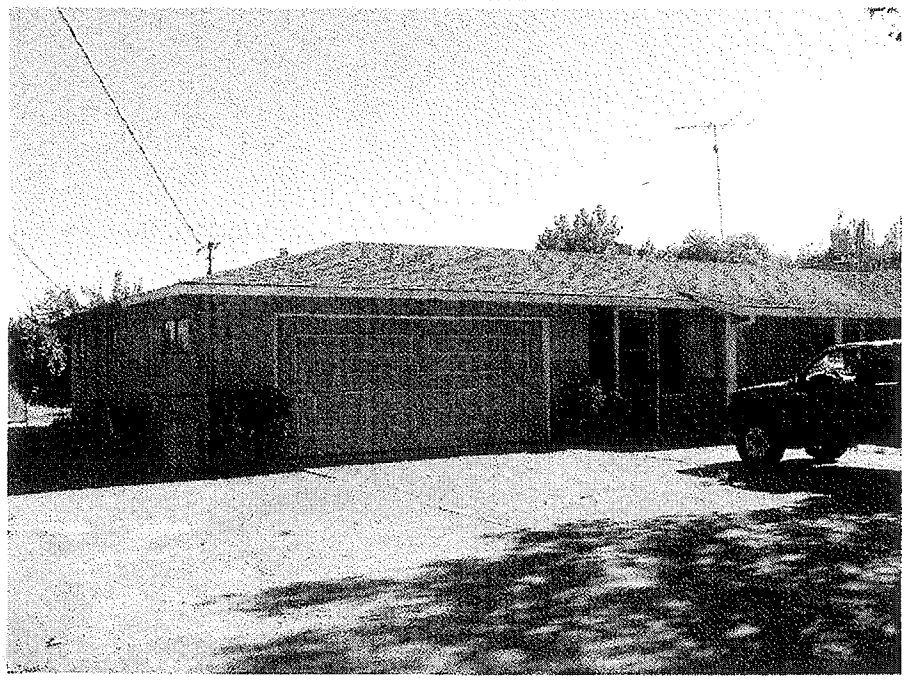


Photo 2: View of the garage at 980 Morse Street.

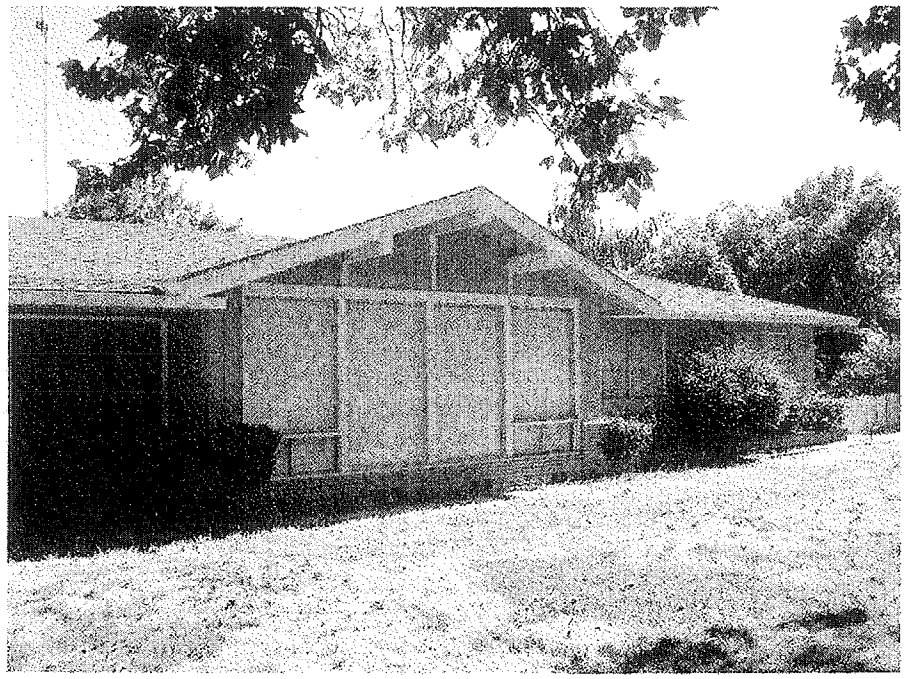


Photo 3: View of the southern half of the front façade.

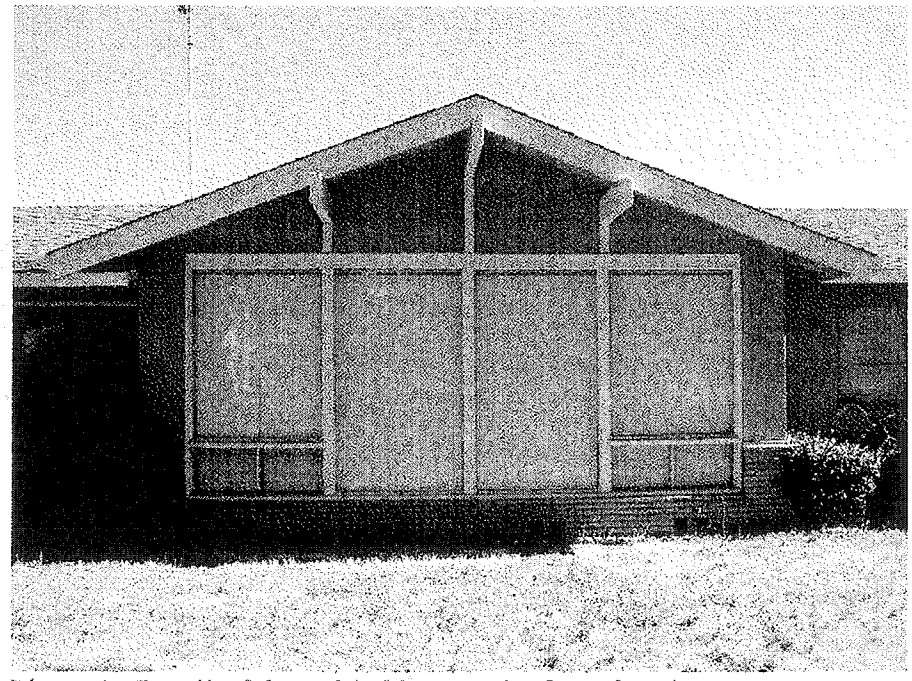


Photo 4: Detail of the gabled bay on the front façade.

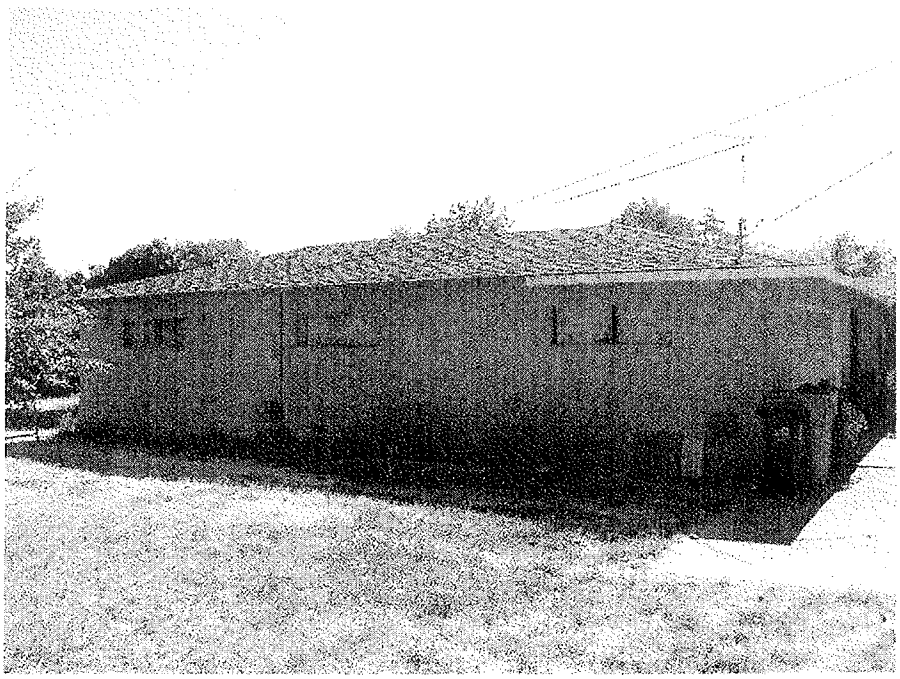


Photo 5: View of the northern side of the structure.

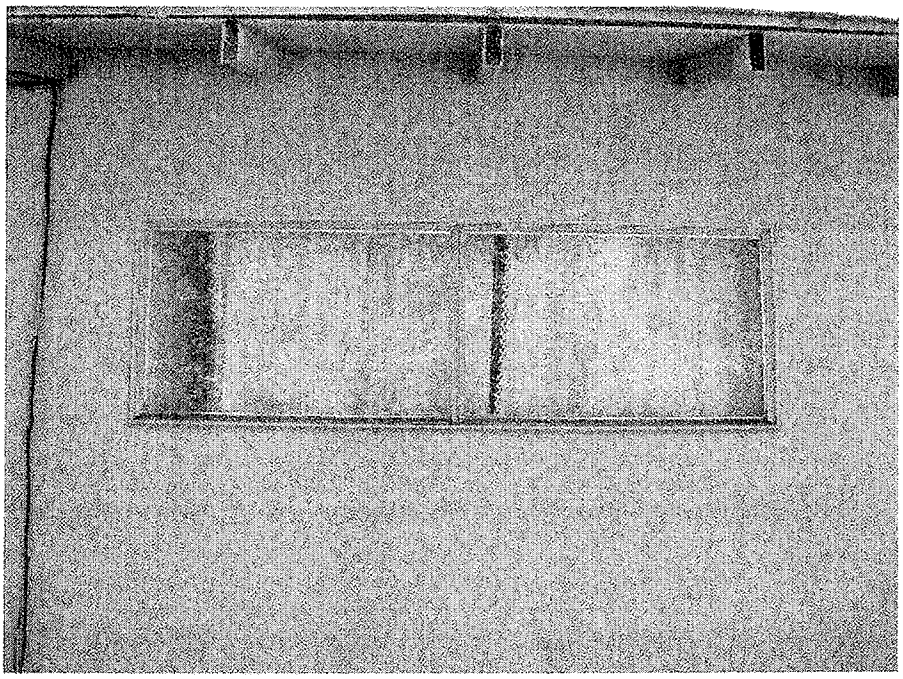


Photo 6: Detail of aluminum framed window on northern façade.

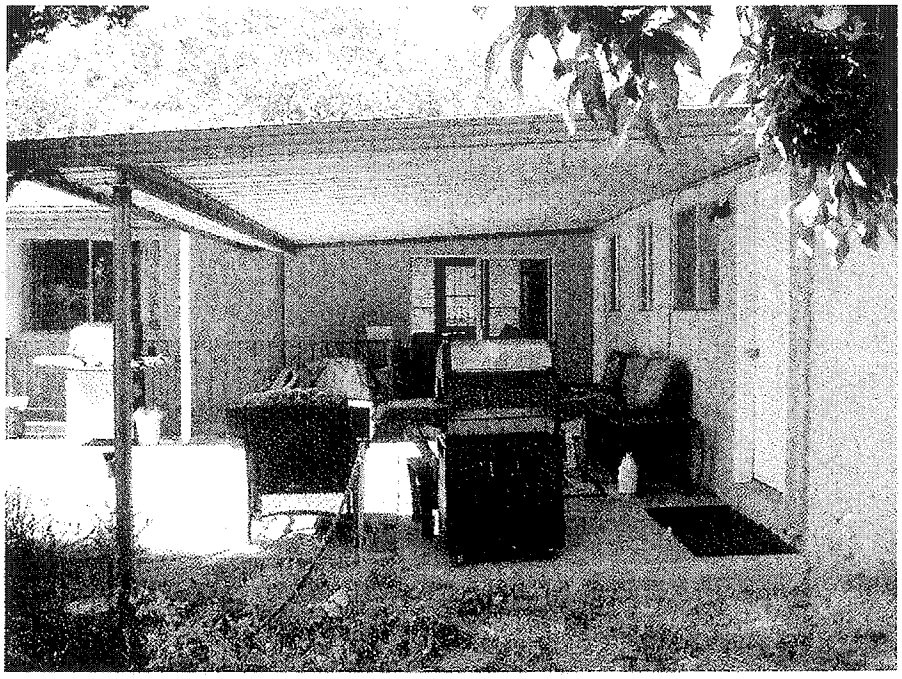


Photo 7: View of the back patio area from the back yard.

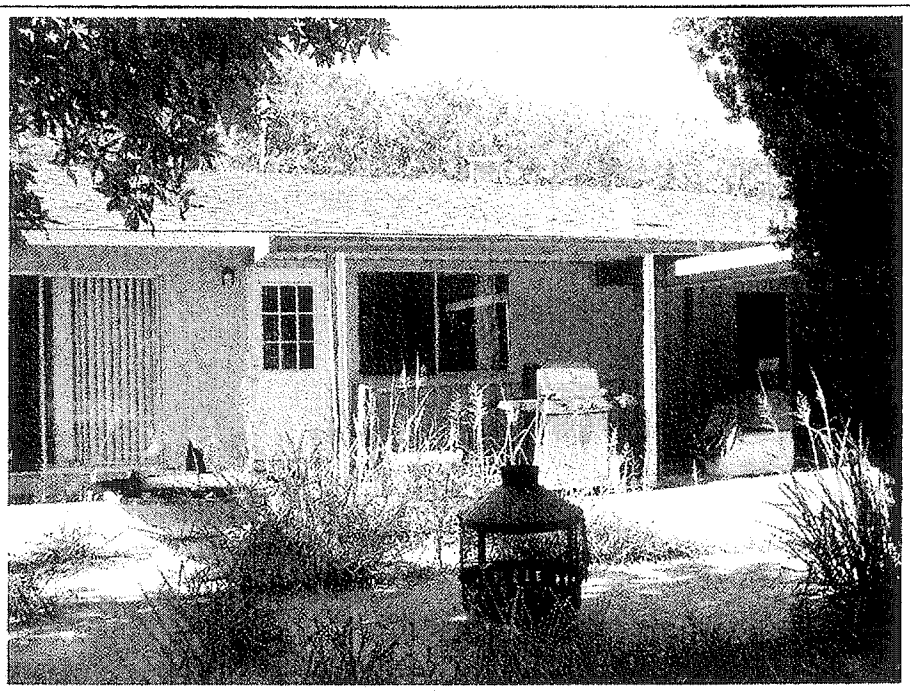


Photo 8: View of another portion of the back patio.

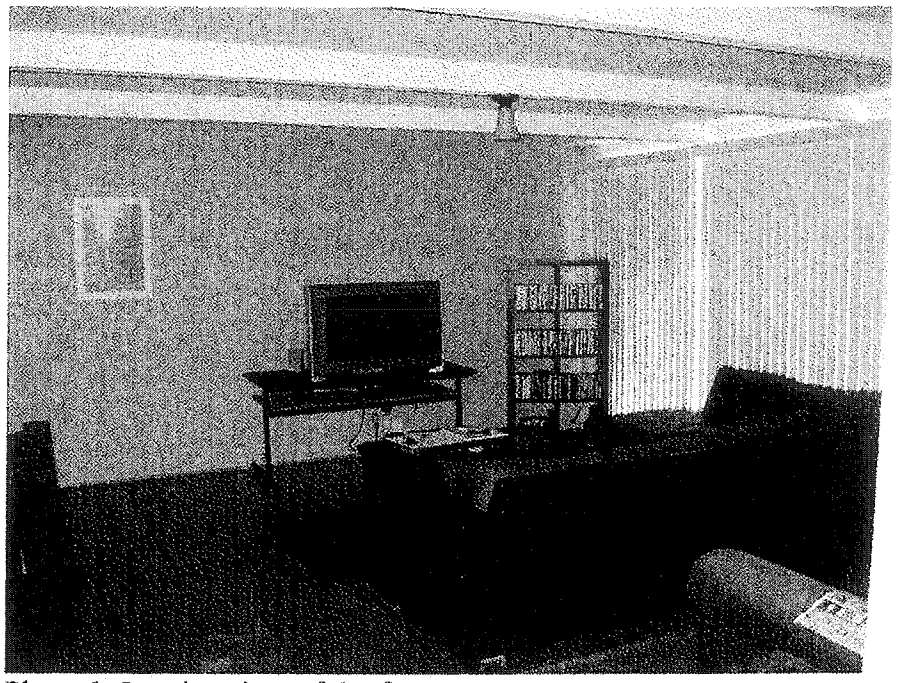


Photo 9: Interior view of the front room. .

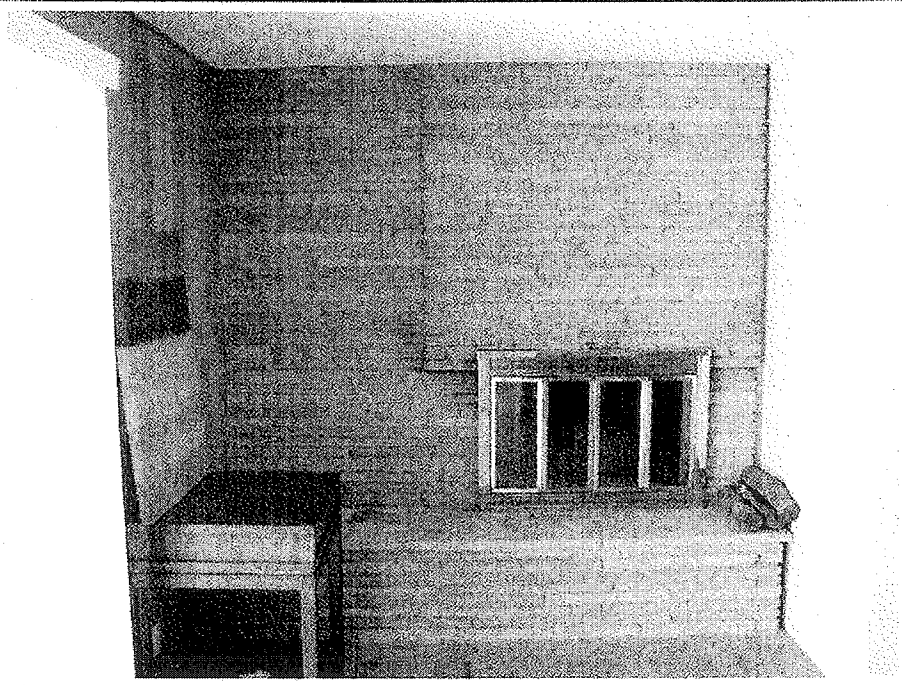


Photo 10: View of the asymmetrical modern fireplace.

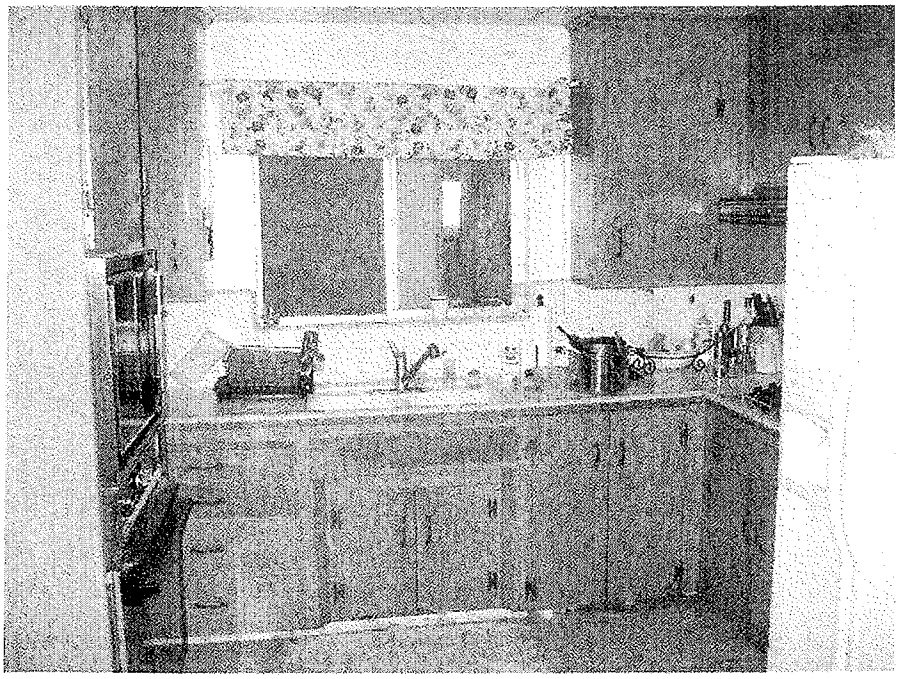


Photo 11: View of the kitchen, note original cabinets and counters.

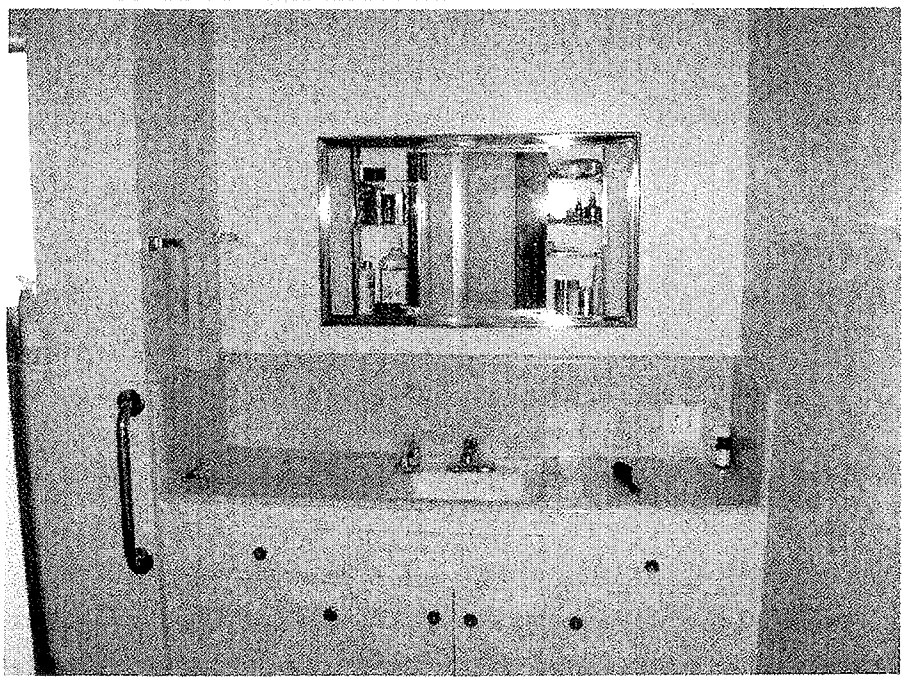


Photo 12: View of the cabinets and vanity counter in the bathroom.

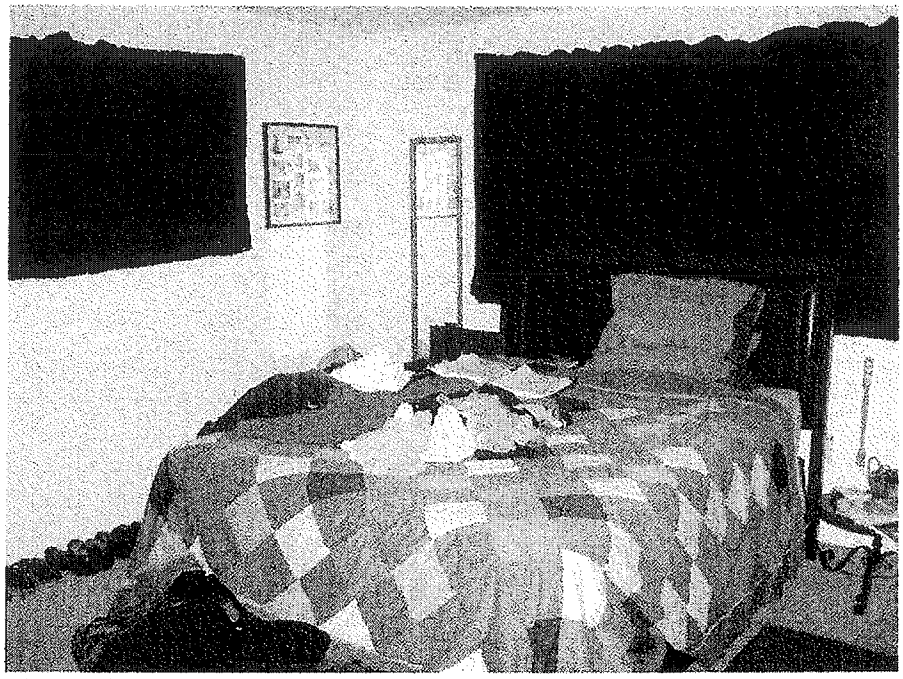


Photo 13: View of the master bedroom.

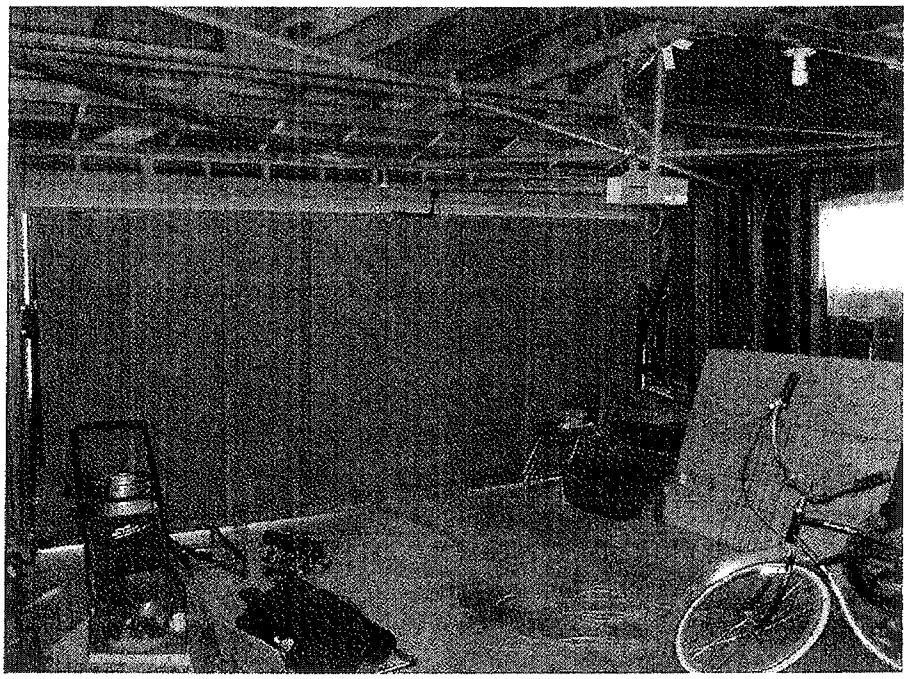


Photo 14: Interior view of the garage.

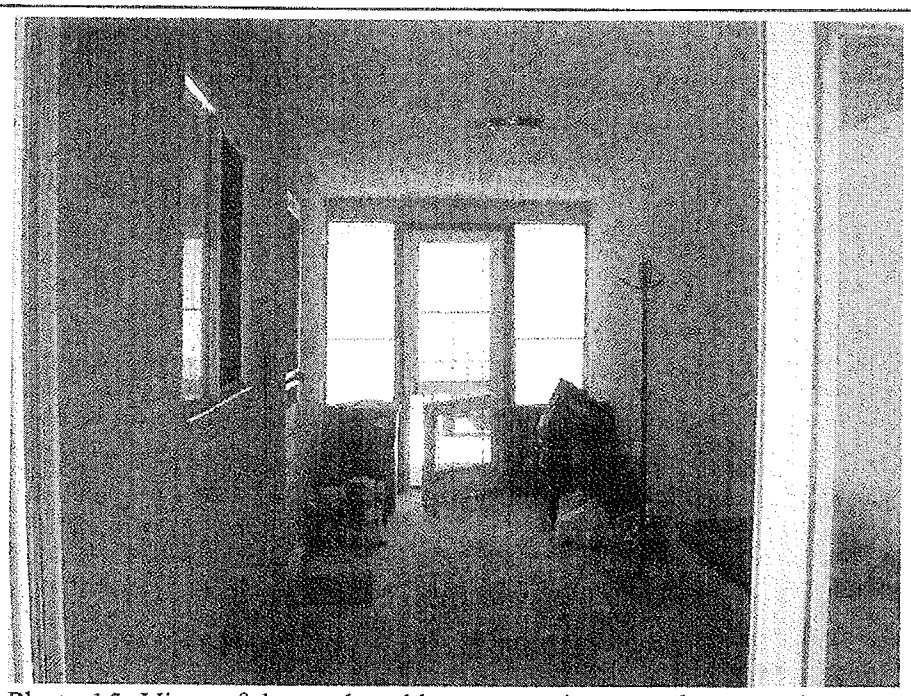


Photo 15: View of the enclosed breezeway between house and garage.

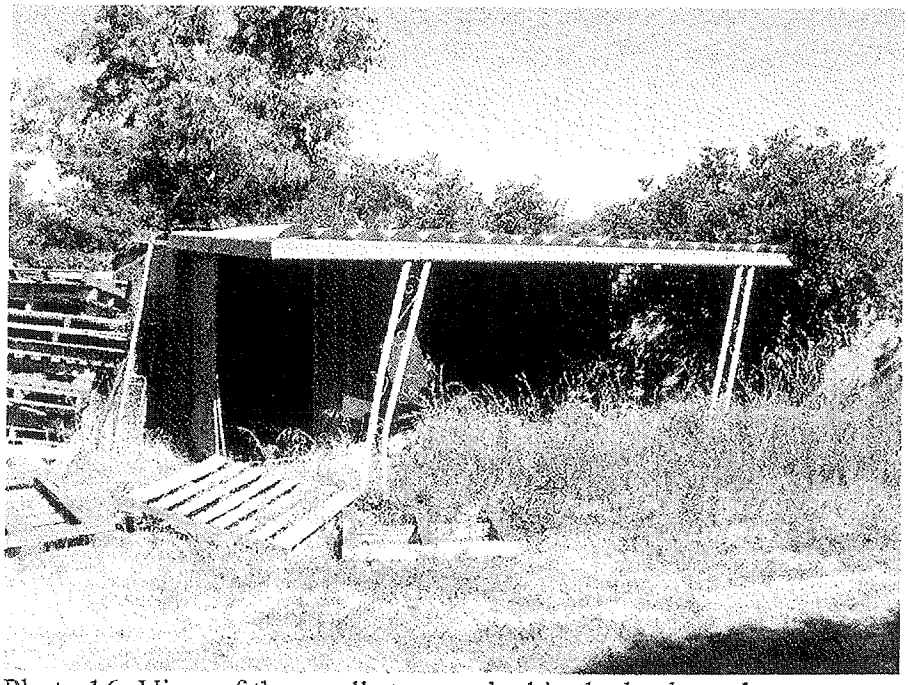


Photo 16: View of the small storage shed in the back yard.

980 Morse Street Evaluation Form

A. VISUAL QUALITY/DESIGN

1. EXTERIOR
   Quality of form, composition, detailing, and ornament in part of originality, artistic merit, craftsmanship, sensitivity to surroundings and overall visual quality.

   G - Good

2. STYLE
   Significance as an example of a particular architectural style, type, or convention.

   G - Good example

3. DESIGNER

   a. Designed or built by an architect, engineer, builder, artist, or other designer who has made significant contribution to the community, state, or nation.

   FP - Designer unknown

OR

   b. Significance as an example of vernacular architecture.

4. CONSTRUCTION
   Significance as example of a particular structural material, surface material, or method of construction.

   FP - Of no particular interest

5. SUPPORTIVE ELEMENTS
   Fences, walls, out-buildings, trees, landscaping, and other secondary elements which are accessory to the feature being evaluated and are supportive of, or enhance the features notable qualities; also stores, institutions, and other tenants located within buildings.

   G – Supportive elements, but none are especially fine or unusual

B. HISTORY/ASSOCIATION

6. PERSON/ORGANIZATION
   Associated with the life or activities of a person, group, organization, or institution that has made a significant contribution to the community, state, or nation.

   FP - No known connection

7. EVENT
   Associated with an event that has made a significant contribution to the community, state, or nation.

   FP - No known connections with event of importance

PATTERNS

Associated with and effectively illustrative of broad patterns of cultural, social, political economic, or industrial history, or of the development of the City, or of distinct geographic regions, or ethnic groups of particular well-defined era.

FP - No known connections with patterns of importance

9. AGE

Of particular age in relationship of the periods of development of buildings in the area.

FP - Built 1959

C. ENVIRONMENTAL/CONTEXT

10. CONTINUITY

Contributes to the visual, historic, or other environmental continuity or character of the street area.

FP – Not located in an area of primary or secondary importance

11. SETTING

Setting and/or landscaping contributes to the continuity or character of the street, neighborhood, or area.

G - Compatible with the dominant character of the area

12. FAMILIARITY

Prominence or familiarity within the neighborhood, city, or region.

FP - Not particularly conspicuous or familiar

D. INTEGRITY

13. CONDITION

Extent to which the feature has experienced deterioration.

VG - Exhibits only minor surface wear.

14. EXTERIOR ALTERATIONS

Degree of alteration done to important exterior materials and design features.

VG – Minor alterations which do not effect the overall character

15. STRUCTURAL REMOVALS

Extent to which wings, stories, roofs, and other important large scale structural components have been removed

E - No important structural removals

16. SITE
Relation of features to its original site and neighborhood.

E - Has not been moved

E. REVERSIBILITY

17. EXTERIOR
Extent to which integrity losses (see Criteria 13-16) can be reversed, and ease or difficulty of making such corrections.

VG - Reversible

HISTORIC EVALUATION SHEET

HISTORIC RESOURCE NAME: 980 Morse Street

A. VISUAL QUALITY/DESIGN

1. EXTERIOR	E	VG	**G**	FP
2. STYLE	E	VG	**G**	FP
3. DESIGNER	E	VG	G	**FP**
4. CONSTRUCTION	E	VG	G	**FP**
5. SUPPORTIVE ELEMENTS	E	VG	**G**	FP

B. HISTORY/ASSOCIATION

6. PERSON/ORGANIZATION	E	VG	G	**FP**
7. EVENT	E	VG	G	**FP**
8. PATTERNS	E	VG	G	**FP**
9. AGE	E	VG	G	**FP**

C. ENVIRONMENTAL/CONTEXT

10. CONTINUITY	E	VG	G	**FP**
11. SETTING	E	VG	**G**	FP
12. FAMILIARITY	E	VG	G	**FP**

D. INTEGRITY

13. CONDITION	E	**VG**	G	FP
14. EXTERIOR ALTERATIONS	E	**VG**	G	FP
15. STRUCTURAL REMOVALS	**E**	VG	G	FP
16. SITE	**E**	VG	G	FP

E. REVERSIBILITY

17. EXTERIOR	E	**VG**	G	FP

REVIEWED BY: Robert Cartier DATE: August 31, 2011

EVALUATION TALLY SHEET
PART I

		VALUE				
A.	**VISUAL QUALITY/DESIGN**	**E**	**VG**	**G**	**FP**	
	1. EXTERIOR	16	12	**6**	0	6
	2. STYLE	10	8	**4**	0	4
	3. DESIGNER	6	4	2	**0**	0
	4. CONSTRUCTION	10	8	4	**0**	0
	5. SUPPORTIVE ELEMENTS	8	6	**3**	0	3
				SUBTOTAL:		13
B.	**HISTORY/ASSOCIATION**	**E**	**VG**	**G**	**FP**	
	6. PERSON/ORGANIZATION	20	15	7	**0**	0
	7. EVENT	20	15	7	**0**	0
	8. PATTERNS	12	9	5	**0**	0
	9. AGE	8	6	3	**0**	0
				SUBTOTAL:		0
C.	**ENVIRONMENTAL/CONTEXT**	**E**	**VG**	**G**	**FP**	
	10. CONTINUITY	8	6	3	**0**	0
	11. SETTING	6	4	**2**	0	2
	12. FAMILIARITY	10	8	4	**0**	0
				SUBTOTAL:		2

"A" & "C" SUBTOTAL: 15

"B" SUBTOTAL: 0

PRELIMINARY TOTAL: 15
(Sum of A, B, and C)

EVALUATION TALLY SHEET
Part II

			VALUE			
D.	**INTEGRITY**	**E**	**VG**	**G**	**FP**	
	13. CONDITION	--	**.03**	.05	.10	.03 x * 15 = 0.45 * from A, B, C Subtotals
	14. EXTERIOR ALTERATIONS	--	**.05**	.10	.20	.05 x * 15 = 0.75 * from A and C Subtotals
		--	**.03**	.05	.10	.03 x * 0 = 0.0 * from B Subtotal
	15. STRUCTURAL REMOVALS	--	.20	.30	.40	.--- x * 15 = 0.0 * from A and C Subtotals
		--	.10	.20	.40	.-- x * 0 = 0.0 * from B Subtotal
	16. SITE	--	.10	.20	.40	.-- x * 0 = 0.0 * from B Subtotal

INTEGRITY DEDUCTIONS SUBTOTAL: 1.2

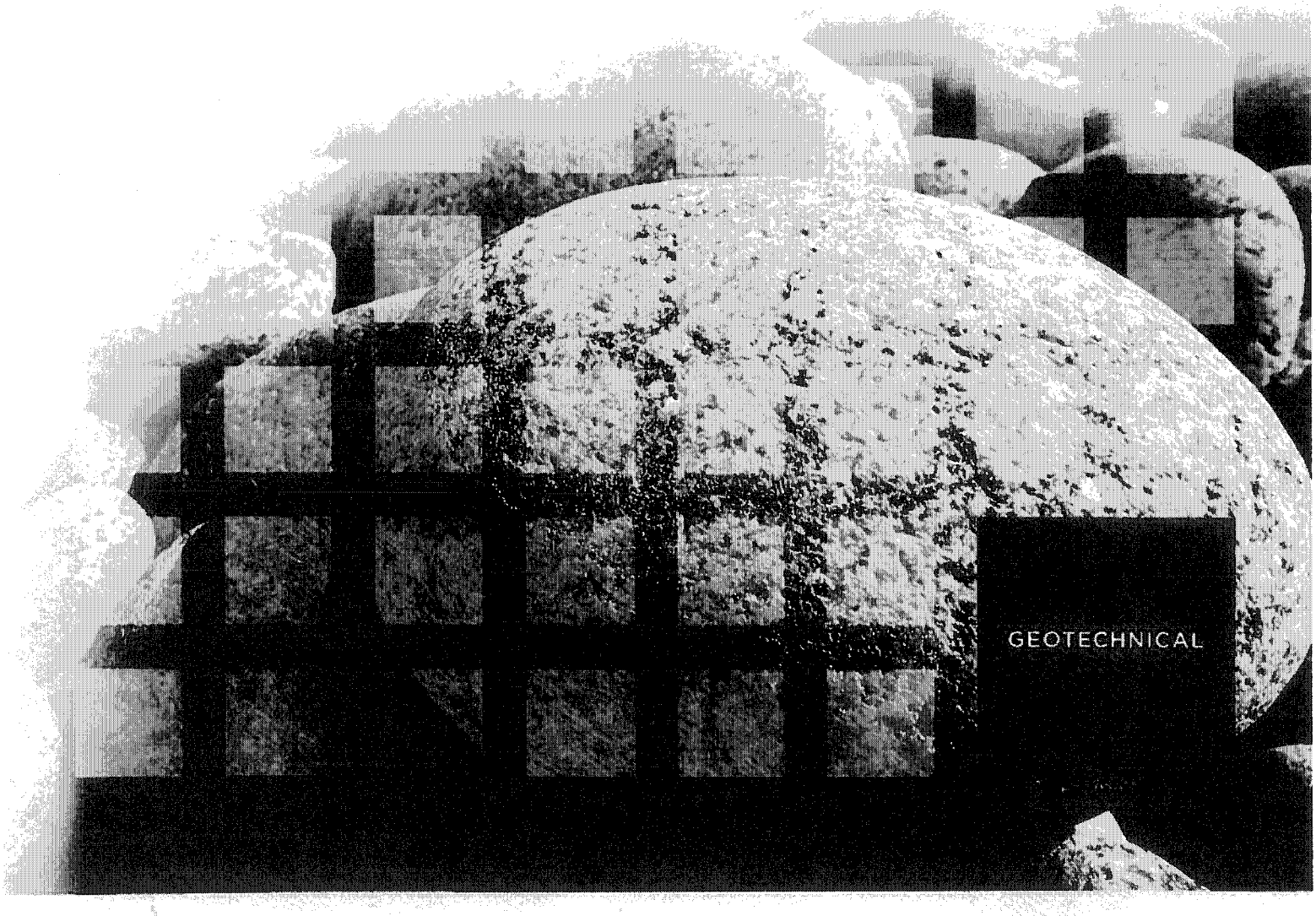
ADJUSTED SUBTOTAL: 15 - 1.2 = 13.8
(Preliminary Total minus Integrity Deductions)

			VALUE			
E.	**REVERSIBILITY**	**E**	**VG**	**G**	**FP**	
	17. EXTERIOR	3	**3**	2	2	3

TOTAL: 16.8

CORNERSTONE
EARTH GROUP

TYPE OF SERVICES	Barry Swenson Builder
PROJECT NAME	Morse Street Courthomes
LOCATION	980 Morse Street San Jose, California
CLIENT	Barry Swenson Builder
PROJECT NUMBER	100-14-1
DATE	September 13, 2011



CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**Morse Street Courthomes**
Location	**980 Morse Street** **San Jose, California**
Client	**Barry Swenson Builder**
Client Address	**777 North First Street** **San Jose, California**
Project Number	**100-14-1**
Date	**September 13, 2011**

Prepared by **Danh T. Tran, P.E.**
Principal Engineer
Geotechnical Project Manager

C. Barry Butler, P.E., G.E.
Principal Engineer
Quality Assurance Reviewer

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T 408 245 4600 | F 408 245 4620

2737 North Main Street Suite 10 | Walnut Creek, CA 94597
T 925 988 9500 | F 925 988 9501

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Type of Services	**Geotechnical Investigation**
Project Name	**Morse Street Courthomes**
Location	**980 Morse Street** **San Jose, California**

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Barry Swenson Builder for the new residential development to be located at 980 Morse Street in San Jose, California. For our use, we received a set of plans titled "Morse Street Courthomes, 980 Morse Street, San Jose, California" prepared by Barry Swenson Architecture, and dated August 22, 2011 (PDZ Resubmittal).

1.1 PROJECT DESCRIPTION

The proposed site plan is shown on Figure 1. Based on the information provided, we understand the project will consist of redeveloping the approximately ¾-acre site for a new residential development consisting of four single-family homes (Plan A through D). The new homes will be two-story structures with wood-frame construction and slab-on-grade floors. The two-story homes will total approximately 2,000 square with a first floor footprint of approximately 1,100 square feet. Plan A will include an attached garage. Plan B will include a detached garage. Plan C and D will include two detached garages but connected to each other. The garages will be approximately 475 square feet each.

Structural loads are not available for our review at this time. However, we assume structural loads will be typical for these types of structures. We anticipate minor cuts and fills, on the order of 1 to 2 feet, will be required during site grading and construction.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated January 19, 2011, and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, as well as preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

To evaluate the subsurface conditions at the site, we advanced two Cone Penetration Test (CPT) borings to a depth of approximately 50 feet. We also performed one hand-auger boring near CPT-1 to a depth of approximately 12 feet below the ground surface. Our CPTs were backfilled with cement grout in accordance with SCVWD guidelines. The approximate location of our CPT is shown on the Site Plan, Figure 2. Details regarding our field exploration are presented in Appendix A.

1.4 LABORATORY TESTING PROGRAM

Our laboratory evaluation included two plasticity index tests (ASTM D4318). Laboratory test results are summarized in Appendix B.

1.5 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	6.6	10.7
Hayward (Total Length)	8.9	14.3
Calaveras	9.7	15.6
San Andreas (1906)	10.8	17.4

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 approximately ¾-acre triangular site is located at 980 Morse Street southeast of Highway 880 in San Jose, California. The site is located in a residential neighborhood.

At the time of our field exploration, the site was bounded on the north by the Highway 880 northbound off-ramp to The Alameda. It was bounded by existing residential dwellings to the southeast and Morse Street to the southwest. The site is currently occupied with a single-family residence. The area surrounding the house was covered with surface vegetation and some mature trees.

3.2 SUBSURFACE CONDITIONS

Based on our interpretations of the CPTs and hand-auger boring, the site was underlain by predominantly medium stiff to very stiff clay to a depth of approximately 50 feet. The clay was interbedded with silty and sandy soils. Those strata ranged less than one foot to about 12 feet, and generally located at depths of approximately 23 and 40 feet. Detailed subsurface information is presented in the CPT logs as part of Appendix A.

A Plasticity Index (PI) test performed on a sample of the surficial clayey soil resulted in a PI of 29 and a Liquid Limit of 48, indicating a high plasticity and expansion potential.

3.3 GROUND WATER

Based on the CPT pore pressure measurements, ground water is estimated to be at depths of approximately 15 to 20 feet. This measurement was taken at the time of our field exploration and may not reflect a stabilized level. Based on available published data, seasonal and/or historical high ground water on the order of about 13 feet below the ground surface could be expected for the site vicinity (CGS, San Jose West Quadrangle, 2002). Based on the information above, we judged a ground water depth of 13 feet to be appropriate for design. 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. As discussed, the site is located in a highly seismically active region of Northern California, and the Monte Vista-Shannon Fault is located less than 6 kilometers from the site. A Probabilistic Seismic Hazard Analysis (PSHA) was performed, utilizing EZ-FRISK version 7.62 by Risk Engineering Inc., to evaluate the likelihood of various ground motion levels at the site as reflected in peak horizontal ground acceleration (PHGA). This approach takes into account the geological slip rate of all active faults and background seismicity within 100 kilometers (62 miles) of the site and the site-specific response characteristics.

The PSHA results are based on ground motions, which corresponds to the anticipated response at a free field (i.e., ground motions are not influenced by the presence of a structure, topographic features, or ground failure).

The site coordinates of 37.341° and -121.926° were utilized in this analysis. The site is underlain by deep alluvium. We used a mean shear wave velocity of 280 meters per second within the upper 100 feet (Wills and Clahan, 2006). Next generation attenuation (NGA) relationships by Campbell-Bozorgnia (2008), Chiou-Youngs (2007), and Boore and Atkinson (2008) were utilized in the analyses. The average of these attenuation relationship results was utilized in our analyses. These attenuation relationships are based on the geometric mean of the peak horizontal accelerations.

The average PHGA corresponding to a 10 percent probability of exceedance in 50 years (475-year ARP event) is 0.59g. This PHGA is used for our liquefaction analysis outlined below.

4.3 LIQUEFACTION POTENTIAL

The site is located within a State-designated Liquefaction Hazard Zone (CGS, San Jose West Quadrangle, 2002) and also within a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2002). Therefore, our field and laboratory programs addressed this issue by sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT correlations, and performing various tests to further classify the soil properties. Additional findings and recommendations follow.

4.3.1 Background

The State of California is in the process of mapping seismic hazards statewide. These maps will assist cities and counties in fulfilling their responsibilities for protecting the public safety from the effects of earthquake-triggered ground failure as required by the Seismic Hazards Mapping Act. As discussed above, the site is located within a State of California Seismic Hazard Zone for liquefaction. Our field and laboratory programs addressed this issue by sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT correlations, and performing various tests to further classify the soil properties.

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 1998). 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 draining materials, such as sand and silt layers bedded with a cohesive cap.

4.3.2 Analysis

As discussed above, several silty and sandy layers were encountered below the design ground water depth of 13 feet. Following the procedures in the 2008 monograph, Soil Liquefaction During Earthquakes (Idriss and Boulanger, 2008) and in accordance with CDMG Special Publication 117 guidelines (CDMG, 2008) for quantitative analysis, those 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. The CPT 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 site is primarily underlain by medium stiff to very still clayey soils and silts. The silt strata ranged from approximately less than 1 foot to about 2 feet in thickness.

The results of our CPT analyses (CPT-1 and CPT-2) are presented on Figures 4 and 5 of this report. Calculations for these CPTs are also included in Appendix C.

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 from approximately ⅓ inch, or less, based on the updated Yoshimine et al., 2006 (after Ishihara and Yoshimine, 1992) method. As discussed in the SCEC report, differential movement for level ground sites over deep soil sites will be about half of the total settlement. In our opinion, differential settlements are anticipated to be less than ¼-inch between independent foundation elements or within about 50 feet along continuous foundation elements.

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 approximately 15-foot thick layer of non-liquefiable cap that blankets the site 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.

There are no open faces within 200 feet of the site where lateral spreading could occur. In addition, the potential for liquefaction at the site is low; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

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

SECTION 5: CONCLUSIONS

Based on the subsurface conditions encountered, the primary geotechnical concern is the presence of highly expansive clayey soil blanketing the site. From a geotechnical viewpoint, the project is feasible provided the above concern is addressed in the project design. A brief description of this concern is provided below.

5.1 EXPANSIVE SOILS

As discussed, the surficial clayey soil is highly expansive. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned building and pertinent structures, footings should extend below the zone of seasonal moisture fluctuation and slab-on-grades be underlain by a non-expansive fill layer. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from footings as well as limiting landscaping watering. Detailed grading and foundation recommendations addressing this concern are provided in Sections 7, 9, and 10.

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 from those encountered in our small-diameter and widely-spaced 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.

6.1.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the rootballs and any roots greater than ½-inch diameter removed completely. Grade depressions resulting from rootball 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. Slabs, foundations, and pavements that extend into planned flatwork, pavement, or landscape areas may be left in place provided there is at least 3 feet of engineered fill overlying the remaining materials, they are shown not to conflict with new utilities, and that asphalt and concrete more than 10 feet square is broken up to provide subsurface drainage.

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 must 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. The risk for each issue are relatively low for single utility lines less than 4 inches in diameter and increase with increasing pipe diameter.

6.2 REMOVAL OF EXISTING FILLS

Any fills encountered during site grading should be completely removed from within building areas. 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 12 to 18 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 10 feet at the site may be classified as OSHA Site B materials. A Cornerstone representative should be retained to confirm the preliminary site classification.
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 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.

6.5 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silts, 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, more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

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.

6.5.1 Scarification and Drying

The subgrade may be scarified to a depth of 12 to 18 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.

6.5.2 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 geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.5.3 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 range from 12 to 18 inches depending on the magnitude of the instability.

6.6 MATERIAL FOR FILL

6.6.1 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.

6.6.2 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less. 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.

6.6.3 Non-Expansive Fill Using Chemical Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the clay content and high expansion potential of the surficial soils, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. It has been our experience that highly plastic clay will likely need to be mixed with quicklime, or approved equivalent, to fully react with the clay and adequately reduce the PI of the on-site soils to 15 or less.

For your project budgeting and preliminary design purposes, we estimate the native clayey soil will need to be mixed with approximately 4 percent quicklime (CaO) by weight to reduce the PI down to 15 or less. If this option is considered, additional laboratory tests should be performed during the initial site grading to further evaluate the optimum percentage of chemical treatment required.

6.7 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 2: Compaction Requirements

Description	Material Description	Minimum Relative [1] Compaction (percent)	Moisture Content [2] (percent)
General Fill	On-Site Expansive Soils	87 – 92	>3
(within upper 5 feet)	On-Site Low Expansion Soils	90	>1
General Fill	On-Site Expansive Soils	95	>3
(below a depth of 5 feet)	On-Site Low Expansion Soils	95	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	On-Site Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	On-Site Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	On-Site Low Expansion Soils	90	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	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

6.8 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 (⅜-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.

6.9 LOT 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. Roof runoff should be directed away from building areas. Where minimal side yards are planned (10 feet or less), we recommend that area drains collect surface runoff and transmit the runoff to other suitable landscape drainage facilities to prevent ponding adjacent to building foundations. Landscape drainage such as drain inlets and storm water filtration and/or infiltration trenches should be provided to collect and transmit storm water runoff to project storm drains, and/or detention or retention facilities. Although the PT-mat foundations are designed to accommodate some moisture variability within the near-surface soils, excessive moisture or desiccation may result in additional differential foundation movement.

6.10 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation,
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes,
- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers, and
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed buildings 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 CPT and review of local geologic maps, the site is underlain by medium stiff to very stiff and medium dense to very dense alluvial soils to depths of at least 50 feet with equivalent SPT "N" values generally between 15 to greater than 50 blows per foot; therefore, we have classified the site as Soil Classification D. The mapped spectral acceleration parameters S_S and S_1 may be 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 in Table 3 and the Site Class. Table 3 also lists various factors used to determine the seismic coefficients and other parameters.

Table 3: 2010 CBC Site Classification and Seismic Coefficients

Classification/Coefficient	Design Value
Soil Classification (Table 1613.5.2)	D
Site Latitude	37.341°
Site Longitude	-121.926°
Short Period Mapped Spectral Acceleration, S_S	1.500g
1-second Period Mapped Spectral Acceleration, S_1	0.600g
Seismic Coefficient F_a (Table 1613.5.3(1))	1.0
Seismic Coefficient F_v (Table 1613.5.3(2))	1.5
MCE[1] Spectral Response Acceleration for Short Periods, S_{MS}	1.500g
MCE[1] Spectral Response Acceleration for 1-Second Period, S_{M1}	0.900g
Five-Percent Damped Design Spectral Response at Short Periods, S_{DS}	1.000g
Five-Percent Damped Design Spectral Response at 1-Second Period, S_{D1}	0.600g

Note: [1] MCE is defined as Maximum Considered Earthquake

7.3 SHALLOW FOUNDATIONS

7.3.1 Spread Footings

Spread footings should bear entirely on natural, undisturbed soil or engineered fill and should extend at least 18 inches below the lowest adjacent grade. 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.

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 2,000 psf for dead loads, 3,000 psf for combined dead plus live loads, and 4,000 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.

7.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; however, typical loads for this type of residential construction are expected to be light. We have assumed interior column dead plus live loads are on the order of 20 to 30 kips and perimeter footing dead plus live loads on the order of 1 to 2 kips per lineal foot.

Based on the above loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of ½-inch, with less than ½-inch of post-construction differential settlement between adjacent foundation elements. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading, and verify the settlement estimates above.

7.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.45 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf may be used in design. 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.

7.3.4 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.

7.4 MAT FOUNDATIONS ALTERNATIVES

7.4.1 General

As an alternative to spread footings, residential structures may also be supported on mat foundations bearing on natural soil or engineered fill prepared in accordance with the "Earthwork" section of this report, and designed in accordance with recommendations below.

7.4.2 Conventional Reinforced Mats

Reinforced concrete mat foundations may be designed in accordance with Section 1816 of the 2001 California Building Code, using an effective weighted plasticity index (PI) of 22 and a minimum cantilever length of 4 feet. The perimeter of all mats should have a turned down, thickened edge at least 12 inches wide and 12 inches thick, measured from mat top to bottom of thickened edge.

7.4.3 Post-Tensioned Mats

As an alternative to spread footings and conventional mat, residential structures can be supported on post-tensioned (PT) concrete mat foundations designed in accordance with the parameters provided in Table 4 based on procedures developed by the Post-Tensioning Institute (2004).

Table 4: Post-Tensioned Mat Design Criteria

Differential Movement Condition	Center Lift	Edge Lift
Edge Moisture Variation (feet)	5	3
Differential Soil Movement (inches)	2.7	0.6

7.4.4 Allowable Mat Bearing Pressures

To reduce potential differential movement, all mats should be designed for a maximum average areal bearing pressure of 1,500 psf for dead plus live loads; at column or wall loading, the maximum localized bearing pressure should be limited to 3,000 psf. When evaluating wind and seismic conditions, allowable bearing pressures may be increased by one-third. These pressures are net values; the weight of the mat may be neglected for the portion of the mat extending below grade. Top and bottom mats of reinforcing steel should be included as required to help span irregularities and differential settlement.

7.4.5 Mat Foundation Settlement

We estimate differential static settlements of less than ½-inch across the mat area for reinforced concrete mats and the differential movement listed in the Table 4 for PT-mats.

7.4.6 Lateral Loading on Mat Foundations

Lateral loads may be resisted by friction between the bottom of mat foundation and the supporting subgrade, and also by passive pressures generated against deepened mat edges. An ultimate frictional resistance of 0.45 applied to the mat dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. The upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.4.7 Mat Foundation Construction Considerations

Due to the presence of expansive soils, mat subgrade areas should be kept moist until concrete placement by regular sprinkling to prevent desiccation. If deep drying is allowed to occur, several days of moisture conditioning (flooding of the pads is not recommended) may be required to allow the moisture to re-penetrate the subgrade. If sever drying occurs, reworking and moisture conditioning of the pad may be required. Prior to placement of any vapor retarder and mat construction, the subgrade should be proof-rolled and visually observed by a Cornerstone representative to confirm stable subgrade conditions. The pad moisture should also be checked at least 24 hours prior to vapor barrier or mat reinforcement placement to confirm that the soil has a moisture content of at least 3 percent over optimum in the upper 12 inches.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 INTERIOR SLABS-ON-GRADE WITH FOOTINGS

As the surficial clays are highly expansive, the proposed slabs-on-grade used in conjunction with spread footings should be supported on at least 12 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over 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 NEF 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 at least 3 percent over the 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. 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.

8.2 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 mat foundation performance.

- Place a minimum 10-mil 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 rock may be considered as the upper 4 inches of the non-expansive fill recommended in Section 8.1 above.

- 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.

- 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.

8.3 EXTERIOR 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 6 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 unreinforced 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.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, 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 near-surface soils encountered in our explorations, our experience with similar soils, and engineering judgment.

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

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base[1] (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	12.5	16.0
6.5	4.0	14.0	18.0

Note: 1 – 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 6: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
0.8	5
13	5½
130	6

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. The slab for the trash enclosure should be at least 6 inches thick and supported ion at least 8 inches of Class 2 aggregate base. 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 unreinforced concrete thickness.

9.3 VEHICULAR CONCRETE UNIT PAVERS

We understand that vehicular concrete pavers may be used for the new drive aisle and driveways. We recommend that 80mm concrete pavers be placed over at least 12 inches of Class 2 aggregate base and 6 inches of prepared subgrade in accordance with the recommendations in the "Earthwork" section of this report. A maximum of 1 inch of bedding sand, in accordance with the manufacturers recommended gradation, is recommended to level the pavers on the aggregate base. If desired, a geosynthethic (stabilization fabric or geogrid) may be placed below the aggregate base section for additional support.

If concrete pavers are to be used as permeable pavers, then an open-graded crushed stone could be used as an alternate to Class 2 aggregate base for improved permeability and storage. The thickness of the crushed stone would be the same as that for the Class 2 aggregate base.

Because surface water will infiltrate the concrete pavers, and saturate the subgrade, occasional maintenance, as with any pavement, will likely be required. For concrete pavers, maintenance usually consists of removal of the pavers, re-leveling aggregate base, re-placing bedding sand, and re-placement of the concrete pavers.

Where concrete pavers are being placed, and are not required as a permeable surface, then they could optionally be placed directly on a PCC slab, with the recommended maximum bedding sand. This would reduce future maintenance. The PCC slab should be designed in accordance with the recommendations for PCC pavements above.

9.4 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduce to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or "Deep-Root Moisture Barriers" that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 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 with level backfill be designed for the following pressures:

Table 7: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure[1]	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H psf [2]	½ of vertical loads at top of wall

Note: 1 Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
2 H is the distance in feet between the bottom of footing and top of retained soil

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 WALL DRAINAGE

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. The drainage panel should be connected to the perforated pipe at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Miradrain 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 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.

10.4 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.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Barry Swenson Builder, specifically to support the design of the Morse Street Courthomes residential development located at 980 Morse Street in San Jose, 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.
Barry Swenson Builder may have provided Cornerstone with plans, reports and other documents prepared by others. Barry Swenson Builder 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.

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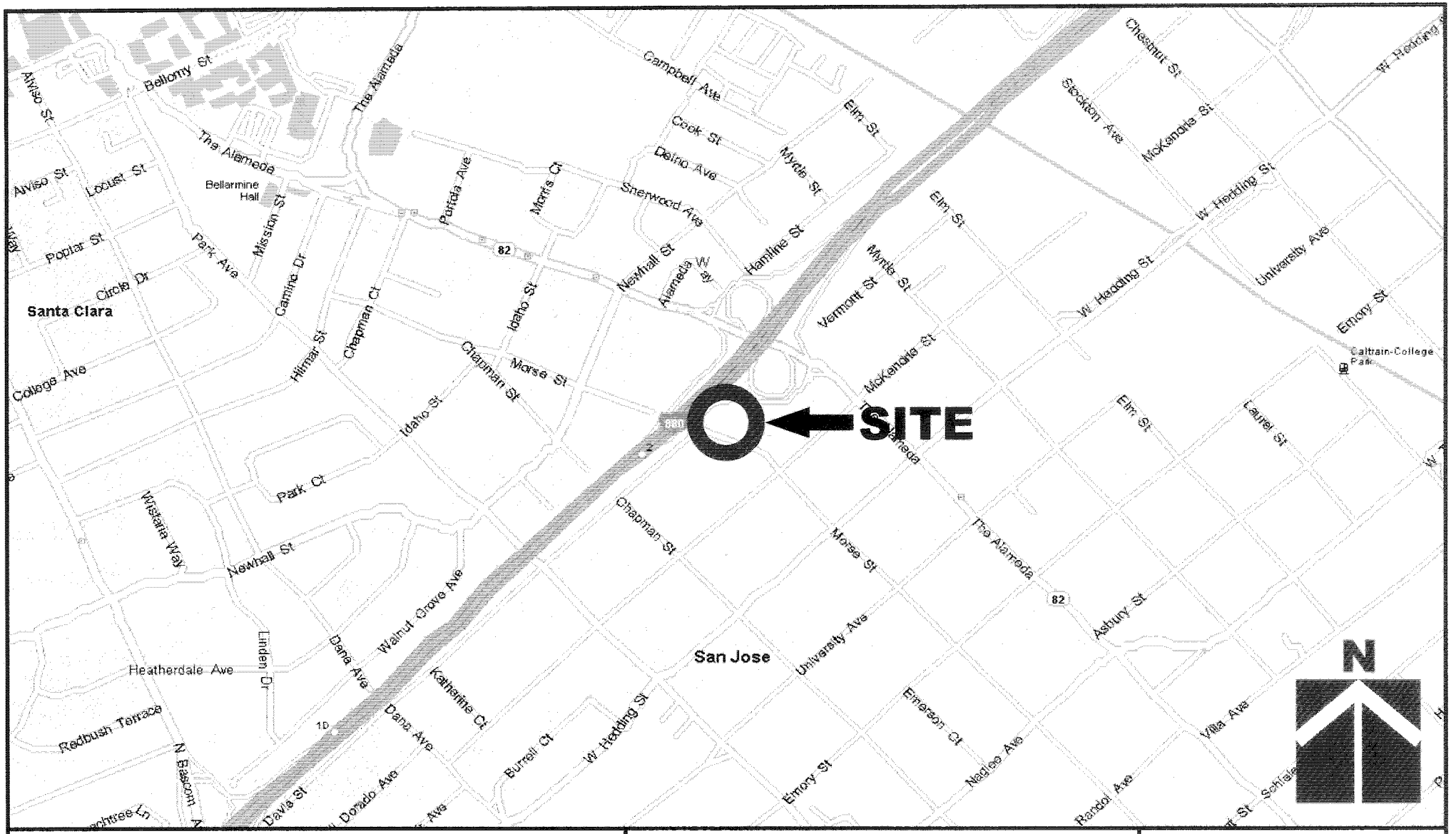
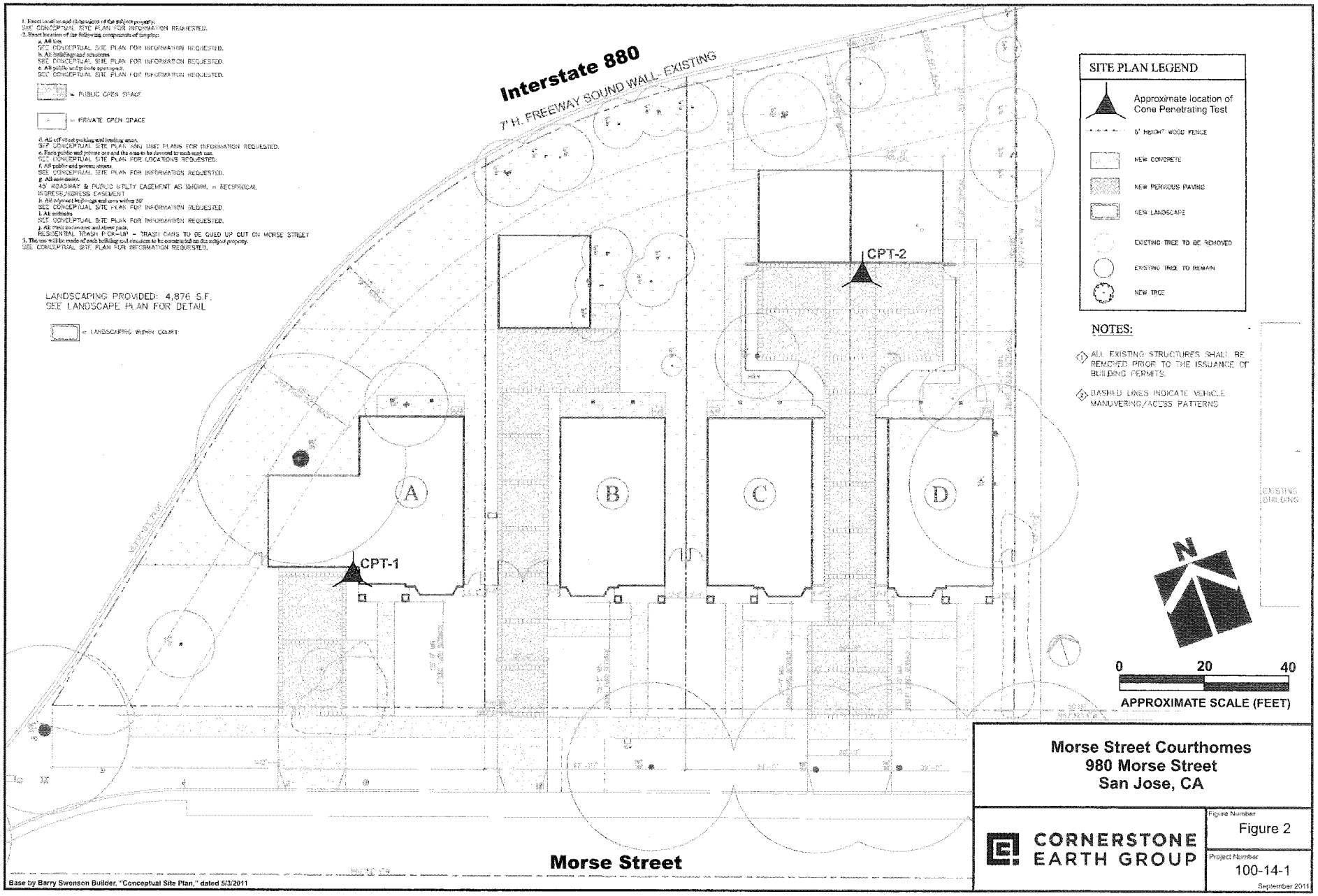


CORNERSTONE EARTH GROUP

Vicinity Map

Morse Street Courthomes
980 Morse Street
San Jose, CA

Project Number	100-14-1
Figure Number	Figure 1
Date	September 2011
Drawn By	RRN



Morse Street Courthomes
980 Morse Street
San Jose, CA

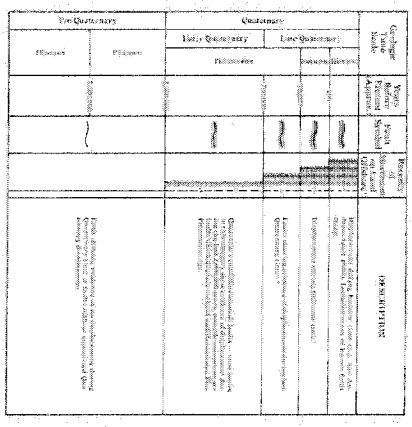
CORNERSTONE EARTH GROUP

Figure Number
Figure 2

Project Number
100-14-1

September 2011

Base Map: "Map showing recency of faulting, San Francisco - San Jose Quadrangle California," by Bortugno, et.al. (California Division of Mines and Geology) dated 1991.



APPROXIMATE SCALE (MILES)

0 10 20

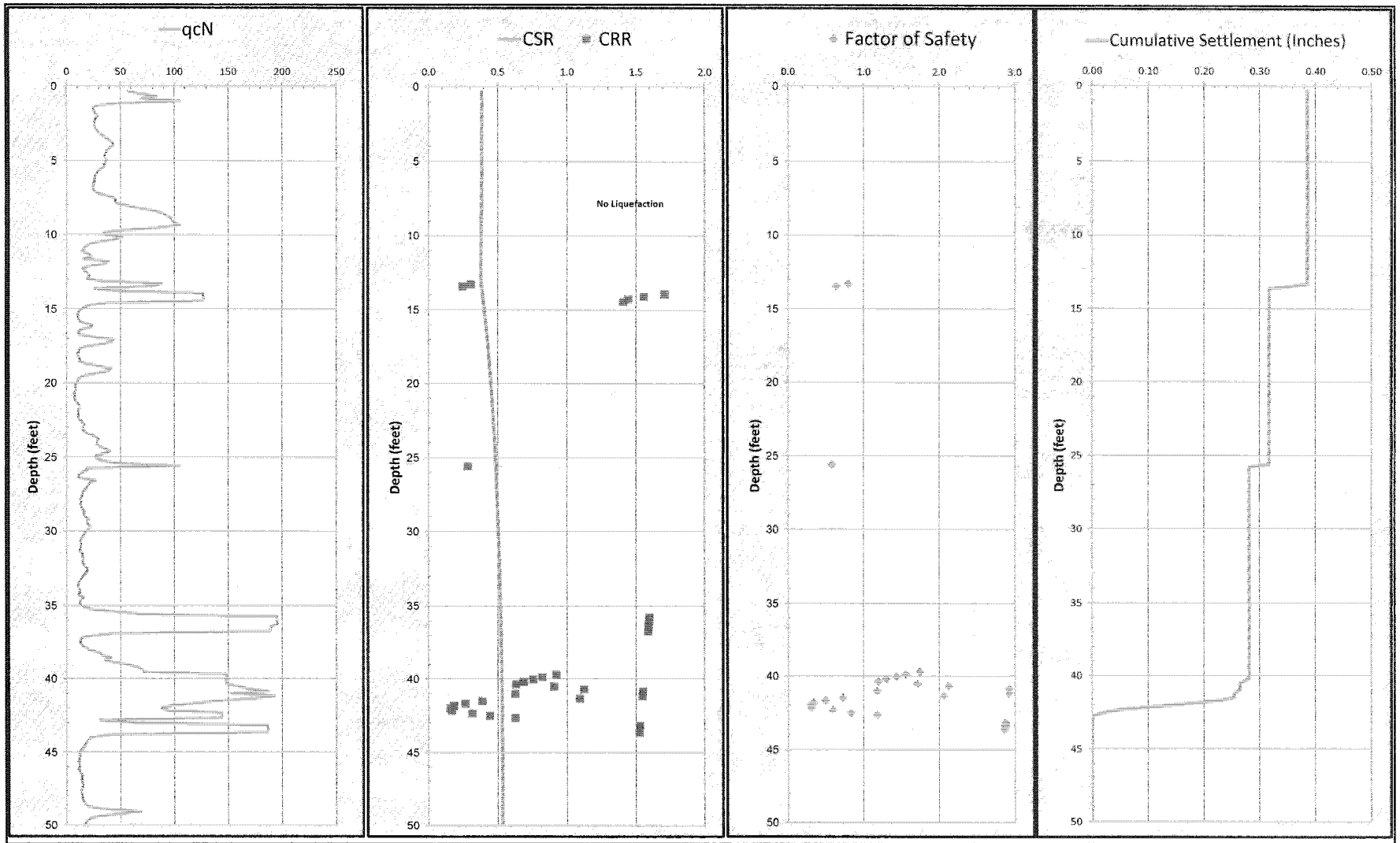
N

Regional Fault Map

Morse Street Courthomes
980 Morse Street
San Jose, CA

CORNERSTONE EARTH GROUP

Project Number	100-14-1
Figure Number	Figure 3
Date	September 2011
Drawn By	RRN

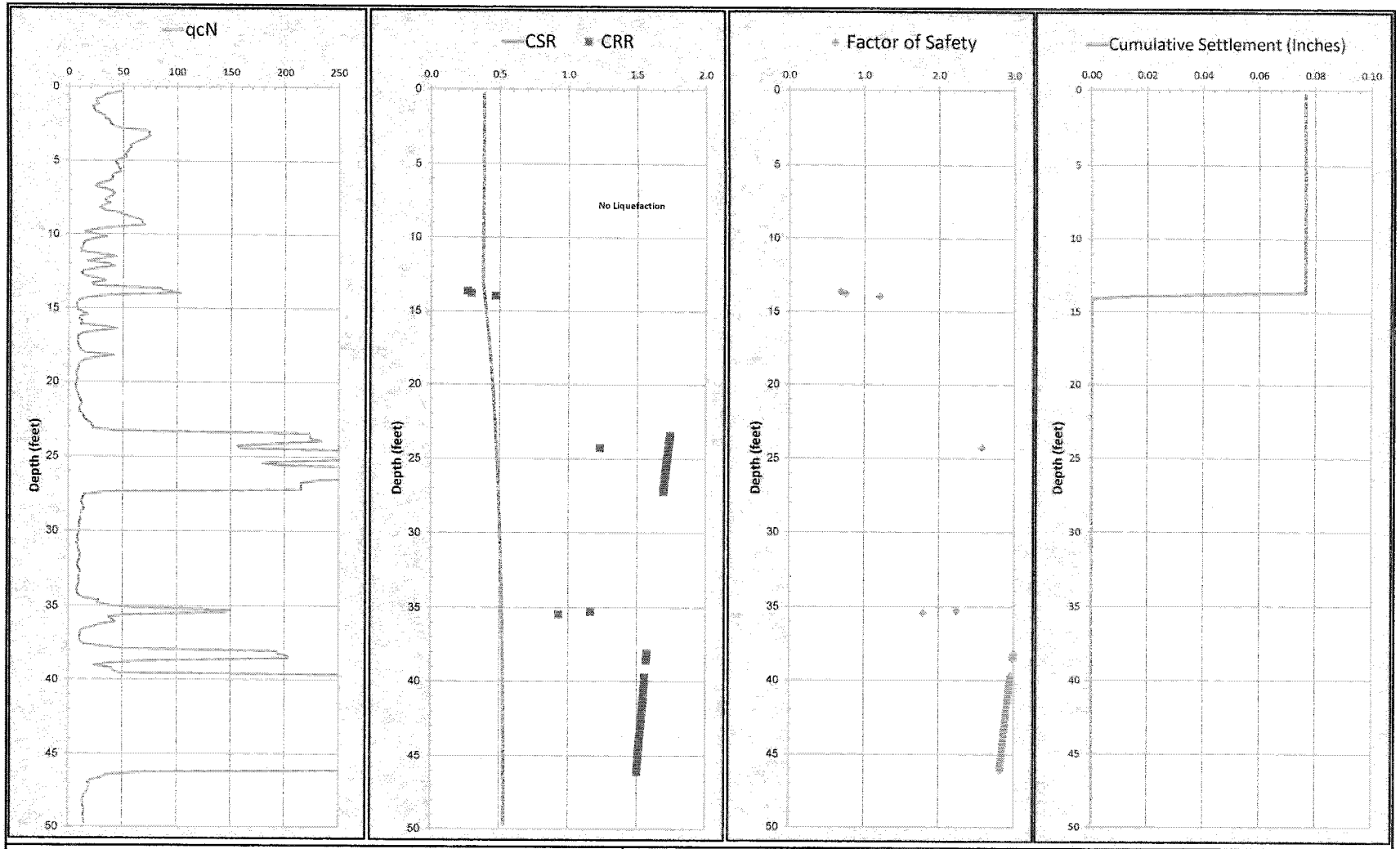


CORNERSTONE EARTH GROUP

Liquefaction Analysis Summary

980 Morse Street
Sunnyvale, California

Project Number	100-14-1
Figure Number	Figure 4
9/13/2011	CPT No. 1



CORNERSTONE EARTH GROUP

Liquefaction Analysis Summary

980 Morse Street
Sunnyvale, California

Project Number: 100-14-1

Figure Number: Figure 5

9/13/2011 | CPT No. 2

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using cone penetration test (CPT) and hand augering/sampling equipment. Two CPTs were advanced on August 29, 2011, to a maximum depth of 50 feet. We also performed one hand-auger boring next to CPT-1 to retrieve samples for soil correlation and laboratory testing. Approximate CPT locations are shown on the Site Plan, Figure 2. CPT logs are included as part of this appendix.

CPT locations were approximated using existing site boundaries and other site features for references. CPT locations should be considered accurate only to the degree implied by the method used.

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.

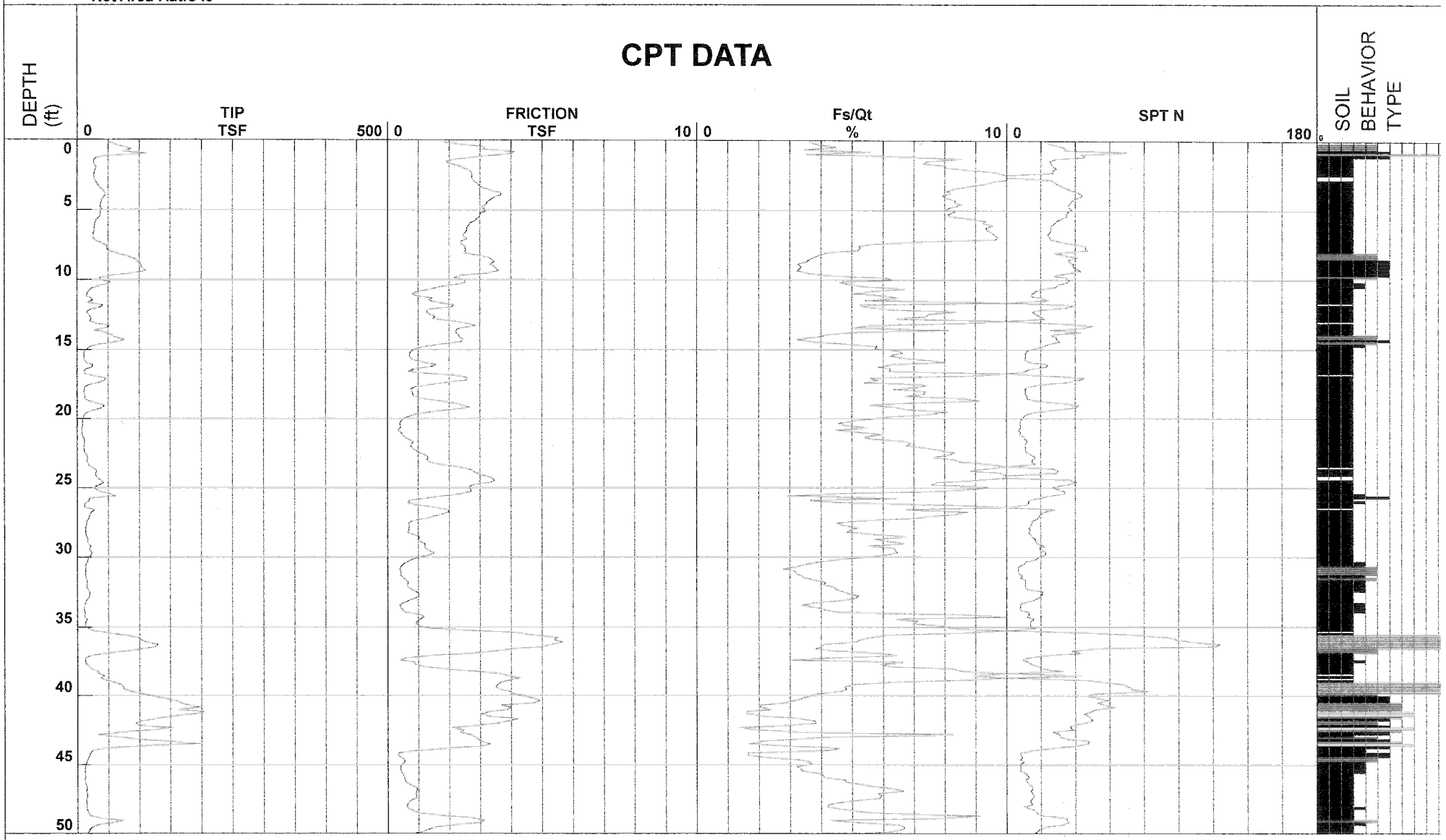
The attached CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at those CPT locations. The passage of time may result in altered subsurface conditions 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.

Cornerstone Earth Group

Project	980 Morse St	Operator	BH-JB	Filename	SDF(501).cpt
Job Number	100-14-1	Cone Number	DSG0906	GPS	
Hole Number	CPT-01	Date and Time	8/29/2011 8:47:56 AM	Maximum Depth	50.52 ft
Water Table Depth		17.00 ft			

Net Area Ratio .8

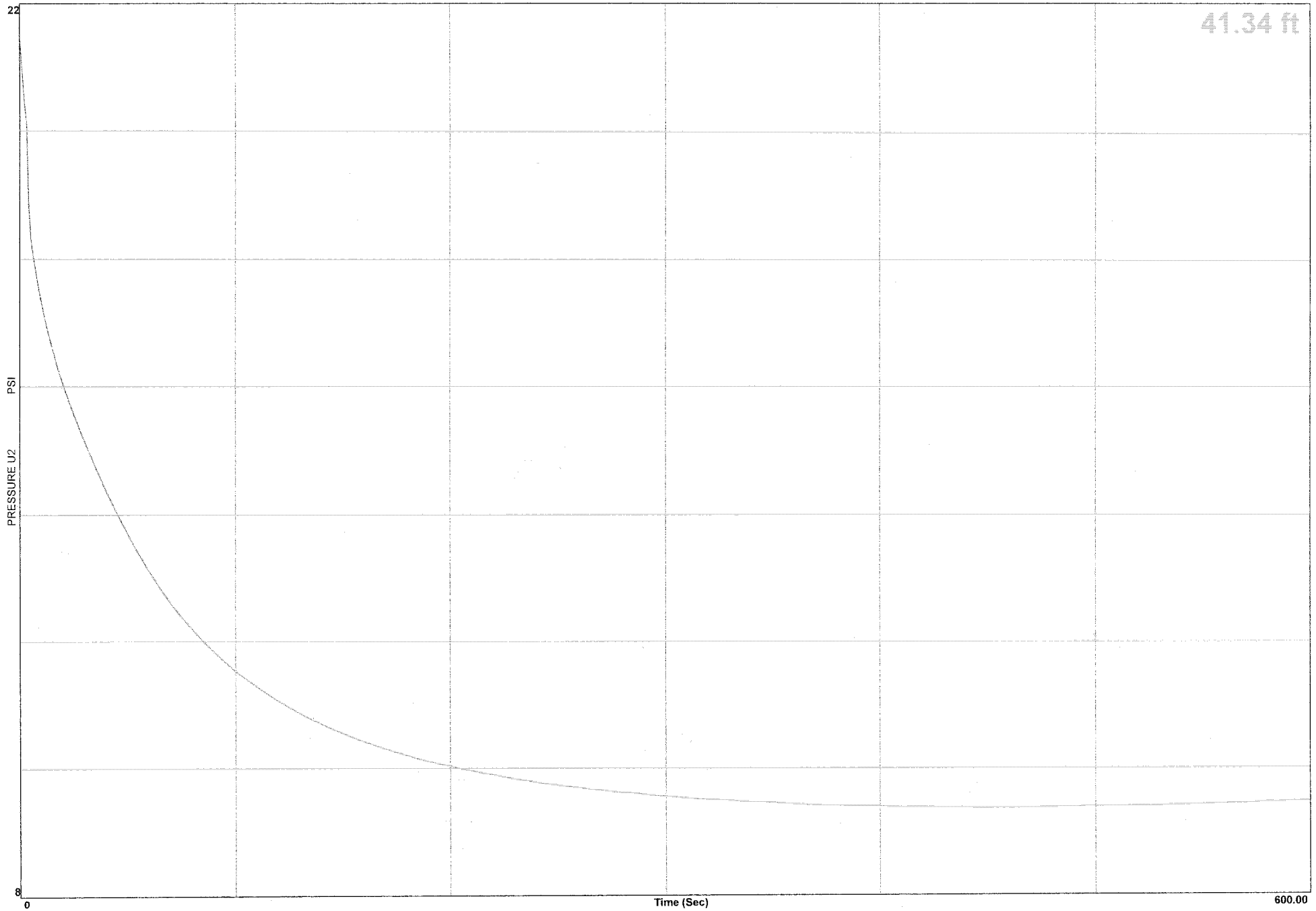
CPT DATA



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

Cornerstone Earth Group

Location	980 Morse St	Operator	BH-JB	GPS
Job Number	100-14-1	Cone Number	DSG0906	
Hole Number	CPT-01	Date and Time	8/29/2011 8:47:56 AM	
Equilized Pressure	9.4	Ground Water Depth	19.4	

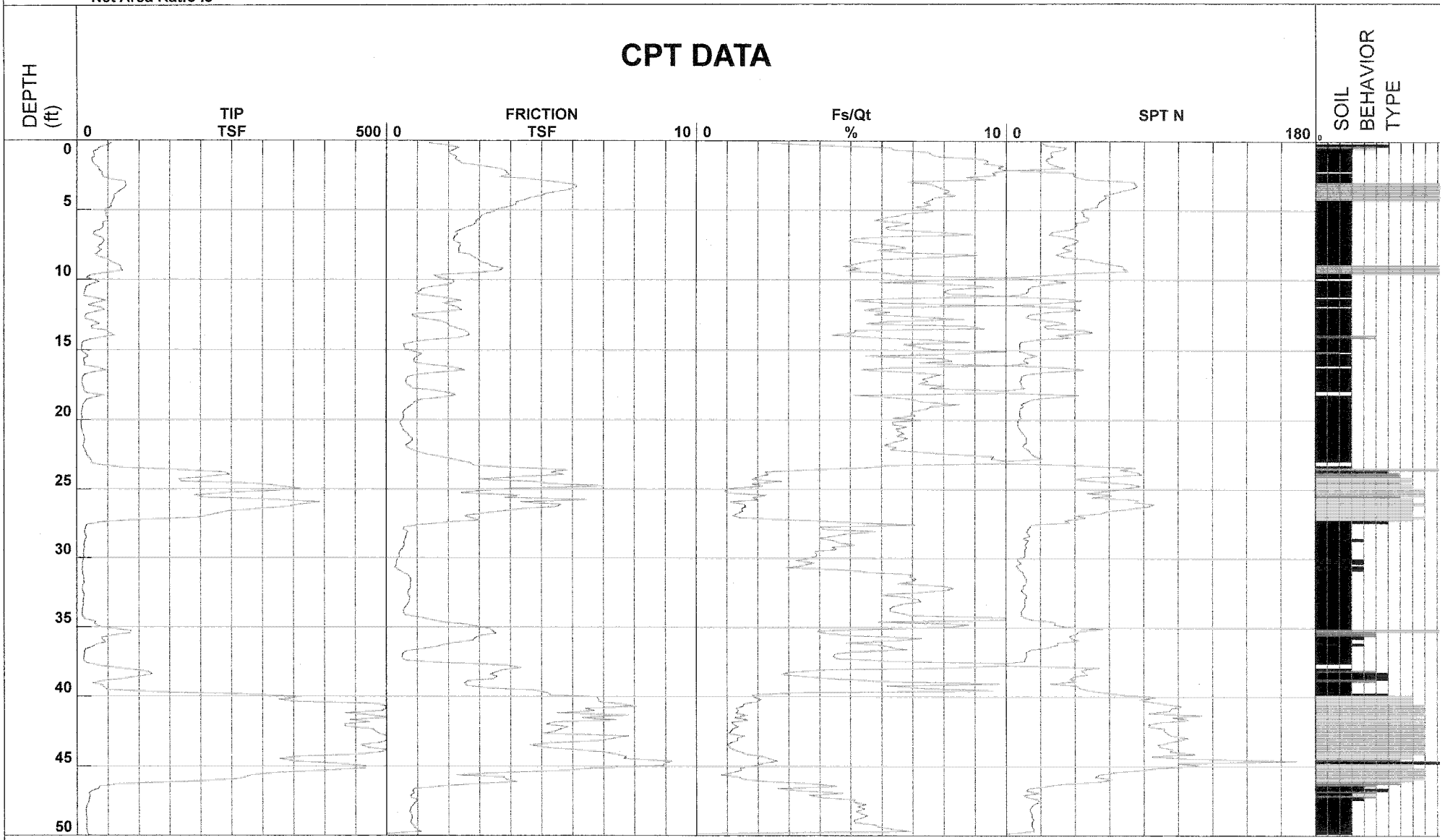


Cornerstone Earth Group

Project	980 Morse St	Operator	BH-JB	Filename	SDF(502).cpt
Job Number	100-14-1	Cone Number	DSG0906	GPS	
Hole Number	CPT-02	Date and Time	8/29/2011 9:58:30 AM	Maximum Depth	50.03 ft
Water Table Depth		17.00 ft			

Net Area Ratio .8

CPT DATA



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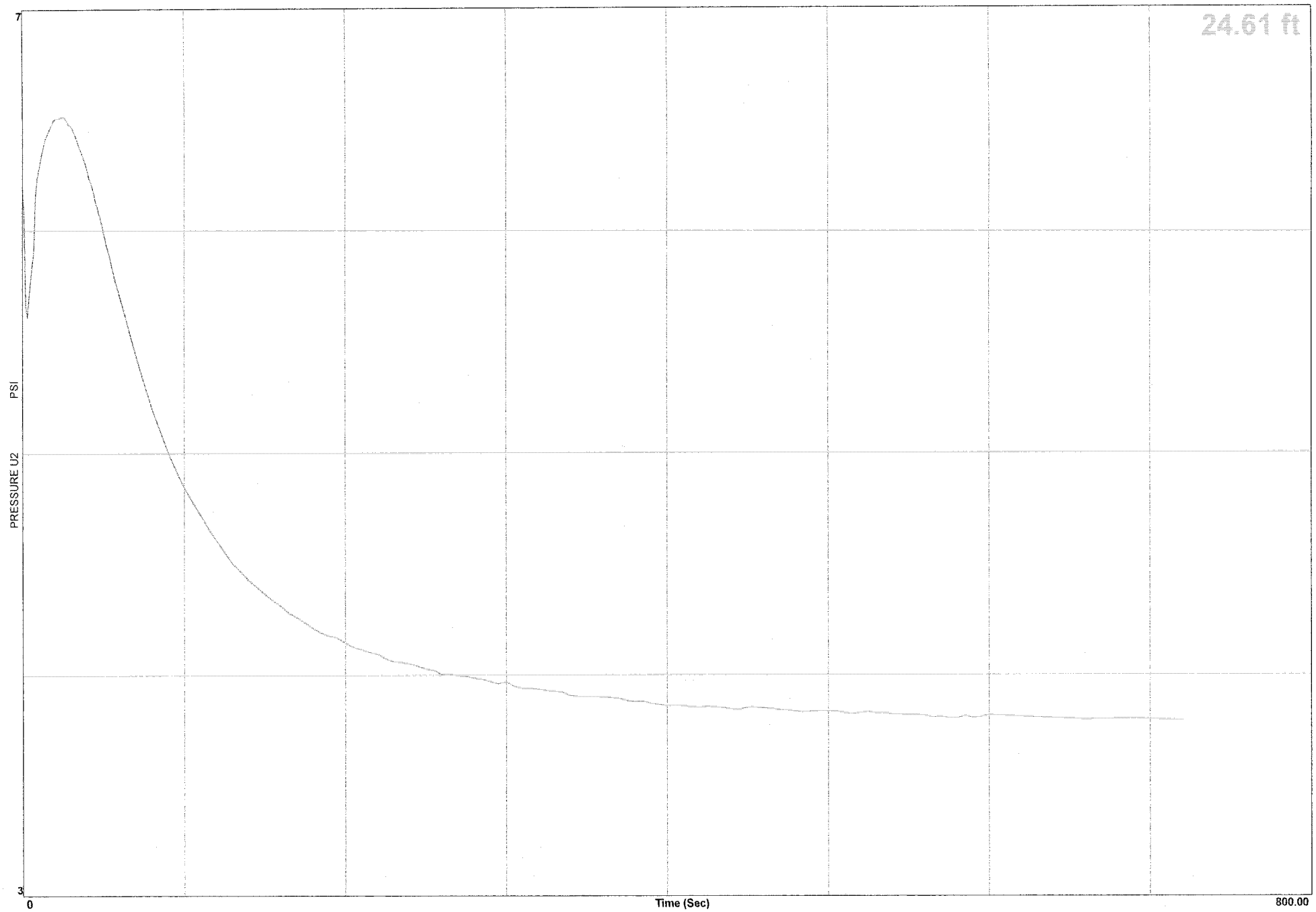
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cornerstone Earth Group

Location	980 Morse St	Operator	BH-JB	GPS
Job Number	100-14-1	Cone Number	DSG0906	
Hole Number	CPT-02	Date and Time	8/29/2011 9:58:30 AM	
Equilized Pressure	3.7	Ground Water Depth	15.8	

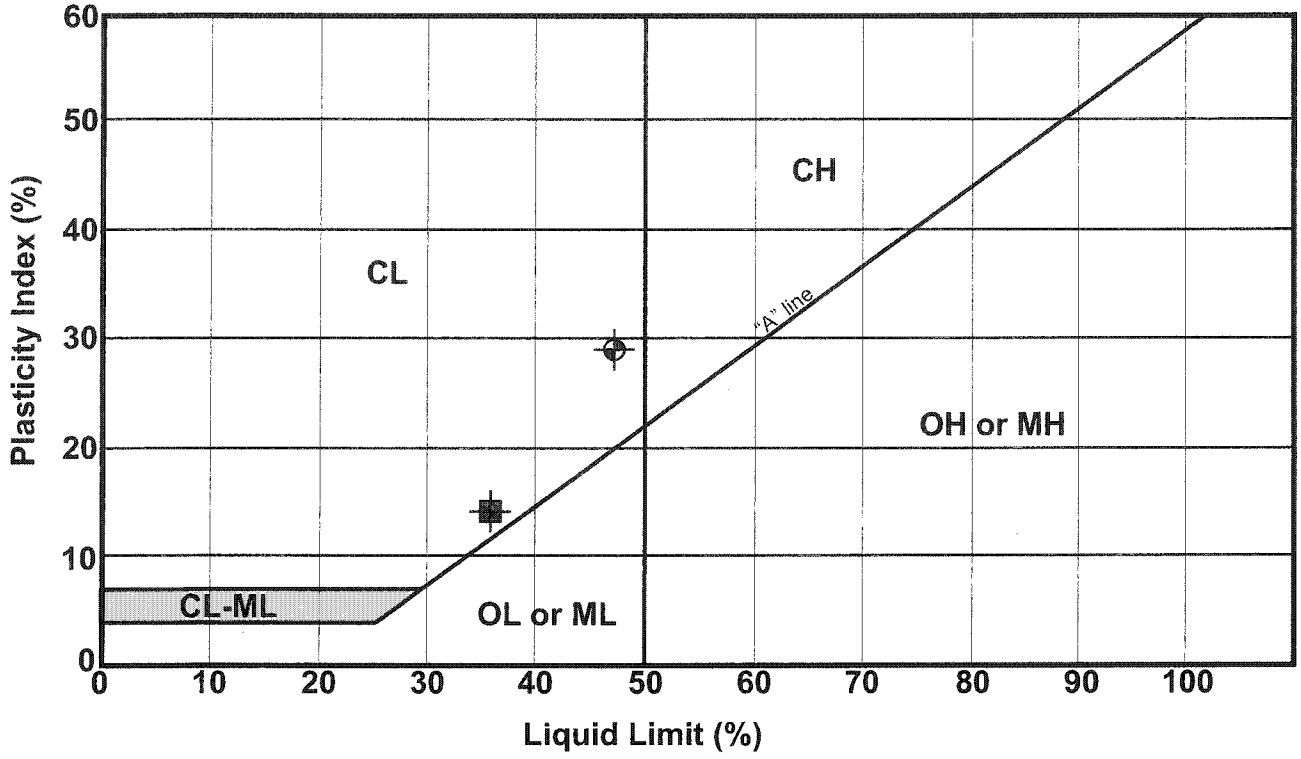


APPENDIX B: LABORATORY TEST PROGRAM

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.

Plasticity Index: Two Plasticity Index tests (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 and used in the liquefaction evaluation. Test results are shown graphically on the attached Figure B-1.

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)
⊕	CPT-1	Surficial	—	48	19	29	—	Lean Clay (CL)
■	CPT-1	11.5	25	36	22	14	89	Lean Clay (CL)

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

Morse Street Courthomes
San Jose, CA

Project Number: 100-14-1

Figure Number: Figure B1

Date: September 2011

Drawn By: FLL

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.59

Total Settlement 0.39 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{tl})	Interpreted Q_{cN}	C_N	Q_{c1N}	Q_{c1Ncs}	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.330	60.500	2.400	41.3	41.3	409.419	3.968	2.01		Unsaturated	17.2			57.18	1.70	97.21	142.03	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	71.200	3.200	61.3	61.3	395.378	4.496	2.07		Unsaturated	18.5			67.30	1.70	114.40	167.04	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	88.400	3.100	82.5	82.5	422.956	3.508	1.96		Unsaturated	16.0			83.55	1.70	142.04	193.22	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	73.300	4.100	102.5	102.5	314.565	5.597	2.20		Unsaturated	21.6			69.28	1.70	117.78	178.00	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	111.600	3.900	122.5	122.5	438.157	3.497	1.95		Unsaturated	15.9			105.48	1.70	179.32	238.03	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	47.600	3.100	143.8	143.8	172.353	6.522	2.38		Unsaturated	26.7			44.99	1.70	76.48	129.34	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	29.000	2.500	163.8	163.8	163.915	8.645	2.50		Unsaturated	30.2			27.41	1.70	46.60	91.24	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	25.900	1.900	185.0	185.0	134.308	7.362	2.48		Unsaturated	29.7			24.48	1.70	41.62	84.44	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	26.600	1.900	205.0	205.0	80.464	7.170	2.60		Unsaturated	33.5			25.14	1.70	42.74	86.93	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	28.200	2.300	225.0	225.0	127.456	8.189	2.53		Unsaturated	31.4			26.65	1.70	45.31	89.87	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	30.400	2.400	246.3	246.3	128.980	7.927	2.52		Unsaturated	30.9			28.73	1.70	48.85	94.46	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	28.600	2.600	266.3	266.3	114.819	9.133	2.60		Unsaturated	33.5			27.03	1.70	45.95	91.23	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	27.800	2.700	287.5	287.5	105.711	9.763	2.64		Unsaturated	35.0			26.28	1.70	44.67	89.77	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	27.000	2.700	307.5	307.5	97.897	10.057	2.67		Unsaturated	36.0			25.52	1.70	43.38	88.20	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	27.100	2.700	327.5	327.5	93.986	10.024	2.68		Unsaturated	36.3			25.61	1.70	43.54	88.45	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	27.500	2.700	348.8	348.8	91.240	9.881	2.68		Unsaturated	36.3			25.99	1.70	44.19	89.33	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	29.500	2.800	368.8	368.8	94.137	9.551	2.66		Unsaturated	35.7			27.88	1.70	47.40	93.55	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	31.600	2.900	390.0	390.0	96.968	9.234	2.64		Unsaturated	35.0			29.87	1.70	50.78	97.98	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	34.500	3.000	410.0	410.0	102.249	8.748	2.61		Unsaturated	33.9			32.61	1.70	55.43	104.04	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.450	37.900	3.200	431.3	431.3	108.449	8.492	2.58		Unsaturated	33.0			35.82	1.70	60.90	111.18	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	42.000	3.400	451.3	451.3	116.464	8.139	2.55		Unsaturated	32.0			39.70	1.70	67.49	119.73	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	44.800	3.700	471.3	471.3	120.528	8.303	2.55		Unsaturated	31.9			42.34	1.70	71.98	125.75	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	46.100	3.700	492.5	492.5	120.245	8.069	2.54		Unsaturated	31.6			43.57	1.70	74.07	128.45	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	42.900	3.400	512.5	512.5	108.754	7.973	2.56		Unsaturated	32.3			40.55	1.70	68.93	121.75	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	39.900	3.300	533.8	533.8	98.242	8.326	2.60		Unsaturated	33.6			37.71	1.70	64.11	115.63	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	38.700	3.200	553.8	553.8	92.821	8.328	2.62		Unsaturated	34.1			36.58	1.70	62.18	113.14	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	37.300	3.200	573.8	573.8	87.222	8.646	2.64		Unsaturated	35.1			35.26	1.70	59.93	110.31	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	37.200	3.100	595.0	595.0	84.775	8.401	2.64		Unsaturated	35.0			35.16	1.70	59.77	110.08	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	39.300	3.100	615.0	615.0	87.527	7.950	2.61		Unsaturated	34.0			37.15	1.70	63.15	114.43	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	37.800	3.200	636.3	636.3	82.159	8.537	2.65		Unsaturated	35.4			35.73	1.70	60.74	111.46	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	36.900	3.000	656.3	656.3	78.447	8.203	2.65		Unsaturated	35.4			34.88	1.70	59.29	109.50	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	36.700	3.000	676.3	676.3	76.374	8.250	2.66		Unsaturated	35.7			34.69	1.70	58.97	109.12	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	33.200	2.900	697.5	697.5	94.197	8.828	2.63		Unsaturated	34.7			31.38	1.70	53.35	101.38	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	30.500	2.800	717.5	717.5	84.017	9.290	2.68		Unsaturated	36.3			28.83	1.70	49.01	95.81	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	28.900	2.700	738.8	738.8	77.240	9.464	2.71		Unsaturated	37.3			27.32	1.70	46.44	92.47	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	27.600	2.600	758.8	758.8	71.751	9.552	2.73		Unsaturated	38.1			26.09	1.70	44.35	89.74	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	27.500	2.600	778.8	778.8	69.626	9.590	2.74		Unsaturated	38.4			25.99	1.69	43.86	89.11	1.00	0.382	1.098	n.a.	n.a.	n.a.	0.00	0.00
6.400	27.500	2.600	800.0	800.0	67.750	9.594	2.75		Unsaturated	38.7			25.99	1.67	43.31	88.41	0.99	0.382	1.094	n.a.	n.a.	n.a.	0.00	0.00
6.560	26.500	2.500	820.0	820.0	63.634	9.582	2.76		Unsaturated	39.3			25.05	1.65	41.44	85.93	0.99	0.381	1.090	n.a.	n.a.	n.a.	0.00	0.00
6.730	25.500	2.500	841.3	841.3	59.624	9.968	2.79		Unsaturated	40.4			24.10	1.64	39.56	83.49	0.99	0.381	1.086	n.a.	n.a.	n.a.	0.00	0.00
6.890	25.600	2.500	861.3	861.3	58.448	9.933	2.80		Unsaturated	40.6			24.20	1.62	39.25	83.08	0.99	0.381	1.084	n.a.	n.a.	n.a.	0.00	0.00
7.050	26.600	2.600	881.3	881.3	59.369	9.939	2.79		Unsaturated	40.4			25.14	1.60	40.16	84.32	0.99	0.381	1.082	n.a.	n.a.	n.a.	0.00	0.00
7.220	32.000	2.400	902.5	902.5	69.914	7.607	2.66		Unsaturated	35.5			30.25	1.55	46.89	92.84	0.99	0.381	1.086	n.a.	n.a.	n.a.	0.00	0.00
7.380	40.900	2.400	922.5	922.5	68.343	5.935	2.58		Unsaturated	32.9			38.66	1.49	57.74	106.90	0.99	0.381	1.093	n.a.	n.a.	n.a.	0.00	0.00
7.550	47.600	2.500	943.8	943.8	66.700	5.305	2.55		Unsaturated	31.9			44.99	1.45	65.38	116.87	0.99	0.381	1.098	n.a.	n.a.	n.a.	0.00	0.00
7.710	47.700	2.500	963.8	963.8	66.130	5.295	2.55		Unsaturated	31.9			45.09	1.44	64.94	116.30	0.99	0.381	1.095	n.a.	n.a.	n.a.	0.00	0.00
7.870	48.800	2.500	983.8	983.8	66.965	5.175	2.54		Unsaturated	31.5			46.12	1.42	65.71	117.23	0.99	0.380	1.093	n.a.	n.a.	n.a.	0.00	0.00
8.040	59.300	2.500	1005.0	1005.0	80.640	4.252	2.42		Unsaturated	27.9			56.05	1.38	77.50	131.44	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.200	71.100	2.800	1025.0	1025.0	95.860	3.967	2.35		Unsaturated	25.8			67.20	1.34	90.34	147.05	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.370	85.900	3.200	1046.3	1046.3	114.761	3.748	2.28		Unsaturated	23.9			81.19	1.31	105.97	165.81	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.530	93.300	3.400	1066.3	1066.3	123.520	3.665	2.25		Unsaturated	23.2			88.19	1.28	113.27	174.46	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.690	97.700	3.500	1086.3	1086.3	128.168	3.602	2.24		Unsaturated	22.8			92.34	1.27	117.28	179.11	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.860	102.700	3.300	1107.5	1107.5	133.451	3.231	2.19		Unsaturated	21.5			97.07	1.26	121.96	183.22	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.020	102.800	3.500	1127.5	1127.5	132.379	3.423	2.21		Unsaturated	22.1			97.16	1.25	121.30	183.32	0.99	0.380	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.190	105.900	3.500	1148.8	1148.8	135.112	3.323	2.20		Unsaturated	21.7			100.09	1.24	123.86	185.96	0.99	0.379	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.350	111.200	3.600	1168.8	1168.8	140.679	3.255	2.18		Unsaturated	21.2			105.10	1.22	128.70	191.40	0.99	0.379	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.510	90.200	3.200	1188.8	1188.8	112.996	3.571	2.27		Unsaturated	23.6			85.26	1.24	106.06	165.53	0.99	0.379	1.100	n.a.	n.a.	n.a.	0.00	0.00
9.680	58.100	2.400	1210.0	1210.0	71.864	4.174	2.45		Unsaturated	28.7			54.91	1.29	70.67	122.76	0.99	0.379	1.071	n.a.	n.a.	n.a.	0.00	0.00
9.840	36.400	2.200	1230.0	1230.0	58.187	6.148	2.63		Unsaturated	34.8			34.40	1.33	45.59	90.98	0.99	0.379	1.054	n.a.	n.a.	n.a.	0.00	0.00
10.010	38.500	2.500	1251.3	1251.3	60.538	6.601	2.65		Unsaturated	35.2			36.39	1.31	47.63	93.79	0.99	0.379	1.053	n.a.	n.a.	n.a.	0.00	0.00
10.170	54.600	2.500	1271.3	1271.3	65.806	4.633	2.51		Unsaturated	30.5			51.61	1.27	65.36	116.43	0.99	0.379	1.062	n.a.	n.a.	n.a.	0.00	0.00
10.340	46.200	2.200	1292.5	1292.5	55.091	4.829	2.57		Unsaturated	32.6			43.67	1.27	55.58	103.96	0.99	0.378	1.054	n.a.	n.a.	n.a.	0.00	0.00
10.500	30.500	1.700	1312.5	1312.5	45.476	5.696	2.68		Unsaturated	36.4			28.83	1.30	37.41	80.21	0.99	0.378	1.043	n.a.	n.a.	n.a.	0.00	0.00
10.660	21.600	1.500	1332.5	1332.5	31.420	7.165	2.86		Unsaturated	43.2			20.42	1.31	26.75	66.34	0.99	0.378	1.038	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.59

Total Settlement: 0.39 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{DL})	Interpreted Q_{cN}	C_N	Q_{c1N}	$Q_{c1N,cs}$	Stress Reduction Coeff r_d	CSR	Ks for Sand	$CRR_{M=7.5}$ S'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.830	18.000	1.000	1353.8	1353.8	25.593	5.773	2.86		Unsaturated	43.0			17.01	1.31	22.27	60.29	0.99	0.378	1.035	n.a.	n.a.	n.a.	0.00	0.00
10.990	16.200	0.800	1373.8	1373.8	22.585	5.157	2.87		Unsaturated	43.2			15.31	1.30	19.96	57.17	0.99	0.378	1.033	n.a.	n.a.	n.a.	0.00	0.00
11.160	14.900	0.900	1395.0	1395.0	20.362	6.337	2.96		Unsaturated	47.0			14.08	1.30	18.24	54.94	0.99	0.378	1.031	n.a.	n.a.	n.a.	0.00	0.00
11.320	22.200	1.400	1415.0	1415.0	30.378	6.514	2.84		Unsaturated	42.4			20.98	1.27	26.56	86.05	0.98	0.378	1.033	n.a.	n.a.	n.a.	0.00	0.00
11.480	24.500	1.300	1435.0	1435.0	33.146	5.466	2.76		Unsaturated	39.3			23.16	1.25	28.96	69.12	0.98	0.377	1.032	n.a.	n.a.	n.a.	0.00	0.00
11.650	16.300	1.600	1456.3	1456.3	21.386	10.275	3.09		Unsaturated	52.7			15.41	1.26	19.39	56.51	0.98	0.377	1.028	n.a.	n.a.	n.a.	0.00	0.00
11.810	41.000	2.200	1476.3	1476.3	54.546	5.464	2.61		Unsaturated	34.1			38.75	1.20	46.66	92.29	0.98	0.377	1.036	n.a.	n.a.	n.a.	0.00	0.00
11.980	37.200	2.100	1497.5	1497.5	48.683	5.761	2.66		Unsaturated	35.8			35.16	1.20	42.22	86.61	0.98	0.377	1.033	n.a.	n.a.	n.a.	0.00	0.00
12.140	20.900	1.300	1517.5	1517.5	26.545	6.454	2.88		Unsaturated	43.9			19.75	1.22	24.08	62.76	0.98	0.377	1.026	n.a.	n.a.	n.a.	0.00	0.00
12.300	15.200	1.300	1537.5	1537.5	18.772	9.008	3.09		Unsaturated	52.6			14.37	1.22	17.54	54.01	0.98	0.377	1.023	n.a.	n.a.	n.a.	0.00	0.00
12.470	18.100	1.300	1558.8	1558.8	22.224	7.506	2.98		Unsaturated	48.0			17.11	1.21	20.61	58.16	0.98	0.377	1.023	n.a.	n.a.	n.a.	0.00	0.00
12.630	20.700	1.500	1578.8	1578.8	25.223	7.534	2.95		Unsaturated	46.4			19.57	1.19	23.31	61.78	0.98	0.376	1.023	n.a.	n.a.	n.a.	0.00	0.00
12.800	22.800	1.500	1600.0	1600.0	27.500	6.818	2.89		Unsaturated	44.1			21.55	1.18	25.41	64.57	0.98	0.376	1.022	n.a.	n.a.	n.a.	0.00	0.00
12.960	19.700	2.100	1620.0	1620.0	23.321	11.117	3.09		Unsaturated	52.7			18.62	1.18	21.88	59.88	0.98	0.376	1.021	n.a.	n.a.	n.a.	0.00	0.00
13.120	30.600	2.600	1640.0	1640.0	36.317	8.731	2.88		Clay	44.0			28.92	1.07	n.a.	n.a.	0.98	0.378	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	51.800	2.900	1661.3	1661.3	57.066	5.690	2.61		Mixed	34.1		1.8	88.13	1.10	96.80	159.63	0.98	0.380	1.042	0.324	0.303	0.80	0.01	0.03
13.450	47.000	2.400	1681.3	1681.3	51.250	5.199	2.62		Mixed	34.1		1.8	79.96	1.10	87.81	147.58	0.98	0.382	1.036	0.261	0.243	0.64	0.02	0.04
13.620	27.300	2.200	1702.5	1702.5	31.070	8.318	2.91		Clay	45.2			25.80	1.06	n.a.	n.a.	0.98	0.384	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	44.300	2.200	1722.5	1722.5	50.437	5.065	2.61		Clay	34.0			41.87	1.06	n.a.	n.a.	0.98	0.386	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	54.800	2.300	1742.5	1742.5	56.170	4.265	2.53		Sand	31.2	71	1.78	126.38	1.06	134.42	209.03	0.98	0.388	1.057	1.797	1.708	4.40	0.00	0.00
14.110	60.400	2.300	1763.8	1763.8	61.617	3.864	2.47		Sand	29.3	71	1.78	126.38	1.06	133.96	207.42	0.98	0.391	1.052	1.646	1.558	3.99	0.00	0.00
14.270	75.900	2.500	1783.8	1783.8	77.217	3.333	2.35		Sand	25.9		1.78	127.70	1.06	134.91	206.04	0.98	0.392	1.048	1.530	1.443	3.68	0.00	0.00
14.440	64.900	2.400	1805.0	1805.0	65.493	3.750	2.44		Sand	28.5	71	1.78	126.38	1.05	133.02	205.63	0.98	0.395	1.045	1.498	1.407	3.57	0.00	0.00
14.600	38.400	1.800	1825.0	1825.0	41.082	4.802	2.66		Clay	35.5			36.29	1.04	n.a.	n.a.	0.98	0.396	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	21.600	1.300	1845.0	1845.0	22.415	6.287	2.93		Clay	45.7			20.42	1.04	n.a.	n.a.	0.98	0.398	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	16.500	0.900	1866.3	1866.3	16.683	5.782	3.00		Clay	48.6			15.60	1.03	n.a.	n.a.	0.98	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	12.000	0.800	1885.8	1880.2	11.762	7.235	3.18		Clay	56.5			11.34	1.03	n.a.	n.a.	0.98	0.402	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	11.000	0.700	1906.2	1890.0	10.632	6.967	3.20		Clay	57.5			10.40	1.03	n.a.	n.a.	0.98	0.404	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	11.200	0.700	1925.4	1899.2	10.781	6.838	3.19		Clay	57.1			10.59	1.03	n.a.	n.a.	0.97	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	11.300	0.700	1944.6	1908.4	10.823	6.778	3.18		Clay	56.9			10.68	1.03	n.a.	n.a.	0.97	0.408	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	11.700	0.900	1965.0	1918.2	11.175	8.397	3.23		Clay	59.2			11.06	1.03	n.a.	n.a.	0.97	0.410	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	14.700	1.200	1984.2	1927.4	14.224	8.754	3.17		Clay	56.2			13.89	1.02	n.a.	n.a.	0.97	0.411	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	24.900	1.600	2004.6	1937.2	24.672	6.695	2.92		Clay	45.2			23.53	1.02	n.a.	n.a.	0.97	0.413	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	23.700	1.400	2023.8	1946.4	23.313	6.171	2.91		Clay	45.0			22.40	1.02	n.a.	n.a.	0.97	0.415	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	13.800	0.900	2043.0	1955.6	13.068	7.043	3.13		Clay	54.5			13.04	1.02	n.a.	n.a.	0.97	0.416	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	11.000	0.700	2063.4	1965.4	10.144	7.022	3.22		Clay	58.4			10.40	1.02	n.a.	n.a.	0.97	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	12.000	1.400	2082.6	1974.6	11.099	12.775	3.36		Clay	65.4			11.34	1.02	n.a.	n.a.	0.97	0.420	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	27.200	2.400	2103.0	1984.4	26.354	9.178	2.99		Clay	48.5			25.71	1.02	n.a.	n.a.	0.97	0.421	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	46.400	2.600	2122.2	1993.7	45.483	5.735	2.68		Clay	36.4			43.86	1.02	n.a.	n.a.	0.97	0.423	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.230	43.400	2.500	2142.6	2003.4	42.256	5.906	2.71		Clay	37.5			41.02	1.01	n.a.	n.a.	0.97	0.425	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	34.100	1.800	2161.8	2012.7	32.811	5.451	2.77		Clay	39.4			32.23	1.01	n.a.	n.a.	0.97	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	18.200	1.300	2181.0	2021.9	16.924	7.598	3.07		Clay	51.8			17.20	1.01	n.a.	n.a.	0.97	0.428	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	12.300	0.900	2201.4	2031.7	11.025	8.036	3.23		Clay	58.9			11.63	1.01	n.a.	n.a.	0.97	0.429	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	11.500	0.700	2220.6	2040.9	10.182	6.737	3.20		Clay	57.8			10.87	1.01	n.a.	n.a.	0.97	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.050	10.900	0.800	2241.0	2050.7	9.538	8.180	3.28		Clay	61.4			10.30	1.01	n.a.	n.a.	0.97	0.432	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	11.100	0.800	2260.2	2059.9	9.680	8.024	3.27		Clay	60.9			10.49	1.01	n.a.	n.a.	0.97	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	12.700	0.900	2279.4	2069.1	11.174	7.785	3.21		Clay	58.2			12.00	1.01	n.a.	n.a.	0.97	0.435	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	12.400	1.100	2299.8	2078.9	10.823	9.778	3.29		Clay	61.9			11.72	1.00	n.a.	n.a.	0.97	0.437	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	17.700	1.600	2319.0	2088.1	15.842	9.673	3.17		Clay	56.0			16.73	1.00	n.a.	n.a.	0.97	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.870	31.000	2.100	2339.4	2097.9	28.438	7.040	2.89		Clay	44.1			29.30	1.00	n.a.	n.a.	0.97	0.440	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	43.600	2.400	2358.6	2107.1	40.264	5.658	2.71		Clay	37.6			41.21	1.00	n.a.	n.a.	0.97	0.441	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	41.400	2.700	2377.8	2116.3	38.001	6.715	2.79		Clay	40.2			39.13	1.00	n.a.	n.a.	0.97	0.442	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	29.800	2.000	2398.2	2126.1	26.904	6.993	2.90		Clay	44.7			28.17	1.00	n.a.	n.a.	0.96	0.444	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	17.500	1.400	2417.4	2135.4	15.259	8.594	3.14		Clay	54.9			16.54	1.00	n.a.	n.a.	0.96	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	12.100	0.900	2437.8	2145.1	10.145	8.271	3.26		Clay	60.6			11.44	1.00	n.a.	n.a.	0.96	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	10.700	0.700	2457.0	2154.4	8.793	7.391	3.28		Clay	61.3			10.11	1.00	n.a.	n.a.	0.96	0.448	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	9.400	0.500	2476.2	2163.6	7.545	6.126	3.28		Clay	61.4			8.88	0.99	n.a.	n.a.	0.96	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	8.500	0.400	2496.6	2173.4	6.673	5.516	3.29		Clay	62.1			8.03	0.99	n.a.	n.a.	0.96	0.450	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	8.700	0.400	2515.8	2182.6	6.820	5.375	3.28		Clay	61.4			8.22	0.99	n.a.	n.a.	0.96	0.451	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	8.700	0.400	2536.2	2192.4	6.780	5.382	3.28		Clay	61.5			8.22	0.99	n.a.	n.a.	0.96	0.453	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	7.700	0.400	2555.4	2201.6	5.834	6.228	3.37		Clay	66.0			7.28	0.99	n.a.	n.a.	0.96	0.454	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	7.500	0.300	2574.6	2210.8	5.620	4.829	3.32		Clay	63.4			7.09	0.99	n.a.	n.a.	0.96	0.455	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	8.200	0.400	2595.0	2220.6	6.217	5.795	3.33		Clay	64.0			7.75	0.99	n.a.	n.a.	0.96	0.456	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.160	8.100	0.500	2614.2	2229.8	6.093	7.361	3.40		Clay	67.5			7.66	0.99	n.a.	n.a.	0.96	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.59

Total Settlement: 0.39 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	Interpreted Q_{cN}	C_N	Q_{c1N}	Q_{c1N-cs}	Stress Reduction Coeff. r_d	CSR	K_{σ} for Sand	$CRR_{M=7.5}$ S_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.330	10.100	0.500	2634.6	2239.6	7.843	5.693	3.25		Clay	59.8			9.55	0.99	n.a.	n.a.	0.96	0.459	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	11.800	0.700	2653.8	2248.8	9.314	6.684	3.23		Clay	59.1			11.15	0.98	n.a.	n.a.	0.96	0.460	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	12.200	0.800	2673.0	2258.0	9.622	7.364	3.25		Clay	59.8			11.53	0.98	n.a.	n.a.	0.96	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	11.700	0.800	2693.4	2267.8	9.131	7.727	3.28		Clay	61.3			11.06	0.98	n.a.	n.a.	0.96	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	11.100	0.700	2712.6	2277.0	8.558	7.184	3.28		Clay	61.4			10.49	0.98	n.a.	n.a.	0.96	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	10.800	0.800	2733.0	2286.8	8.250	8.480	3.34		Clay	64.3			10.21	0.98	n.a.	n.a.	0.96	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	11.600	0.900	2752.2	2296.1	8.906	8.803	3.32		Clay	63.5			10.96	0.98	n.a.	n.a.	0.96	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	12.300	1.000	2771.4	2305.3	9.469	9.162	3.31		Clay	63.1			11.63	0.98	n.a.	n.a.	0.96	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	15.100	1.200	2791.8	2315.1	11.839	8.757	3.23		Clay	58.9			14.27	0.98	n.a.	n.a.	0.96	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	17.400	1.300	2811.0	2324.3	13.763	8.128	3.16		Clay	55.7			16.45	0.98	n.a.	n.a.	0.96	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	15.400	1.300	2831.4	2334.1	11.983	9.296	3.24		Clay	59.6			14.56	0.97	n.a.	n.a.	0.95	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	15.600	1.300	2850.6	2343.3	12.098	9.171	3.23		Clay	59.2			14.74	0.97	n.a.	n.a.	0.95	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.300	17.300	1.600	2871.0	2353.1	13.484	10.085	3.23		Clay	58.9			16.35	0.97	n.a.	n.a.	0.95	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	21.100	2.200	2890.2	2362.3	16.641	11.193	3.19		Clay	57.4			19.94	0.97	n.a.	n.a.	0.95	0.473	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	27.800	2.600	2909.4	2371.5	22.218	9.869	3.07		Clay	51.6			26.28	0.97	n.a.	n.a.	0.95	0.474	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	31.400	2.800	2929.8	2381.3	25.142	9.354	3.01		Clay	49.3			29.68	0.97	n.a.	n.a.	0.95	0.475	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	29.400	2.900	2949.0	2390.5	23.364	10.385	3.07		Clay	51.7			27.79	0.97	n.a.	n.a.	0.95	0.476	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.120	29.900	3.100	2969.4	2400.3	23.676	10.910	3.08		Clay	52.2			28.26	0.97	n.a.	n.a.	0.95	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	32.300	3.400	2988.6	2409.5	25.570	11.037	3.06		Clay	51.4			30.53	0.97	n.a.	n.a.	0.95	0.477	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	37.900	3.500	3007.8	2418.7	30.095	9.616	2.97		Clay	47.4			35.82	0.97	n.a.	n.a.	0.95	0.478	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	42.800	3.300	3028.2	2428.5	34.001	7.993	2.87		Clay	43.6			40.45	0.96	n.a.	n.a.	0.95	0.479	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	36.600	2.800	3047.4	2437.8	28.778	7.983	2.92		Clay	45.6			34.59	0.96	n.a.	n.a.	0.95	0.480	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.940	28.100	2.600	3067.8	2447.5	21.708	9.787	3.07		Clay	51.8			26.56	0.96	n.a.	n.a.	0.95	0.481	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	30.000	2.700	3087.0	2456.8	23.166	9.488	3.04		Clay	50.5			28.36	0.96	n.a.	n.a.	0.95	0.482	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	35.600	2.700	3106.2	2466.0	27.813	7.930	2.93		Clay	46.0			33.65	0.96	n.a.	n.a.	0.95	0.483	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	52.300	2.400	3126.6	2475.8	40.987	4.730	2.65		Clay	35.4			49.43	0.96	n.a.	n.a.	0.95	0.484	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	61.600	1.800	3145.8	2485.0	52.355	2.999	2.44		Sand	28.4		1.8	104.80	0.94	98.47	159.61	0.95	0.484	0.972	0.324	0.283	0.58	0.02	0.04
25.760	19.200	1.200	3166.2	2494.8	14.123	6.812	3.10		Clay	53.0			18.15	0.96	n.a.	n.a.	0.95	0.485	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	19.700	0.700	3185.4	2504.0	14.463	3.866	2.93		Clay	45.9			18.62	0.96	n.a.	n.a.	0.95	0.486	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	13.600	0.600	3204.6	2513.2	9.548	5.001	3.14		Clay	55.0			12.85	0.96	n.a.	n.a.	0.95	0.487	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	11.600	0.900	3225.0	2523.0	7.917	9.011	3.37		Clay	65.8			10.96	0.95	n.a.	n.a.	0.94	0.488	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	11.900	1.500	3244.2	2532.2	8.118	14.594	3.50		Clay	72.7			11.25	0.95	n.a.	n.a.	0.94	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.580	28.600	1.900	3264.6	2542.0	21.218	7.045	2.98		Clay	47.8			27.03	0.95	n.a.	n.a.	0.94	0.489	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	22.800	2.000	3283.8	2551.2	16.587	9.453	3.14		Clay	55.0			21.55	0.95	n.a.	n.a.	0.94	0.490	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	21.000	1.800	3303.0	2560.4	15.113	9.303	3.17		Clay	56.1			19.85	0.95	n.a.	n.a.	0.94	0.491	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	19.800	1.500	3323.4	2570.2	14.114	8.270	3.15		Clay	55.5			18.71	0.95	n.a.	n.a.	0.94	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	18.200	1.300	3342.6	2579.4	12.816	7.865	3.17		Clay	56.3			17.20	0.95	n.a.	n.a.	0.94	0.492	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	15.400	0.800	3363.0	2589.2	10.597	5.832	3.15		Clay	55.3			14.56	0.95	n.a.	n.a.	0.94	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	15.100	0.700	3382.2	2598.5	10.321	5.220	3.13		Clay	54.3			14.27	0.95	n.a.	n.a.	0.94	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	14.900	0.700	3401.4	2607.7	10.123	5.303	3.14		Clay	54.8			14.08	0.95	n.a.	n.a.	0.94	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	13.400	0.700	3421.8	2617.5	8.932	5.988	3.21		Clay	58.3			12.67	0.95	n.a.	n.a.	0.94	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	13.900	0.700	3441.0	2626.7	9.274	5.747	3.19		Clay	57.2			13.14	0.94	n.a.	n.a.	0.94	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	13.600	0.700	3461.4	2636.5	9.004	5.898	3.21		Clay	58.0			12.85	0.94	n.a.	n.a.	0.94	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	14.200	0.800	3480.6	2645.7	9.419	6.421	3.22		Clay	58.4			13.42	0.94	n.a.	n.a.	0.94	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	15.200	1.000	3499.8	2654.9	10.132	7.435	3.23		Clay	59.1			14.37	0.94	n.a.	n.a.	0.94	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	17.400	1.000	3520.2	2664.7	11.739	6.394	3.14		Clay	54.9			16.45	0.94	n.a.	n.a.	0.94	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	16.600	1.000	3539.4	2673.9	11.093	6.743	3.17		Clay	56.4			15.69	0.94	n.a.	n.a.	0.94	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	18.300	1.200	3559.8	2683.7	12.311	7.264	3.16		Clay	55.8			17.30	0.94	n.a.	n.a.	0.94	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	21.700	1.200	3579.0	2692.9	14.787	6.027	3.05		Clay	50.8			20.51	0.94	n.a.	n.a.	0.94	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	19.400	1.200	3598.2	2702.1	13.027	6.818	3.12		Clay	54.2			18.34	0.94	n.a.	n.a.	0.94	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	20.800	1.300	3618.6	2711.9	14.005	6.845	3.10		Clay	53.2			19.66	0.94	n.a.	n.a.	0.93	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	23.500	1.500	3637.8	2721.1	15.935	6.918	3.06		Clay	51.4			22.21	0.94	n.a.	n.a.	0.93	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	22.000	1.300	3658.2	2730.9	14.772	6.445	3.07		Clay	51.6			20.79	0.93	n.a.	n.a.	0.93	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	18.400	1.000	3677.4	2740.2	12.088	6.038	3.12		Clay	53.7			17.39	0.93	n.a.	n.a.	0.93	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.190	17.100	0.800	3697.8	2749.9	11.092	5.246	3.11		Clay	53.3			16.16	0.93	n.a.	n.a.	0.93	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	16.100	0.600	3717.0	2759.2	10.323	4.213	3.07		Clay	51.8			15.22	0.93	n.a.	n.a.	0.93	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	14.000	0.500	3736.2	2768.4	8.765	4.121	3.12		Clay	54.1			13.23	0.93	n.a.	n.a.	0.93	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	13.200	0.400	3756.6	2778.2	8.150	3.533	3.11		Clay	53.5			12.48	0.93	n.a.	n.a.	0.93	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	13.700	0.400	3775.8	2787.4	8.475	3.386	3.09		Clay	52.4			12.95	0.93	n.a.	n.a.	0.93	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.010	13.500	0.400	3796.2	2797.2	8.295	3.448	3.10		Clay	53.0			12.76	0.93	n.a.	n.a.	0.93	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	13.500	0.400	3815.4	2806.4	8.261	3.451	3.10		Clay	53.0			12.76	0.93	n.a.	n.a.	0.93	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	12.900	0.400	3834.6	2815.6	7.801	3.642	3.13		Clay	54.6			12.19	0.93	n.a.	n.a.	0.93	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	14.700	0.500	3855.0	2825.4	9.041	3.915	3.10		Clay	53.0			13.89	0.93	n.a.	n.a.	0.93	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.660	15.600	0.600	3874.2	2834.6	9.640	4.391	3.11		Clay	53.3			14.74	0.93	n.a.	n.a.	0.93	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.59

Total Settlement: 0.39 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	CRR$_{M=7.5}$ σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.830	16.100	0.700	3894.6	2844.4	9.951	4.946	3.13		Clay	54.2			15.22	0.92	n.a.	n.a.	0.93	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	15.600	0.600	3913.8	2853.6	9.562	4.398	3.11		Clay	53.5			14.74	0.92	n.a.	n.a.	0.93	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	15.000	0.700	3933.0	2862.8	9.105	5.371	3.18		Clay	56.6			14.18	0.92	n.a.	n.a.	0.93	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	17.300	0.800	3953.4	2872.6	10.668	5.221	3.12		Clay	53.8			16.35	0.92	n.a.	n.a.	0.93	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	19.800	0.900	3972.6	2881.8	12.363	5.052	3.06		Clay	51.2			18.71	0.92	n.a.	n.a.	0.92	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.650	20.500	1.000	3993.0	2891.6	12.798	5.404	3.07		Clay	51.5			19.38	0.92	n.a.	n.a.	0.92	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	19.200	1.000	4012.2	2900.9	11.854	5.816	3.11		Clay	53.6			18.15	0.92	n.a.	n.a.	0.92	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	17.000	0.900	4031.4	2910.1	10.298	6.006	3.17		Clay	56.1			16.07	0.92	n.a.	n.a.	0.92	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	14.700	0.700	4051.8	2919.9	8.681	5.523	3.20		Clay	57.7			13.89	0.92	n.a.	n.a.	0.92	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	13.100	0.500	4071.0	2929.1	7.555	4.519	3.20		Clay	57.6			12.38	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.470	11.600	0.400	4091.4	2938.9	6.502	4.187	3.23		Clay	59.2			10.96	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	11.000	0.400	4110.6	2948.1	6.068	4.472	3.27		Clay	61.1			10.40	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	11.900	0.500	4129.8	2957.3	6.651	5.084	3.27		Clay	61.1			11.25	0.92	n.a.	n.a.	0.92	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	12.500	0.600	4150.2	2967.1	7.027	5.755	3.29		Clay	61.8			11.81	0.91	n.a.	n.a.	0.92	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	12.400	1.100	4169.4	2976.3	6.932	10.664	3.46		Clay	70.5			11.72	0.91	n.a.	n.a.	0.92	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.290	11.600	1.200	4189.8	2986.1	6.366	12.625	3.54		Clay	74.6			10.96	0.91	n.a.	n.a.	0.92	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	16.200	1.000	4209.0	2995.3	9.412	7.094	3.24		Clay	59.7			15.31	0.91	n.a.	n.a.	0.92	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	13.400	1.000	4228.2	3004.5	7.513	8.861	3.38		Clay	66.5			12.67	0.91	n.a.	n.a.	0.92	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	13.000	0.900	4248.6	3014.3	7.216	8.275	3.38		Clay	66.2			12.29	0.91	n.a.	n.a.	0.92	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	13.200	1.000	4267.8	3023.5	7.320	9.037	3.39		Clay	67.2			12.48	0.91	n.a.	n.a.	0.92	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.110	17.000	1.400	4288.2	3033.3	9.795	9.424	3.31		Clay	62.9			16.07	0.91	n.a.	n.a.	0.92	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	25.300	2.900	4307.4	3042.6	15.215	12.529	3.26		Clay	60.3			23.91	0.91	n.a.	n.a.	0.92	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	50.300	4.300	4326.6	3051.8	31.547	8.933	2.93		Clay	45.9			47.54	0.91	n.a.	n.a.	0.92	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	77.000	4.700	4347.0	3061.6	48.881	6.281	2.69		Clay	36.7			72.78	0.91	n.a.	n.a.	0.91	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	97.900	5.500	4366.2	3070.8	75.099	5.746	2.54		Sand	31.7	122	1.6	195.20	0.91	176.93	266.17	0.91	0.520	0.888	2.000	1.598	3.07	0.00	0.00
35.930	102.400	5.400	4386.6	3080.6	78.497	5.389	2.51		Sand	30.6	122	1.6	195.20	0.91	176.79	265.37	0.91	0.520	0.887	2.000	1.596	3.07	0.00	0.00
36.090	110.800	5.700	4405.8	3089.8	84.943	5.249	2.48		Sand	29.6	122	1.6	195.20	0.90	176.65	264.56	0.91	0.521	0.886	2.000	1.595	3.06	0.00	0.00
36.260	129.300	5.300	4426.2	3099.6	99.248	4.170	2.36		Sand	26.0		1.6	195.54	0.90	176.80	261.52	0.91	0.521	0.885	2.000	1.593	3.06	0.00	0.00
36.420	125.400	5.100	4445.4	3108.8	96.052	4.140	2.36		Sand	26.2		1.6	189.64	0.90	171.34	254.50	0.91	0.521	0.885	2.000	1.591	3.05	0.00	0.00
36.580	105.700	4.000	4464.6	3118.0	80.564	3.866	2.39		Sand	27.0	118	1.6	188.80	0.90	170.44	254.11	0.91	0.522	0.884	2.000	1.590	3.05	0.00	0.00
36.750	78.500	3.500	4485.0	3127.8	59.284	4.590	2.53		Sand	31.4	118	1.6	188.80	0.90	170.30	257.17	0.91	0.522	0.883	2.000	1.588	3.04	0.00	0.00
36.910	44.700	2.700	4504.2	3137.0	27.063	6.361	2.87		Clay	43.5			42.25	0.90	n.a.	n.a.	0.91	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.080	22.200	1.400	4524.6	3146.8	12.672	7.022	3.14		Clay	55.0			20.98	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	13.600	0.600	4543.8	3156.0	7.179	5.297	3.26		Clay	60.4			12.85	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	13.200	0.400	4563.0	3165.2	6.899	3.664	3.18		Clay	56.6			12.48	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	13.200	0.900	4583.4	3175.0	6.871	8.251	3.39		Clay	67.0			12.48	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	15.200	0.900	4602.6	3184.2	8.102	6.977	3.29		Clay	61.9			14.37	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.900	19.000	1.200	4623.0	3194.0	10.450	7.191	3.21		Clay	58.2			17.96	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	22.300	1.900	4642.2	3203.3	12.474	9.510	3.24		Clay	59.3			21.08	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	33.000	2.800	4681.4	3212.5	19.094	9.130	3.09		Clay	52.6			31.19	0.90	n.a.	n.a.	0.91	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	34.600	3.600	4681.8	3222.3	20.023	11.160	3.14		Clay	54.7			32.70	0.89	n.a.	n.a.	0.90	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	43.300	3.900	4701.0	3231.5	25.344	9.524	3.02		Clay	49.4			40.93	0.89	n.a.	n.a.	0.90	0.525	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.720	37.000	4.300	4721.4	3241.3	21.374	12.414	3.15		Clay	55.4			34.97	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	45.900	3.900	4740.6	3250.5	26.783	8.959	2.98		Clay	47.9			43.38	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	60.500	3.700	4759.8	3259.7	35.660	6.366	2.79		Clay	40.3			57.18	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	70.200	3.500	4780.2	3269.5	41.480	5.161	2.68		Clay	36.2			66.35	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	73.700	3.500	4799.4	3278.7	43.493	4.909	2.65		Clay	35.2			69.66	0.89	n.a.	n.a.	0.90	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.540	75.300	3.600	4819.8	3288.5	44.330	4.939	2.64		Clay	35.1			71.17	0.89	n.a.	n.a.	0.90	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	85.300	4.000	4839.0	3297.7	62.751	4.826	2.53		Sand	31.4	148		148.00	0.86	127.90	200.42	0.90	0.527	0.883	1.160	0.921	1.75	0.00	0.00
39.860	105.500	4.100	4858.2	3306.9	77.928	3.978	2.41		Sand	27.5	148		148.00	0.86	127.58	197.72	0.90	0.527	0.886	1.027	0.818	1.55	0.00	0.00
40.030	121.200	4.400	4878.6	3316.7	89.658	3.705	2.35		Sand	25.7	148		148.00	0.86	127.30	195.77	0.90	0.528	0.887	0.944	0.754	1.43	0.00	0.00
40.190	139.000	4.700	4897.8	3325.9	102.946	3.442	2.28		Sand	23.9	148		148.00	0.86	127.00	193.41	0.90	0.528	0.890	0.857	0.686	1.30	0.00	0.01
40.360	157.100	4.900	4918.2	3335.7	116.413	3.169	2.22		Sand	22.3			148.49	0.86	127.12	191.22	0.90	0.528	0.892	0.786	0.631	1.19	0.00	0.01
40.520	167.100	4.700	4937.4	3345.0	123.763	2.855	2.17		Sand	21.0			157.94	0.86	135.83	200.11	0.90	0.528	0.880	1.144	0.905	1.71	0.00	0.00
40.680	178.300	3.700	4956.6	3354.2	131.993	2.104	2.05		Sand	18.1			168.53	0.86	145.21	204.74	0.90	0.528	0.872	1.431	1.123	2.12	0.00	0.00
40.850	197.700	4.000	4977.0	3364.0	146.336	2.049	2.01		Sand	17.2			186.86	0.87	162.64	223.53	0.90	0.529	0.861	2.000	1.549	2.93	0.00	0.00
41.010	161.800	3.900	4996.2	3373.2	119.254	2.448	2.13		Sand	20.0			152.93	0.85	130.40	190.98	0.90	0.529	0.889	0.779	0.623	1.18	0.00	0.01
41.180	204.000	3.300	5016.6	3383.0	150.619	1.638	1.93		Sand	15.5			192.82	0.87	167.35	221.57	0.89	0.529	0.859	2.000	1.546	2.92	0.00	0.00
41.340	186.100	3.000	5035.8	3392.2	137.045	1.634	1.96		Sand	16.1			175.90	0.86	150.96	204.24	0.89	0.529	0.870	1.396	1.092	2.06	0.00	0.00
41.500	149.100	3.300	5055.0	3401.4	109.269	2.251	2.13		Sand	19.9			140.93	0.84	118.60	175.78	0.89	0.529	0.904	0.474	0.385	0.73	0.01	0.02
41.670	127.400	4.200	5075.4	3411.2	92.950	3.364	2.30		Sand	24.5			120.42	0.83	99.98	158.59	0.89	0.530	0.918	0.317	0.262	0.49	0.02	0.03
41.830	103.500	3.900	5094.6	3420.4	75.050	3.863	2.41		Sand	27.6			97.83	0.81	79.55	133.96	0.89	0.530	0.933	0.214	0.179	0.34	0.02	0.05
42.000	92.800	3.500	5115.0	3430.2	66.992	3.878	2.44		Sand	28.6			87.71	0.80	70.51	122.49	0.89	0.530	0.939	0.185	0.156	0.29	0.03	0.05
42.160	99.400	2.900	5134.2	3439.4	71.788	2.995	2.34		Sand	25.6			93.95	0.81	75.79	127.66	0.89	0.530	0.936	0.197	0.166	0.31	0.02	0.05

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.59

Total Settlement: 0.39 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	Interpreted q_{cN}	C_N	q_{c1N}	$q_{cN,cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.320	152.400	2.100	5153.4	3448.6	110.925	1.402	1.97		Sand	16.4			144.05	0.83	119.90	167.55	0.89	0.530	0.908	0.384	0.314	0.59	0.01	0.03
42.490	122.500	2.500	5173.8	3458.4	88.654	2.085	2.16		Sand	20.9	144		144.00	0.84	120.88	180.63	0.89	0.530	0.895	0.546	0.440	0.83	0.01	0.02
42.650	71.200	2.300	5193.0	3467.6	50.653	3.353	2.48		Sand	29.8	144		144.00	0.84	121.66	191.28	0.89	0.531	0.882	0.788	0.625	1.18	0.00	0.01
42.820	32.200	2.700	5213.4	3477.4	17.020	9.124	3.13		Clay	54.2			30.43	0.88	n.a.	n.a.	0.89	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	65.000	2.800	5232.6	3486.6	35.784	4.488	2.68		Clay	36.3			61.44	0.88	n.a.	n.a.	0.89	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.150	93.500	2.900	5253.0	3496.4	66.818	3.191	2.38		Sand	26.8	186		186.00	0.87	161.86	242.53	0.89	0.531	0.849	2.000	1.528	2.88	0.00	0.00
43.310	148.800	3.000	5272.2	3505.7	107.332	2.052	2.10		Sand	19.3	186		186.00	0.86	160.29	227.51	0.89	0.531	0.849	2.000	1.526	2.87	0.00	0.00
43.470	197.600	3.300	5291.4	3514.9	142.972	1.693	1.96		Sand	16.0			186.77	0.85	159.54	214.63	0.89	0.531	0.848	2.000	1.525	2.87	0.00	0.00
43.640	100.900	3.100	5311.8	3524.7	71.948	3.155	2.36		Sand	26.0	186		186.00	0.87	161.36	241.11	0.89	0.531	0.847	2.000	1.524	2.87	0.00	0.00
43.800	41.300	1.900	5331.0	3533.9	21.865	4.918	2.86		Clay	43.1			39.04	0.87	n.a.	n.a.	0.89	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.970	23.800	1.000	5351.4	3543.7	11.922	4.734	3.05		Clay	51.0			22.50	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	21.400	0.400	5370.6	3552.9	10.535	2.137	2.90		Clay	44.5			20.23	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	19.700	0.300	5389.8	3562.1	9.548	1.764	2.89		Clay	44.2			18.62	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	18.600	0.400	5410.2	3571.9	8.900	2.517	3.00		Clay	48.6			17.58	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	16.500	0.500	5429.4	3581.1	7.699	3.627	3.14		Clay	54.7			15.60	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.790	15.000	0.500	5449.8	3590.9	6.837	4.073	3.21		Clay	58.0			14.18	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	13.100	0.500	5469.0	3600.1	5.758	4.824	3.31		Clay	63.0			12.38	0.87	n.a.	n.a.	0.88	0.532	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	12.500	0.400	5488.2	3609.3	5.406	4.100	3.29		Clay	62.1			11.81	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	12.200	0.400	5508.6	3619.1	5.220	4.235	3.31		Clay	63.1			11.53	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	12.200	0.400	5527.8	3628.3	5.201	4.239	3.32		Clay	63.2			11.53	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.610	11.700	0.500	5548.2	3638.1	4.907	5.602	3.41		Clay	67.7			11.06	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	12.300	0.500	5567.4	3647.4	5.218	5.254	3.37		Clay	65.8			11.63	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	12.900	0.500	5586.6	3656.6	5.528	4.947	3.33		Clay	64.0			12.19	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	11.400	0.500	5607.0	3666.4	4.689	5.816	3.43		Clay	69.1			10.78	0.87	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	12.000	0.600	5626.2	3675.6	4.999	6.531	3.44		Clay	69.4			11.34	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.430	13.400	0.700	5646.6	3685.4	5.740	6.618	3.39		Clay	67.1			12.67	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	14.800	0.800	5665.8	3694.6	6.478	6.685	3.35		Clay	65.1			13.99	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	15.000	1.000	5685.0	3703.8	6.565	8.225	3.41		Clay	67.7			14.18	0.86	n.a.	n.a.	0.87	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	14.100	0.900	5705.4	3713.6	6.057	8.002	3.43		Clay	68.8			13.33	0.86	n.a.	n.a.	0.87	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	15.400	0.900	5724.6	3722.8	6.736	7.178	3.36		Clay	65.4			14.56	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.250	15.600	0.900	5745.0	3732.6	6.820	7.071	3.35		Clay	65.0			14.74	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	15.300	0.900	5764.2	3741.8	6.637	7.248	3.37		Clay	65.8			14.46	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	14.400	0.800	5783.4	3751.0	6.136	6.952	3.38		Clay	66.6			13.61	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	14.300	0.700	5803.8	3760.8	6.061	6.141	3.35		Clay	65.2			13.52	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	14.900	0.600	5823.0	3770.0	6.360	5.005	3.29		Clay	61.7			14.08	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.070	14.800	0.600	5843.4	3779.8	6.285	5.051	3.29		Clay	62.0			13.99	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	15.300	0.700	5862.6	3789.0	6.529	5.659	3.31		Clay	62.8			14.46	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	16.500	0.900	5881.8	3798.3	7.140	6.638	3.32		Clay	63.3			15.60	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	17.900	1.100	5902.2	3808.1	7.851	7.358	3.31		Clay	63.1			16.92	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	20.500	1.900	5921.4	3817.3	9.189	10.833	3.37		Clay	66.0			19.38	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.890	35.400	2.800	5941.8	3827.1	16.947	8.634	3.11		Clay	53.5			33.46	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	73.000	3.100	5961.0	3836.3	36.504	4.427	2.67		Clay	35.9			69.00	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.220	56.200	2.900	5981.4	3846.1	27.669	5.450	2.82		Clay	41.4			53.12	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	32.800	2.100	6000.6	3855.3	15.459	7.047	3.08		Clay	52.1			31.00	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	23.000	1.500	6019.8	3864.5	10.345	7.504	3.23		Clay	58.9			21.74	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.710	19.800	1.300	6040.2	3874.3	8.662	7.747	3.30		Clay	62.2			18.71	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	18.000	1.100	6059.4	3883.5	7.710	7.348	3.32		Clay	63.4			17.01	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.040	16.300	0.900	6079.8	3893.3	6.812	6.787	3.34		Clay	64.4			15.41	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	15.100	0.700	6099.0	3902.5	6.176	5.809	3.33		Clay	64.1			14.27	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
												1.8												
												1.8												
												1.8												
												1.8												

CORNERSTONE EARTH GROUP

CPT No: 2

PGA (A_{max}): 0.59

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff. rd	CSR	Ks for Sand	$CRR_{M=7.5}$ σ'_{vo} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (inches)
0.330	50.300	2.000	41.3	41.3	340.369	3.978	2.05		Unsaturated	18.0			47.54	1.70	80.82	123.66	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	37.000	2.300	61.3	61.3	205.381	6.221	2.32		Unsaturated	25.0			34.97	1.70	59.45	105.72	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	34.000	2.200	82.5	82.5	162.554	6.478	2.39		Unsaturated	27.0			32.14	1.70	54.63	100.57	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	26.700	2.000	102.5	102.5	114.442	7.505	2.53		Unsaturated	31.2			25.24	1.70	42.90	86.59	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	27.300	2.100	122.5	122.5	107.002	7.710	2.55		Unsaturated	32.0			25.80	1.70	43.87	88.10	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	28.500	2.300	143.8	143.8	103.090	8.091	2.58		Unsaturated	32.9			26.94	1.70	45.79	90.89	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	23.800	2.200	163.8	163.8	134.440	9.276	2.57		Unsaturated	32.4			22.50	1.70	38.24	80.67	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	24.700	2.300	185.0	185.0	128.063	9.347	2.58		Unsaturated	32.9			23.35	1.70	39.69	82.70	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	26.000	2.400	205.0	205.0	125.431	9.267	2.58		Unsaturated	33.0			24.57	1.70	41.78	85.52	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	30.700	3.000	225.0	225.0	138.801	9.808	2.58		Unsaturated	32.9			29.02	1.70	49.33	95.63	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	35.600	3.500	246.3	246.3	151.132	9.866	2.56		Unsaturated	32.3			33.65	1.70	57.20	106.05	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	35.800	3.800	266.3	266.3	143.859	10.654	2.60		Unsaturated	33.7			33.84	1.70	57.52	106.80	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	40.600	3.900	287.5	287.5	154.637	9.640	2.55		Unsaturated	31.9			38.37	1.70	65.24	116.70	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	40.800	3.900	307.5	307.5	148.219	9.595	2.56		Unsaturated	32.1			38.56	1.70	65.56	117.20	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	41.900	3.600	327.5	327.5	145.627	8.626	2.52		Unsaturated	31.0			39.60	1.70	67.33	119.21	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	50.500	4.700	348.8	348.8	168.037	9.339	2.52		Unsaturated	30.9			47.73	1.70	81.14	137.67	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	77.500	5.300	368.8	368.8	175.055	6.855	2.39		Unsaturated	27.1			73.25	1.70	124.53	193.34	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	78.500	5.900	390.0	390.0	172.397	7.535	2.43		Unsaturated	28.3			74.20	1.70	126.13	196.32	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	79.200	6.100	410.0	410.0	169.621	7.722	2.45		Unsaturated	28.6			74.86	1.70	127.26	198.07	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.450	76.200	6.000	431.3	431.3	159.086	7.896	2.47		Unsaturated	29.3			72.02	1.70	122.44	192.07	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	69.600	5.700	451.3	451.3	141.992	8.216	2.51		Unsaturated	30.6			65.78	1.70	111.83	178.56	1.00	0.384	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	64.800	5.200	471.3	471.3	129.312	8.054	2.52		Unsaturated	31.1			61.25	1.70	104.12	168.45	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	60.000	5.000	492.5	492.5	117.067	8.368	2.56		Unsaturated	32.3			56.71	1.70	96.41	158.57	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	60.400	4.600	512.5	512.5	115.509	7.648	2.53		Unsaturated	31.3			57.09	1.70	97.05	159.09	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	58.600	4.500	533.8	533.8	109.779	7.714	2.55		Unsaturated	31.8			55.39	1.70	94.16	155.40	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	56.800	4.200	553.8	553.8	104.434	7.431	2.55		Unsaturated	31.8			53.69	1.70	91.27	151.52	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	55.000	4.200	573.8	573.8	99.312	7.676	2.57		Unsaturated	32.6			51.98	1.70	88.37	147.90	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	55.600	3.900	595.0	595.0	98.573	7.052	2.54		Unsaturated	31.6			52.55	1.68	88.16	147.30	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	47.400	3.600	615.0	615.0	105.710	7.645	2.55		Unsaturated	32.0			44.80	1.70	76.16	131.36	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	45.500	3.500	636.3	636.3	99.038	7.746	2.57		Unsaturated	32.7			43.01	1.70	73.11	127.47	1.00	0.383	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	47.400	3.200	656.3	656.3	79.891	6.798	2.58		Unsaturated	33.0			44.80	1.67	74.83	129.86	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	47.100	3.100	676.3	676.3	78.183	6.629	2.58		Unsaturated	32.9			44.52	1.65	73.64	128.23	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	50.200	3.000	697.5	697.5	82.068	6.018	2.53		Unsaturated	31.4			47.45	1.62	76.82	132.05	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	50.100	2.900	717.5	717.5	80.738	5.830	2.53		Unsaturated	31.2			47.35	1.60	75.92	130.78	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	41.900	2.900	738.8	738.8	81.997	6.983	2.58		Unsaturated	33.1			39.60	1.63	64.56	116.10	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	42.400	2.800	758.8	758.8	81.427	6.663	2.57		Unsaturated	32.6			40.08	1.61	64.54	115.96	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	42.000	2.600	778.8	778.8	79.177	6.248	2.56		Unsaturated	32.1			39.70	1.60	63.38	114.27	1.00	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	38.500	2.400	800.0	800.0	71.144	6.299	2.59		Unsaturated	33.2			36.39	1.60	58.15	107.52	0.99	0.382	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	28.200	2.200	820.0	820.0	67.780	7.917	2.68		Unsaturated	36.3			26.65	1.64	43.81	88.80	0.99	0.381	1.092	n.a.	n.a.	n.a.	0.00	0.00
6.730	25.700	2.300	841.3	841.3	60.100	9.098	2.76		Unsaturated	39.2			24.29	1.64	39.84	83.77	0.99	0.381	1.086	n.a.	n.a.	n.a.	0.00	0.00
6.890	34.500	2.200	861.3	861.3	60.416	6.457	2.64		Unsaturated	35.0			32.61	1.57	51.18	98.52	0.99	0.381	1.094	n.a.	n.a.	n.a.	0.00	0.00
7.050	42.300	2.200	881.3	881.3	61.308	5.256	2.57		Unsaturated	32.5			39.98	1.52	60.63	110.69	0.99	0.381	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.220	44.000	2.200	902.5	902.5	63.027	5.052	2.55		Unsaturated	31.8			41.59	1.49	62.15	112.55	0.99	0.381	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.380	41.600	2.400	922.5	922.5	69.526	5.834	2.57		Unsaturated	32.5			39.32	1.49	58.61	107.99	0.99	0.381	1.094	n.a.	n.a.	n.a.	0.00	0.00
7.550	36.900	2.400	943.8	943.8	60.592	6.588	2.65		Unsaturated	35.2			34.88	1.50	52.16	99.87	0.99	0.381	1.086	n.a.	n.a.	n.a.	0.00	0.00
7.710	34.400	2.300	963.8	963.8	70.388	6.781	2.62		Unsaturated	34.1			32.51	1.49	48.55	94.84	0.99	0.381	1.080	n.a.	n.a.	n.a.	0.00	0.00
7.870	39.700	2.300	983.8	983.8	63.348	5.866	2.60		Unsaturated	33.4			37.52	1.46	54.68	102.94	0.99	0.380	1.083	n.a.	n.a.	n.a.	0.00	0.00
8.040	34.100	2.300	1005.0	1005.0	66.861	6.846	2.63		Unsaturated	34.7			32.23	1.47	47.25	93.19	0.99	0.380	1.075	n.a.	n.a.	n.a.	0.00	0.00
8.200	29.800	2.700	1025.0	1025.0	57.146	9.219	2.78		Unsaturated	39.8			28.17	1.47	41.39	85.92	0.99	0.380	1.069	n.a.	n.a.	n.a.	0.00	0.00
8.370	35.800	2.800	1046.3	1046.3	67.435	7.937	2.68		Unsaturated	36.4			33.84	1.43	48.44	95.05	0.99	0.380	1.072	n.a.	n.a.	n.a.	0.00	0.00
8.530	49.700	3.000	1066.3	1066.3	65.466	6.102	2.60		Unsaturated	33.6			46.98	1.37	64.57	116.23	0.99	0.380	1.083	n.a.	n.a.	n.a.	0.00	0.00
8.690	55.000	3.000	1086.3	1086.3	71.839	5.509	2.54		Unsaturated	31.6			51.98	1.35	70.20	123.25	0.99	0.380	1.085	n.a.	n.a.	n.a.	0.00	0.00
8.860	63.800	3.300	1107.5	1107.5	82.629	5.218	2.48		Unsaturated	29.8			60.30	1.32	79.59	135.14	0.99	0.380	1.091	n.a.	n.a.	n.a.	0.00	0.00
9.020	71.100	3.400	1127.5	1127.5	91.333	4.820	2.43		Unsaturated	28.1			67.20	1.30	87.14	144.38	0.99	0.380	1.096	n.a.	n.a.	n.a.	0.00	0.00
9.190	70.900	3.800	1148.8	1148.8	90.214	5.403	2.47		Unsaturated	29.4			67.01	1.29	86.27	143.89	0.99	0.379	1.093	n.a.	n.a.	n.a.	0.00	0.00
9.350	73.800	3.600	1168.8	1168.8	93.114	4.917	2.43		Unsaturated	28.2			69.75	1.27	88.90	146.75	0.99	0.379	1.092	n.a.	n.a.	n.a.	0.00	0.00
9.510	43.900	2.700	1188.8	1188.8	61.285	6.235	2.63		Unsaturated	34.4			41.49	1.33	55.05	103.63	0.99	0.379	1.063	n.a.	n.a.	n.a.	0.00	0.00
9.680	23.000	1.500	1210.0	1210.0	37.017	6.698	2.79		Unsaturated	40.5			21.74	1.38	29.93	70.50	0.99	0.379	1.047	n.a.	n.a.	n.a.	0.00	0.00
9.840	15.400	1.700	1230.0	1230.0	24.041	11.498	3.09		Unsaturated	52.7			14.56	1.39	20.28	57.72	0.99	0.379	1.041	n.a.	n.a.	n.a.	0.00	0.00
10.010	27.100	2.200	1251.3	1251.3	42.317	8.310	2.82		Unsaturated	41.6			25.61	1.34	34.30	76.46	0.99	0.379	1.046	n.a.	n.a.	n.a.	0.00	0.00
10.170	36.400	2.200	1271.3	1271.3	56.266	6.151	2.64		Unsaturated	35.1			34.40	1.30	44.87	90.06	0.99	0.379	1.050	n.a.	n.a.	n.a.	0.00	0.00
10.340	23.000	2.000	1292.5	1292.5	34.590	8.947	2.91		Unsaturated	44.8			21.74	1.33	28.87	69.26	0.99	0.378	1.041	n.a.	n.a.	n.a.	0.00	0.00
10.500	15.200	1.500	1312.5	1312.5	22.162	10.314	3.08		Unsaturated	52.3			14.37	1.34	19.28	56.37	0.99	0.378	1.036	n.a.	n.a.	n.a.	0.00	0.00
10.660	13.900	1.100	1332.5	1332.5	19.863	8.312	3.05		Unsaturated	50.8			13.14	1.33	17.53	54.01	0.99	0.378	1.034	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.59

Total Settlement 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{tl})	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1Ncs}	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ $_{S'vc=1\ atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.830	13.300	1.100	1353.8	1353.8	18.649	8.714	3.08		Unsaturated	52.3			12.57	1.32	16.64	52.80	0.99	0.378	1.033	n.a.	n.a.	n.a.	0.00	0.00
10.990	11.400	0.900	1373.8	1373.8	15.597	8.401	3.13		Unsaturated	54.3			10.78	1.32	14.21	49.50	0.99	0.378	1.031	n.a.	n.a.	n.a.	0.00	0.00
11.160	11.900	1.500	1395.0	1395.0	16.061	13.390	3.26		Unsaturated	60.5			11.25	1.30	14.67	50.06	0.99	0.378	1.030	n.a.	n.a.	n.a.	0.00	0.00
11.320	31.300	2.000	1415.0	1415.0	43.240	6.538	2.74		Unsaturated	38.5			29.58	1.25	36.87	79.70	0.98	0.378	1.036	n.a.	n.a.	n.a.	0.00	0.00
11.480	46.400	2.400	1435.0	1435.0	56.667	5.254	2.59		Unsaturated	33.3			43.86	1.21	53.18	100.88	0.98	0.377	1.042	n.a.	n.a.	n.a.	0.00	0.00
11.650	30.200	1.800	1456.3	1456.3	40.476	6.108	2.74		Unsaturated	38.4			28.54	1.23	35.10	77.32	0.98	0.377	1.033	n.a.	n.a.	n.a.	0.00	0.00
11.810	18.200	2.100	1476.3	1476.3	23.657	12.026	3.11		Unsaturated	53.6			17.20	1.24	21.40	59.22	0.98	0.377	1.028	n.a.	n.a.	n.a.	0.00	0.00
11.980	38.300	2.300	1497.5	1497.5	50.152	6.125	2.68		Unsaturated	36.2			36.20	1.20	43.41	88.26	0.98	0.377	1.034	n.a.	n.a.	n.a.	0.00	0.00
12.140	44.600	2.400	1517.5	1517.5	52.296	5.474	2.63		Unsaturated	34.5			42.16	1.18	49.87	96.69	0.98	0.377	1.034	n.a.	n.a.	n.a.	0.00	0.00
12.300	27.000	1.700	1537.5	1537.5	34.122	6.481	2.81		Unsaturated	41.0			25.52	1.20	30.61	71.45	0.98	0.377	1.027	n.a.	n.a.	n.a.	0.00	0.00
12.470	14.500	0.800	1558.8	1558.8	17.605	5.831	2.98		Unsaturated	47.9			13.71	1.21	16.61	52.75	0.98	0.377	1.022	n.a.	n.a.	n.a.	0.00	0.00
12.630	12.100	0.900	1578.8	1578.8	14.329	7.957	3.14		Unsaturated	54.8			11.44	1.21	13.80	48.95	0.98	0.376	1.021	n.a.	n.a.	n.a.	0.00	0.00
12.800	15.200	1.300	1600.0	1600.0	18.000	9.028	3.10		Unsaturated	53.3			14.37	1.19	17.12	53.43	0.98	0.376	1.020	n.a.	n.a.	n.a.	0.00	0.00
12.960	28.900	1.800	1620.0	1620.0	34.679	6.408	2.80		Unsaturated	40.7			27.32	1.16	31.77	72.99	0.98	0.376	1.023	n.a.	n.a.	n.a.	0.00	0.00
13.120	36.000	2.000	1640.0	1640.0	42.902	5.685	2.70		Clay	37.0			34.03	1.07	n.a.	n.a.	0.98	0.378	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	23.100	2.000	1661.3	1661.3	26.810	8.981	2.98		Clay	48.0			21.83	1.07	n.a.	n.a.	0.98	0.380	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	24.800	2.300	1681.3	1681.3	28.502	9.600	2.99		Clay	48.1			23.44	1.06	n.a.	n.a.	0.98	0.382	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	49.400	2.500	1702.5	1702.5	53.431	5.149	2.60		Mixed	33.6		1.8	84.05	1.09	91.66	152.61	0.98	0.384	1.036	0.284	0.264	0.69	0.02	0.04
13.780	51.800	2.700	1722.5	1722.5	55.605	5.300	2.60		Mixed	33.6		1.8	88.13	1.08	95.51	157.75	0.98	0.386	1.035	0.312	0.290	0.75	0.02	0.03
13.940	60.900	2.700	1742.5	1742.5	62.524	4.498	2.51		Sand	30.7		1.8	103.61	1.07	111.13	177.67	0.98	0.388	1.040	0.500	0.468	1.20	0.01	0.01
14.110	39.900	2.300	1763.8	1763.8	44.245	5.895	2.70		Clay	37.0			37.71	1.05	n.a.	n.a.	0.98	0.391	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	18.000	1.400	1783.8	1783.8	19.182	8.183	3.05		Clay	51.1			17.01	1.05	n.a.	n.a.	0.98	0.392	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	9.800	0.900	1805.0	1805.0	9.859	10.115	3.33		Clay	63.8			9.26	1.04	n.a.	n.a.	0.98	0.395	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	8.200	0.500	1825.0	1825.0	7.986	6.861	3.29		Clay	61.9			7.75	1.04	n.a.	n.a.	0.98	0.396	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	8.100	0.600	1845.0	1845.0	7.780	8.359	3.35		Clay	65.0			7.66	1.04	n.a.	n.a.	0.98	0.398	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	8.000	0.600	1866.3	1866.3	7.573	8.490	3.37		Clay	65.7			7.56	1.03	n.a.	n.a.	0.98	0.400	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	8.700	0.900	1885.8	1880.2	8.251	11.602	3.43		Clay	68.8			8.22	1.03	n.a.	n.a.	0.98	0.402	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	13.500	1.100	1906.2	1890.0	13.277	8.767	3.19		Clay	57.2			12.76	1.03	n.a.	n.a.	0.98	0.404	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	18.600	1.000	1925.4	1899.2	18.573	5.670	2.96		Clay	46.9			17.58	1.03	n.a.	n.a.	0.97	0.406	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	11.400	0.900	1944.6	1908.4	10.928	8.631	3.25		Clay	60.0			10.78	1.03	n.a.	n.a.	0.97	0.408	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	10.700	0.900	1965.0	1918.2	10.132	9.262	3.29		Clay	62.2			10.11	1.03	n.a.	n.a.	0.97	0.410	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	13.100	0.900	1984.2	1927.4	12.564	7.433	3.16		Clay	55.8			12.38	1.02	n.a.	n.a.	0.97	0.411	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	11.300	1.600	2004.6	1937.2	10.631	15.537	3.43		Clay	69.2			10.68	1.02	n.a.	n.a.	0.97	0.413	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.240	35.800	2.300	2023.8	1946.4	35.746	6.611	2.80		Clay	40.7			33.84	1.02	n.a.	n.a.	0.97	0.415	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.400	47.200	2.500	2043.0	1955.6	47.226	5.414	2.65		Clay	35.4			44.61	1.02	n.a.	n.a.	0.97	0.416	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.570	25.300	1.700	2063.4	1965.4	24.695	7.005	2.93		Clay	45.8			23.91	1.02	n.a.	n.a.	0.97	0.418	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.730	12.300	1.000	2082.6	1974.6	11.403	8.882	3.24		Clay	59.7			11.63	1.02	n.a.	n.a.	0.97	0.420	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	9.200	0.700	2103.0	1984.4	8.212	8.591	3.34		Clay	64.5			8.70	1.02	n.a.	n.a.	0.97	0.421	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	8.800	0.600	2122.2	1993.7	7.764	7.753	3.33		Clay	64.0			8.32	1.02	n.a.	n.a.	0.97	0.423	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.230	8.300	0.600	2142.6	2003.4	7.216	8.300	3.38		Clay	66.2			7.84	1.01	n.a.	n.a.	0.97	0.425	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.390	9.000	0.600	2161.8	2012.7	7.869	7.577	3.32		Clay	63.5			8.51	1.01	n.a.	n.a.	0.97	0.426	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.550	9.500	0.800	2181.0	2021.9	8.318	9.513	3.37		Clay	65.8			8.98	1.01	n.a.	n.a.	0.97	0.428	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.720	11.400	0.900	2201.4	2031.7	10.139	8.738	3.28		Clay	61.3			10.78	1.01	n.a.	n.a.	0.97	0.429	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.880	11.700	1.600	2220.6	2040.9	10.378	15.109	3.43		Clay	69.1			11.06	1.01	n.a.	n.a.	0.97	0.431	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.050	16.300	2.100	2241.0	2050.7	14.804	13.834	3.30		Clay	62.2			15.41	1.01	n.a.	n.a.	0.97	0.432	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.210	43.900	2.200	2260.2	2059.9	41.526	5.144	2.68		Clay	36.2			41.49	1.01	n.a.	n.a.	0.97	0.434	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.370	27.100	1.700	2279.4	2069.1	25.093	6.548	2.90		Clay	44.8			25.61	1.01	n.a.	n.a.	0.97	0.435	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.540	15.700	1.100	2299.8	2078.9	13.998	7.560	3.13		Clay	54.5			14.84	1.00	n.a.	n.a.	0.97	0.437	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	12.300	0.900	2319.0	2088.1	10.670	8.079	3.24		Clay	59.4			11.63	1.00	n.a.	n.a.	0.97	0.438	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.870	9.700	0.800	2339.4	2097.9	8.132	9.378	3.37		Clay	65.9			9.17	1.00	n.a.	n.a.	0.97	0.440	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	9.800	0.700	2358.6	2107.1	8.182	8.120	3.33		Clay	63.8			9.26	1.00	n.a.	n.a.	0.97	0.441	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	8.600	0.600	2377.8	2116.3	7.004	8.096	3.38		Clay	66.4			8.13	1.00	n.a.	n.a.	0.97	0.442	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	7.900	0.600	2398.2	2126.1	6.303	8.954	3.44		Clay	69.7			7.47	1.00	n.a.	n.a.	0.96	0.444	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	7.800	0.500	2417.4	2135.4	6.174	7.586	3.40		Clay	67.7			7.37	1.00	n.a.	n.a.	0.96	0.445	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	7.900	0.600	2437.8	2145.1	6.229	8.981	3.45		Clay	69.9			7.47	1.00	n.a.	n.a.	0.96	0.446	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	8.700	0.600	2457.0	2154.4	6.936	8.031	3.38		Clay	66.4			8.22	1.00	n.a.	n.a.	0.96	0.448	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	7.100	0.500	2476.2	2163.6	5.419	8.530	3.48		Clay	71.7			6.71	0.99	n.a.	n.a.	0.96	0.449	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	6.900	0.400	2496.6	2173.4	5.201	7.078	3.45		Clay	69.8			6.52	0.99	n.a.	n.a.	0.96	0.450	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	7.300	0.500	2515.8	2182.6	5.537	8.275	3.46		Clay	70.9			6.90	0.99	n.a.	n.a.	0.96	0.451	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	7.500	0.500	2536.2	2192.4	5.685	8.023	3.45		Clay	69.9			7.09	0.99	n.a.	n.a.	0.96	0.453	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	8.200	0.500	2555.4	2201.6	6.288	7.223	3.38		Clay	66.7			7.75	0.99	n.a.	n.a.	0.96	0.454	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	9.000	0.600	2574.6	2210.8	6.977	7.779	3.37		Clay	65.9			8.51	0.99	n.a.	n.a.	0.96	0.455	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	10.200	0.700	2595.0	2220.6	8.018	7.863	3.33		Clay	63.7			9.64	0.99	n.a.	n.a.	0.96	0.456	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.160	11.300	0.700	2614.2	2229.8	8.963	7.005	3.26		Clay	60.3			10.68	0.99	n.a.	n.a.	0.96	0.458	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.59

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vo} (psf)	Insitu S'_{vo} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	Interpreted q_{cN}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.330	12.400	0.800	2634.6	2239.6	9.897	7.218	3.23		Clay	59.1			11.72	0.99	n.a.	n.a.	0.96	0.459	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	12.700	0.800	2653.8	2248.8	10.115	7.034	3.22		Clay	58.4			12.00	0.98	n.a.	n.a.	0.96	0.460	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	11.800	0.700	2673.0	2258.0	9.268	6.690	3.23		Clay	59.1			11.15	0.98	n.a.	n.a.	0.96	0.461	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	10.400	0.600	2693.4	2267.8	7.984	6.627	3.28		Clay	61.5			9.83	0.98	n.a.	n.a.	0.96	0.462	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	10.500	0.700	2712.6	2277.0	8.031	7.656	3.32		Clay	63.3			9.92	0.98	n.a.	n.a.	0.96	0.463	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	12.900	0.800	2733.0	2286.8	10.087	6.936	3.21		Clay	58.3			12.19	0.98	n.a.	n.a.	0.96	0.464	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	14.500	1.000	2752.2	2296.1	11.432	7.620	3.20		Clay	57.6			13.71	0.98	n.a.	n.a.	0.96	0.465	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	15.700	1.300	2771.4	2305.3	12.419	9.082	3.22		Clay	58.7			14.84	0.98	n.a.	n.a.	0.96	0.466	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	17.800	1.700	2791.8	2315.1	14.172	10.363	3.22		Clay	58.6			16.82	0.98	n.a.	n.a.	0.96	0.468	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	21.700	2.100	2811.0	2324.3	17.463	10.348	3.16		Clay	55.6			20.51	0.98	n.a.	n.a.	0.96	0.469	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	23.600	2.400	2831.4	2334.1	19.009	10.818	3.14		Clay	55.0			22.31	0.97	n.a.	n.a.	0.95	0.470	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	23.600	2.700	2850.6	2343.3	18.926	12.176	3.18		Clay	56.8			22.31	0.97	n.a.	n.a.	0.95	0.471	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.300	45.700	2.800	2871.0	2353.1	37.623	6.326	2.77		Clay	39.6			43.19	0.97	n.a.	n.a.	0.95	0.472	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	78.500	4.300	2890.2	2362.3	68.930	5.580	2.56		Sand	32.1	223		223.00	0.97	216.62	319.56	0.95	0.473	0.967	2.000	1.739	3.68	0.00	0.00
23.620	171.400	5.800	2909.4	2371.5	151.729	3.413	2.18		Sand	21.1	223		223.00	0.97	216.39	304.45	0.95	0.474	0.966	2.000	1.737	3.67	0.00	0.00
23.790	236.800	5.300	2929.8	2381.3	209.677	2.252	1.95		Sand	15.8			223.82	0.97	216.95	283.83	0.95	0.475	0.965	2.000	1.735	3.66	0.00	0.00
23.950	247.400	5.700	2949.0	2390.5	218.690	2.318	1.95		Sand	15.8			233.84	0.97	226.43	295.33	0.95	0.476	0.963	2.000	1.733	3.64	0.00	0.00
24.120	207.500	4.100	2969.4	2400.3	182.826	1.990	1.94		Sand	15.7			196.12	0.97	189.59	249.71	0.95	0.477	0.962	2.000	1.731	3.63	0.00	0.00
24.280	165.200	3.000	2988.6	2409.5	145.001	1.833	1.98		Sand	16.5			156.14	0.96	149.72	204.56	0.95	0.477	0.964	1.418	1.229	2.58	0.00	0.00
24.440	169.100	4.700	3007.8	2418.7	148.163	2.804	2.11		Sand	19.6			159.83	0.96	153.46	219.58	0.95	0.478	0.960	2.000	1.727	3.61	0.00	0.00
24.610	296.800	5.300	3028.2	2428.5	260.521	1.795	1.81		Sand	13.1			280.53	0.96	270.52	327.72	0.95	0.479	0.959	2.000	1.725	3.60	0.00	0.00
24.770	325.500	7.000	3047.4	2437.8	285.293	2.161	1.86		Sand	14.0			307.66	0.96	296.38	365.77	0.95	0.480	0.958	2.000	1.723	3.59	0.00	0.00
24.940	360.700	4.100	3067.8	2447.5	315.647	1.142	1.60		Sand	9.6			340.93	0.96	328.08	352.92	0.95	0.481	0.956	2.000	1.720	3.58	0.00	0.00
25.100	317.400	3.000	3087.0	2456.8	277.064	0.950	1.58		Sand	9.2			300.00	0.96	288.41	306.84	0.95	0.482	0.955	2.000	1.718	3.57	0.00	0.00
25.260	243.200	2.400	3106.2	2466.0	211.572	0.993	1.67		Sand	10.6			229.87	0.96	220.55	248.20	0.95	0.483	0.954	2.000	1.716	3.56	0.00	0.00
25.430	190.000	4.300	3126.6	2475.8	164.658	2.282	2.02		Sand	17.3			179.58	0.96	171.71	235.13	0.95	0.484	0.953	2.000	1.714	3.54	0.00	0.00
25.590	206.700	3.800	3145.8	2485.0	178.910	1.853	1.92		Sand	15.3			195.37	0.96	186.93	244.42	0.95	0.484	0.952	2.000	1.712	3.53	0.00	0.00
25.760	320.800	6.400	3166.2	2494.8	277.870	2.005	1.84		Sand	13.6			303.21	0.96	290.32	354.95	0.95	0.485	0.951	2.000	1.710	3.52	0.00	0.00
25.920	392.500	4.300	3185.4	2504.0	339.648	1.100	1.57		Sand	9.1			370.98	0.96	354.87	375.63	0.95	0.486	0.949	2.000	1.708	3.51	0.00	0.00
26.080	359.900	5.600	3204.6	2513.2	310.743	1.563	1.72		Sand	11.5			340.17	0.96	325.08	371.94	0.95	0.487	0.948	2.000	1.706	3.50	0.00	0.00
26.250	341.300	5.500	3225.0	2523.0	294.031	1.619	1.75		Sand	11.9			322.59	0.95	307.96	358.07	0.94	0.488	0.947	2.000	1.704	3.49	0.00	0.00
26.410	295.000	4.300	3244.2	2532.2	253.483	1.466	1.75		Sand	12.0			278.83	0.95	265.93	311.28	0.94	0.489	0.946	2.000	1.702	3.48	0.00	0.00
26.580	245.800	3.700	3264.6	2542.0	210.558	1.515	1.81		Sand	13.1			232.33	0.95	221.35	270.35	0.94	0.489	0.945	2.000	1.700	3.47	0.00	0.00
26.740	227.900	3.100	3283.8	2551.2	194.761	1.370	1.80		Sand	12.9			215.41	0.95	204.84	249.56	0.94	0.490	0.944	2.000	1.698	3.46	0.00	0.00
26.900	212.200	2.500	3303.0	2560.4	180.912	1.187	1.77		Sand	12.4	215		215.00	0.95	204.06	245.11	0.94	0.491	0.943	2.000	1.696	3.46	0.00	0.00
27.070	191.600	2.700	3323.4	2570.2	162.892	1.422	1.86		Sand	14.1	215		215.00	0.95	204.25	257.69	0.94	0.492	0.942	2.000	1.694	3.45	0.00	0.00
27.230	89.400	3.000	3342.6	2579.4	75.102	3.420	2.37		Sand	26.4	215		215.00	0.95	204.05	298.01	0.94	0.492	0.941	2.000	1.692	3.44	0.00	0.00
27.400	38.200	1.900	3363.0	2589.2	28.208	5.203	2.80		Clay	40.6			36.11	0.95	n.a.	n.a.	0.94	0.493	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	15.800	1.100	3382.2	2598.5	10.859	7.796	3.22		Clay	58.7			14.93	0.95	n.a.	n.a.	0.94	0.494	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	14.300	0.600	3401.4	2607.7	9.663	4.762	3.13		Clay	54.2			13.52	0.95	n.a.	n.a.	0.94	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	13.200	0.500	3421.8	2617.5	8.779	4.352	3.14		Clay	54.7			12.48	0.95	n.a.	n.a.	0.94	0.495	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	11.900	0.700	3441.0	2626.7	7.751	6.877	3.30		Clay	62.4			11.25	0.94	n.a.	n.a.	0.94	0.496	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	13.200	0.600	3461.4	2636.5	8.700	5.231	3.19		Clay	57.0			12.48	0.94	n.a.	n.a.	0.94	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	14.300	0.600	3480.6	2645.7	9.494	4.777	3.13		Clay	54.6			13.52	0.94	n.a.	n.a.	0.94	0.497	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	15.300	0.600	3499.8	2654.9	10.208	4.428	3.09		Clay	52.5			14.46	0.94	n.a.	n.a.	0.94	0.498	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	13.100	0.600	3520.2	2664.7	8.511	5.291	3.20		Clay	57.5			12.38	0.94	n.a.	n.a.	0.94	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	12.100	0.600	3539.4	2673.9	7.727	5.808	3.26		Clay	60.3			11.44	0.94	n.a.	n.a.	0.94	0.499	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	11.300	0.600	3559.8	2683.7	7.095	6.302	3.31		Clay	62.8			10.68	0.94	n.a.	n.a.	0.94	0.500	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	12.500	0.600	3579.0	2692.9	7.955	5.602	3.24		Clay	59.3			11.81	0.94	n.a.	n.a.	0.94	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	11.100	0.500	3598.2	2702.1	6.884	5.376	3.28		Clay	61.2			10.49	0.94	n.a.	n.a.	0.94	0.501	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	10.900	0.400	3618.6	2711.9	6.704	4.400	3.23		Clay	59.2			10.30	0.94	n.a.	n.a.	0.93	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	10.600	0.400	3637.8	2721.1	6.454	4.555	3.26		Clay	60.3			10.02	0.94	n.a.	n.a.	0.93	0.502	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	10.800	0.400	3658.2	2730.9	6.570	4.459	3.24		Clay	59.7			10.21	0.93	n.a.	n.a.	0.93	0.503	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	10.700	0.400	3677.4	2740.2	6.468	4.514	3.25		Clay	60.2			10.11	0.93	n.a.	n.a.	0.93	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.190	10.300	0.300	3697.8	2749.9	6.146	3.550	3.21		Clay	58.2			9.74	0.93	n.a.	n.a.	0.93	0.504	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	8.700	0.300	3717.0	2759.2	4.959	4.385	3.34		Clay	64.5			8.22	0.93	n.a.	n.a.	0.93	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	8.900	0.300	3736.2	2768.4	5.080	4.266	3.33		Clay	63.7			8.41	0.93	n.a.	n.a.	0.93	0.505	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	9.600	0.300	3756.6	2778.2	5.559	3.885	3.27		Clay	61.0			9.07	0.93	n.a.	n.a.	0.93	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	7.800	0.400	3775.8	2787.4	4.242	6.766	3.50		Clay	73.0			7.37	0.93	n.a.	n.a.	0.93	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.010	9.300	0.500	3796.2	2797.2	5.292	6.755	3.43		Clay	68.8			8.79	0.93	n.a.	n.a.	0.93	0.507	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	9.500	0.700	3815.4	2806.4	5.411	9.220	3.50		Clay	72.8			8.98	0.93	n.a.	n.a.	0.93	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	10.700	0.700	3834.6	2815.6	6.239	7.970	3.41		Clay	68.2			10.11	0.93	n.a.	n.a.	0.93	0.508	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	11.100	0.800	3855.0	2825.4	6.493	8.722	3.43		Clay	68.8			10.49	0.93	n.a.	n.a.	0.93	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.660	11.300	0.800	3874.2	2834.6	6.606	8.544	3.41		Clay	68.2			10.68	0.93	n.a.	n.a.	0.93	0.509	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 2

PGA (A_{max}): 0.59

Total Settlement: 0.08 (inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vo} (psf)	Q	F (%)	Ic	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	Interpreted q_{cN}	C_N	q_{cN}	$q_{cN,cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	CRRM=7.5, σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.830	11.700	0.800	3894.6	2844.4	6.857	8.203	3.39		Clay	66.9			11.06	0.92	n.a.	n.a.	0.93	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	9.800	0.800	3913.8	2853.6	5.497	10.200	3.52		Clay	74.0			9.26	0.92	n.a.	n.a.	0.93	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	9.200	0.600	3933.0	2862.8	5.053	11.060	3.57		Clay	76.8			8.70	0.92	n.a.	n.a.	0.93	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	9.000	0.700	3953.4	2872.6	4.890	9.967	3.56		Clay	75.9			8.51	0.92	n.a.	n.a.	0.93	0.511	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	9.700	0.700	3972.6	2881.8	5.353	9.075	3.50		Clay	72.8			9.17	0.92	n.a.	n.a.	0.92	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.650	11.600	0.700	3993.0	2891.6	6.642	7.289	3.37		Clay	65.8			10.96	0.92	n.a.	n.a.	0.92	0.512	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	11.200	0.800	4012.2	2900.9	6.339	8.701	3.43		Clay	69.1			10.59	0.92	n.a.	n.a.	0.92	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	10.400	0.800	4031.4	2910.1	5.762	9.542	3.49		Clay	72.2			9.83	0.92	n.a.	n.a.	0.92	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	10.100	0.700	4051.8	2919.9	5.530	8.670	3.48		Clay	71.5			9.55	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	10.400	0.700	4071.0	2929.1	5.711	8.369	3.46		Clay	70.4			9.83	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.470	10.100	0.600	4091.4	2938.9	5.481	7.449	3.44		Clay	69.6			9.55	0.92	n.a.	n.a.	0.92	0.514	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	9.300	0.600	4110.6	2948.1	4.915	8.282	3.51		Clay	73.1			8.79	0.92	n.a.	n.a.	0.92	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	8.700	0.500	4129.8	2957.3	4.487	7.536	3.51		Clay	73.4			8.22	0.92	n.a.	n.a.	0.92	0.515	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	8.400	0.600	4150.2	2967.1	4.263	9.486	3.59		Clay	77.7			7.94	0.91	n.a.	n.a.	0.92	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	8.600	0.600	4169.4	2976.3	4.378	9.209	3.57		Clay	76.8			8.13	0.91	n.a.	n.a.	0.92	0.516	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.290	9.900	1.100	4189.8	2986.1	5.228	14.093	3.63		Clay	80.0			9.36	0.91	n.a.	n.a.	0.92	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	13.900	1.400	4209.0	2995.3	7.876	11.869	3.45		Clay	70.0			13.14	0.91	n.a.	n.a.	0.92	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	29.400	1.700	4228.2	3004.5	18.163	6.230	2.99		Clay	48.3			27.79	0.91	n.a.	n.a.	0.92	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	28.300	2.500	4248.6	3014.3	17.368	9.551	3.13		Clay	54.5			26.75	0.91	n.a.	n.a.	0.92	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	36.000	3.000	4267.8	3023.5	22.402	8.858	3.03		Clay	50.1			34.03	0.91	n.a.	n.a.	0.92	0.518	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.110	57.800	3.300	4288.2	3033.3	36.696	5.929	2.76		Clay	39.1			54.63	0.91	n.a.	n.a.	0.92	0.519	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	87.400	3.400	4307.4	3042.6	67.194	3.988	2.45		Sand	28.8		1.8	148.70	0.89	132.23	204.83	0.92	0.519	0.899	1.437	1.162	2.24	0.00	0.00
35.430	85.100	3.500	4326.6	3051.8	65.274	4.220	2.48		Sand	29.7		1.8	144.78	0.89	128.33	200.13	0.92	0.519	0.904	1.145	0.930	1.79	0.00	0.00
35.600	57.600	3.000	4347.0	3061.6	36.208	5.413	2.73		Clay	38.2			54.44	0.91	n.a.	n.a.	0.91	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	39.200	2.900	4366.2	3070.8	24.109	7.834	2.97		Clay	47.5			37.05	0.91	n.a.	n.a.	0.91	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	42.700	2.800	4386.6	3080.6	26.298	6.912	2.91		Clay	44.8			40.36	0.91	n.a.	n.a.	0.91	0.520	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	45.900	2.200	4405.8	3089.8	28.285	5.035	2.79		Clay	40.2			43.38	0.90	n.a.	n.a.	0.91	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.260	30.700	1.800	4426.2	3099.6	18.381	6.319	2.99		Clay	48.3			29.02	0.90	n.a.	n.a.	0.91	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	24.800	1.600	4445.4	3108.8	14.525	7.087	3.10		Clay	53.1			23.44	0.90	n.a.	n.a.	0.91	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	14.700	1.000	4464.6	3118.0	7.997	8.021	3.33		Clay	64.0			13.89	0.90	n.a.	n.a.	0.91	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	12.000	0.600	4485.0	3127.8	6.239	6.149	3.35		Clay	64.7			11.34	0.90	n.a.	n.a.	0.91	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	11.700	0.500	4504.2	3137.0	6.023	5.292	3.32		Clay	63.3			11.06	0.90	n.a.	n.a.	0.91	0.522	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.080	11.400	0.500	4524.6	3146.8	5.808	5.472	3.34		Clay	64.4			10.78	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	11.000	0.500	4543.8	3156.0	5.531	5.729	3.37		Clay	65.9			10.40	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	11.000	0.700	4563.0	3165.2	5.509	8.029	3.46		Clay	70.5			10.40	0.90	n.a.	n.a.	0.91	0.523	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	15.000	2.100	4583.4	3175.0	8.005	16.525	3.54		Clay	74.9			14.18	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	31.200	3.900	4602.6	3184.2	18.151	13.495	3.23		Clay	58.9			29.49	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.900	55.000	4.400	4623.0	3194.0	32.992	8.351	2.90		Clay	44.5			51.98	0.90	n.a.	n.a.	0.91	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	89.800	3.700	4642.2	3203.3	67.202	4.230	2.47		Sand	29.4	108	1.78	192.24	0.90	172.32	258.65	0.91	0.524	0.876	2.000	1.575	3.00	0.00	0.00
38.220	115.200	3.500	4661.4	3212.5	86.582	3.101	2.30		Sand	24.3		1.78	193.81	0.90	173.60	255.11	0.91	0.525	0.875	2.000	1.574	3.00	0.00	0.00
38.390	120.900	3.300	4681.8	3222.3	90.808	2.783	2.25		Sand	23.0		1.78	203.40	0.89	182.04	264.03	0.90	0.525	0.874	2.000	1.572	2.99	0.00	0.00
38.550	101.200	3.600	4701.0	3231.5	75.604	3.642	2.39		Sand	26.9	114	1.78	202.92	0.89	181.47	268.69	0.90	0.525	0.873	2.000	1.570	2.99	0.00	0.00
38.720	76.200	3.400	4721.4	3241.3	45.562	4.605	2.61		Clay	34.0			72.02	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	42.100	2.600	4740.6	3250.5	24.445	6.544	2.91		Clay	45.1			39.79	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	25.700	2.500	4759.8	3259.7	14.308	10.720	3.23		Clay	58.9			24.29	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	42.200	2.600	4780.2	3269.5	24.352	6.531	2.91		Clay	45.1			39.89	0.89	n.a.	n.a.	0.90	0.526	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	43.700	3.200	4799.4	3278.7	25.193	7.748	2.95		Clay	46.8			41.30	0.89	n.a.	n.a.	0.90	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.540	49.400	4.700	4819.8	3288.5	28.578	10.002	3.00		Clay	48.6			46.69	0.89	n.a.	n.a.	0.90	0.527	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	149.300	5.200	4839.0	3297.7	111.206	3.540	2.27		Sand	23.6	341		341.00	0.89	303.33	423.86	0.90	0.527	0.867	2.000	1.559	2.96	0.00	0.00
39.860	292.300	5.300	4858.2	3306.9	219.161	1.828	1.86		Sand	14.1	341		341.00	0.89	303.11	374.94	0.90	0.527	0.866	2.000	1.558	2.95	0.00	0.00
40.030	361.700	6.800	4878.6	3316.7	271.223	1.893	1.82		Sand	13.3			341.87	0.89	303.64	367.82	0.90	0.528	0.865	2.000	1.556	2.95	0.00	0.00
40.190	326.100	6.800	4897.8	3325.9	244.001	2.101	1.88		Sand	14.5			308.22	0.89	273.56	343.39	0.90	0.528	0.864	2.000	1.555	2.95	0.00	0.00
40.360	349.600	6.900	4918.2	3335.7	261.326	1.988	1.85		Sand	13.8			330.43	0.89	293.04	360.28	0.90	0.528	0.863	2.000	1.553	2.94	0.00	0.00
40.520	486.500	7.500	4937.4	3345.0	363.874	1.549	1.68		Sand	10.8			459.83	0.89	407.50	453.69	0.90	0.528	0.863	2.000	1.552	2.94	0.00	0.00
40.680	532.900	8.100	4956.6	3354.2	398.200	1.527	1.65		Sand	10.3			503.69	0.89	446.04	489.16	0.90	0.528	0.862	2.000	1.550	2.93	0.00	0.00
40.850	498.600	6.400	4977.0	3364.0	371.900	1.290	1.61		Sand	9.6			471.27	0.88	417.01	447.54	0.90	0.529	0.861	2.000	1.549	2.93	0.00	0.00
41.010	494.600	6.700	4996.2	3373.2	368.390	1.362	1.63		Sand	9.9			467.49	0.88	413.37	448.42	0.90	0.529	0.860	2.000	1.547	2.93	0.00	0.00
41.180	434.200	5.500	5016.6	3383.0	322.698	1.274	1.64		Sand	10.1			410.40	0.88	362.61	395.97	0.89	0.529	0.859	2.000	1.546	2.92	0.00	0.00
41.340	476.000	7.800	5035.8	3392.2	353.457	1.647	1.71		Sand	11.2			449.91	0.88	397.23	449.42	0.89	0.529	0.858	2.000	1.544	2.92	0.00	0.00
41.500	503.500	6.300	5055.0	3401.4	373.471	1.258	1.60		Sand	9.4			475.90	0.88	419.88	448.42	0.89	0.529	0.858	2.000	1.543	2.91	0.00	0.00
41.670	440.900	7.400	5075.4	3411.2	326.326	1.688	1.73		Sand	11.7			416.73	0.88	367.40	422.68	0.89	0.530	0.857	2.000	1.541	2.91	0.00	0.00
41.830	473.200	5.400	5094.6	3420.4	349.892	1.147	1.58		Sand	9.2			447.26	0.88	394.04	417.97	0.89	0.530	0.856	2.000	1.540	2.91	0.00	0.00
42.000	433.400	5.100	5115.0	3430.2	319.839	1.184	1.61		Sand	9.7			409.64	0.88	360.62	389.16	0.89	0.530	0.855	2.000	1.538	2.90	0.00	0.00
42.160	433.900	5.800	5134.2	3439.4	319.773	1.345	1.66		Sand	10.4			410.11	0.88	360.78	398.44	0.89	0.530	0.854	2.000	1.537	2.90	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No: 2

PGA (A_{max}): 0.59

Total Settlement: 0.08 (Inches)

Depth (ft)	q_c (tsf)	f_s (tsf)	S_{vc} (psf)	Insitu S'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	Q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_{σ})	interpreted Q_{cN}	C_N	q_{c1N}	$q_{c1N,cs}$	Stress Reduction Coeff. r_d	CSR	K_σ for Sand	$CRR_{M=7.5}$ σ'_{vc} = 1 atm	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.320	477.600	5.600	5153.4	3448.6	351.693	1.179	1.59		Sand	9.3			451.42	0.88	396.84	422.49	0.89	0.530	0.853	2.000	1.535	2.90	0.00	0.00
42.490	481.300	5.400	5173.8	3458.4	353.923	1.128	1.57		Sand	9.1			454.91	0.88	399.61	422.16	0.89	0.530	0.853	2.000	1.534	2.89	0.00	0.00
42.650	487.600	5.100	5193.0	3467.6	358.096	1.052	1.54		Sand	8.6			460.87	0.88	404.56	422.50	0.89	0.531	0.852	2.000	1.532	2.89	0.00	0.00
42.820	501.300	7.800	5213.4	3477.4	367.685	1.564	1.68		Sand	10.8			473.62	0.88	415.62	462.81	0.89	0.531	0.851	2.000	1.531	2.88	0.00	0.00
42.980	552.800	7.300	5232.6	3486.6	405.113	1.327	1.60		Sand	9.4			522.50	0.88	458.00	488.67	0.89	0.531	0.850	2.000	1.529	2.88	0.00	0.00
43.150	522.400	6.900	5253.0	3496.4	382.185	1.328	1.61		Sand	9.7			493.76	0.88	432.49	464.78	0.89	0.531	0.849	2.000	1.528	2.88	0.00	0.00
43.310	488.800	5.400	5272.2	3505.7	357.002	1.111	1.56		Sand	8.9			462.00	0.88	404.39	425.76	0.89	0.531	0.849	2.000	1.526	2.87	0.00	0.00
43.470	458.700	4.600	5291.4	3514.9	334.452	1.009	1.55		Sand	8.7			433.55	0.87	379.23	396.78	0.89	0.531	0.848	2.000	1.525	2.87	0.00	0.00
43.640	468.100	5.100	5311.8	3524.7	340.864	1.096	1.57		Sand	9.1			442.44	0.87	386.71	408.57	0.89	0.531	0.847	2.000	1.524	2.87	0.00	0.00
43.800	505.100	6.000	5331.0	3533.9	367.473	1.194	1.58		Sand	9.2			477.41	0.87	416.99	442.43	0.89	0.532	0.846	2.000	1.522	2.86	0.00	0.00
43.970	492.000	7.000	5351.4	3543.7	357.390	1.431	1.65		Sand	10.3			465.03	0.87	405.88	446.10	0.88	0.532	0.845	2.000	1.521	2.86	0.00	0.00
44.130	459.100	7.400	5370.6	3552.9	332.921	1.621	1.72		Sand	11.4			433.93	0.87	378.48	430.59	0.88	0.532	0.845	2.000	1.519	2.86	0.00	0.00
44.290	354.900	7.700	5389.8	3562.1	256.575	2.186	1.89		Sand	14.6			335.44	0.87	292.38	366.16	0.88	0.532	0.844	2.000	1.518	2.85	0.00	0.00
44.460	327.300	7.700	5410.2	3571.9	236.137	2.372	1.94		Sand	15.6			309.36	0.87	269.45	346.26	0.88	0.532	0.843	2.000	1.516	2.85	0.00	0.00
44.620	351.600	9.200	5429.4	3581.1	253.481	2.637	1.96		Sand	16.0			332.33	0.87	289.25	373.50	0.88	0.532	0.842	2.000	1.515	2.85	0.00	0.00
44.790	417.200	8.900	5449.8	3590.9	300.724	2.147	1.84		Sand	13.7			394.33	0.87	342.97	417.87	0.88	0.532	0.841	2.000	1.513	2.84	0.00	0.00
44.950	465.200	8.900	5469.0	3600.1	335.114	1.924	1.78		Sand	12.5			439.70	0.87	382.18	449.02	0.88	0.532	0.841	2.000	1.512	2.84	0.00	0.00
45.110	465.800	6.600	5488.2	3609.3	335.114	1.425	1.67		Sand	10.6			440.26	0.87	382.41	423.91	0.88	0.533	0.840	2.000	1.511	2.84	0.00	0.00
45.280	407.500	5.900	5508.6	3619.1	292.518	1.458	1.71		Sand	11.3			385.16	0.87	334.31	380.22	0.88	0.533	0.839	2.000	1.509	2.83	0.00	0.00
45.440	328.900	3.900	5527.8	3628.3	235.406	1.196	1.70		Sand	11.1			310.87	0.87	269.65	306.82	0.88	0.533	0.838	2.000	1.508	2.83	0.00	0.00
45.610	282.400	2.300	5548.2	3638.1	201.563	0.823	1.63		Sand	9.9			266.92	0.87	231.28	253.43	0.88	0.533	0.837	2.000	1.506	2.83	0.00	0.00
45.770	272.600	3.800	5567.4	3647.4	194.246	1.408	1.81		Sand	13.1	266		266.00	0.87	230.41	280.57	0.88	0.533	0.837	2.000	1.505	2.82	0.00	0.00
45.930	254.700	3.800	5586.6	3656.6	181.124	1.508	1.85		Sand	13.9	266		266.00	0.87	230.25	286.81	0.88	0.533	0.836	2.000	1.504	2.82	0.00	0.00
46.100	171.200	4.200	5607.0	3666.4	120.917	2.494	2.13		Sand	20.0	266		266.00	0.87	230.09	318.71	0.88	0.533	0.835	2.000	1.502	2.82	0.00	0.00
46.260	68.000	2.700	5626.2	3675.6	35.470	4.142	2.66		Clay	35.5			64.27	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.430	37.300	1.700	5646.6	3685.4	18.710	4.931	2.91		Clay	45.2			35.26	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	34.100	0.900	5665.8	3694.6	16.926	2.878	2.80		Clay	40.7			32.23	0.86	n.a.	n.a.	0.88	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	24.500	0.800	5685.0	3703.8	11.695	3.694	2.99		Clay	48.5			23.16	0.86	n.a.	n.a.	0.87	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	18.700	0.900	5705.4	3713.6	8.535	5.679	3.22		Clay	58.4			17.67	0.86	n.a.	n.a.	0.87	0.533	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	21.000	0.800	5724.6	3722.8	9.744	4.411	3.10		Clay	53.2			19.85	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.250	19.500	0.800	5745.0	3732.6	8.909	4.811	3.16		Clay	55.6			18.43	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	19.300	1.000	5764.2	3741.8	8.775	6.091	3.23		Clay	58.8			18.24	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	18.600	0.900	5783.4	3751.0	8.375	5.729	3.22		Clay	58.8			17.58	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	15.800	0.900	5803.8	3760.8	6.859	6.978	3.35		Clay	64.7			14.93	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	15.200	0.800	5823.0	3770.0	6.519	6.510	3.34		Clay	64.7			14.37	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.070	14.200	0.800	5843.4	3779.8	5.968	7.093	3.40		Clay	67.4			13.42	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	14.100	0.700	5862.6	3789.0	5.895	6.268	3.37		Clay	65.9			13.33	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	14.800	0.800	5881.8	3798.3	6.244	6.746	3.37		Clay	65.9			13.99	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	14.700	0.800	5902.2	3808.1	6.171	6.809	3.38		Clay	66.2			13.89	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	15.200	0.800	5921.4	3817.3	6.413	6.536	3.35		Clay	65.0			14.37	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.890	15.500	0.800	5941.8	3827.1	6.548	6.385	3.34		Clay	64.3			14.65	0.86	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	15.100	0.800	5961.0	3836.3	6.318	6.601	3.36		Clay	65.4			14.27	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.220	14.700	0.800	5981.4	3846.1	6.089	6.832	3.38		Clay	66.5			13.89	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	15.100	0.900	6000.6	3855.3	6.277	7.438	3.39		Clay	67.1			14.27	0.85	n.a.	n.a.	0.87	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	15.200	1.000	6019.8	3864.5	6.309	8.203	3.42		Clay	68.4			14.37	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.710	15.800	1.100	6040.2	3874.3	6.597	8.607	3.42		Clay	68.3			14.93	0.85	n.a.	n.a.	0.86	0.534	n.a.	n.a.	n.a.	n.a.	0.00	0.00
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October 24, 2011
Project No. 43-023-1

Mr. Bob Hightower
Barry Swenson Builder
777 North First Street
5th Floor
San Jose, CA 95112

Subject: Revised Traffic Noise Assessment Study for the Planned Single-Family Development, 980 Morse Street, San Jose

Dear Mr. Hightower:

This report presents the results of a revised traffic noise assessment study for the planned single-family development at 980 Morse Street in San Jose, as shown on the Conceptual Site Plan, Ref. (a). The purpose of this revision was to re-quantify the on-site noise levels as the surface of Interstate 880 has recently been repaved since the preparation of the original noise study for the project, Ref. (b). The noise exposures at the site were evaluated against the standards of the City of San Jose Noise Element, Ref. (c). Due to the infeasibility of increasing the height of the noise barrier along the freeway right-of-way, the City of San Jose Planning Department has allowed an alternative exterior noise exposure design criterion, Ref. (d). An analysis of the on-site sound level measurements indicates that the existing noise environment at the site is due primarily to vehicular traffic sources on Interstate 880. Noise from traffic on Morse Street does not significantly impact the site. The results of the study reveal that the exterior noise exposures will be within the allowed design criterion. The interior noise exposures will exceed the limits of the standards. Mitigation measures will be required for noise impacted interior living spaces.

Sections I and II of this report contain a summary of our findings and recommendations, respectively. Subsequent sections contain the site, traffic and project descriptions, analyses and evaluations. Attached hereto are Appendices A, B, and C, which include the list of references, descriptions of the applicable standards, definitions of the terminology, descriptions of the acoustical instrumentation used for the field survey, general building shell controls, and the on-site noise measurement data and calculation tables.

I. Summary of Findings

The noise levels presented below were evaluated against the standards of the City of San Jose Noise Element, which utilizes the Day-Night Level (DNL) noise descriptor and specifies a limit of 60 dB DNL at residential exterior spaces, such as rear yards, patios, balconies and common areas, impacted by transportation related noise sources. The Noise Element specifies a limit of 45 dB DNL for residential interior living spaces. The DNL is a 24-hour time-weighted average noise descriptor commonly used to describe community noise environments.

The Noise Element also states that residential developments in close proximity of major thoroughfares, in the Downtown Core Area and in the vicinity of San Jose International Airport have noise exposures that may not be able meet the noise standards in the time frame of the General Plan. An exterior noise exposure of 76 dB DNL is defined in the Noise Element as the threshold of unhealthful noise effects.

The City of San Jose Planning Department will allow an exterior noise exposure of up to 65 dB DNL for this project as reducing the noise exposures further will not be feasible.

A. Exterior Noise Exposures

Table I on the following page provides the range of existing and future exterior noise exposures in the rear yards (exterior living areas) of the planned project, which include the exterior noise exposures at the building setbacks at the first floor elevation (for the purpose of determining interior noise exposures). Also provided are the exterior noise exposures at the second floor building setbacks and the distances from the centerline of I-880 to the receptor locations.

TABLE I				
Exterior Noise Exposures, dB DNL				
Location	Floor Elevation	Existing Traffic	Future Traffic	Distance to CL
Lot A	2nd Floor	71	71	185 ft.
	1st Floor	62-64	62-64	130-190 ft.
Lot B	2nd Floor	65	65	211 ft.
	1st Floor	60-61	60-61	177-210 ft.
Lot C	2nd Floor	63	63	242 ft.
	1st Floor	59-60	59-60	220-230 ft.
Lot D	2nd Floor	61	61	275 ft.
	1st Floor	58	59	235-265 ft.

As shown in the Table, the exterior noise exposures in the exterior living areas of the project will be up to 4 dB in excess of the 60 dB DNL limit of the City of San Jose Noise Element standards. However, the exterior noise exposures will be within the 65 dB DNL limit allowed by the City of San Jose Planning Department where compliance with the 60 dB DNL limit proves difficult or otherwise infeasible.

B. Interior Noise Exposures

Table II, below, provides the interior noise exposures in the most impacted planned living spaces of the project.

TABLE II			
Exterior Noise Exposures, dB DNL			
Location	Floor Elevation	Existing Traffic	Future Traffic
Lot A	2nd Floor	**47**	**47**
	1st Floor	40	40
Lot B	2nd Floor	40	40
	1st Floor	36	36
Lot C	2nd Floor	38	38
	1st Floor	33	33
Lot D	2nd Floor	36	36
	1st Floor	32	32

As shown in Table II, the interior noise exposures in the second floor living spaces of the homes on Lot A will exceed the limits of the City of San Jose Noise Element standards. The noise excesses are shown in **Bold**.

As shown above, interior noise exposure excesses will occur and mitigation measures will be required. The recommended noise mitigation measures are provided in Section II, below.

II. Recommendations

A. Interior Noise Control

Recent adoption of new mechanical code provisions for residential structures under four stories in height have changed the methodology for determining the interior noise exposures. Therefore, rather than the need for window controls and mechanical ventilation for living spaces where the corresponding exterior noise exposure will be greater than 60 dB DNL, the exterior noise exposure criterion for window recommendations is now 70 dB DNL. Mechanical ventilation sufficient to allow windows to be maintained closed at all times for noise control is now mandatory, as are dual-pane thermal insulating windows.

As shown in Table III, only the second floor of the home on Lot A with west, north or south orientation is exposed to noise greater than 70 dB DNL. To achieve compliance with the 45 dB DNL interior standard of the City of San Jose Noise Element, the following noise control measures will be required:

- Install windows rated minimum Sound Transmission Class (STC) 32 in all second floor living spaces on the west, north and south sides of the home on the Lot A.

In addition to the required STC ratings, the windows and doors shall be installed in an acoustically-effective manner. To achieve an acoustically-effective window construction, the sliding window panels must form an air-tight seal when in the closed position and the window frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound to prevent sound infiltration. Exterior doors must seal air-tight around the full perimeter when in the closed position.

Please be aware that many dual-pane window assemblies have inherent noise reduction problems in the traffic noise frequency spectrum due to resonance that occurs within the air space between the window lites, and the noise reduction capabilities vary from manufacturer to manufacturer. Therefore, the acoustical test report of all sound rated windows and doors should be reviewed by a qualified acoustician to ensure that the chosen windows and doors will adequately reduce traffic noise to acceptable levels.

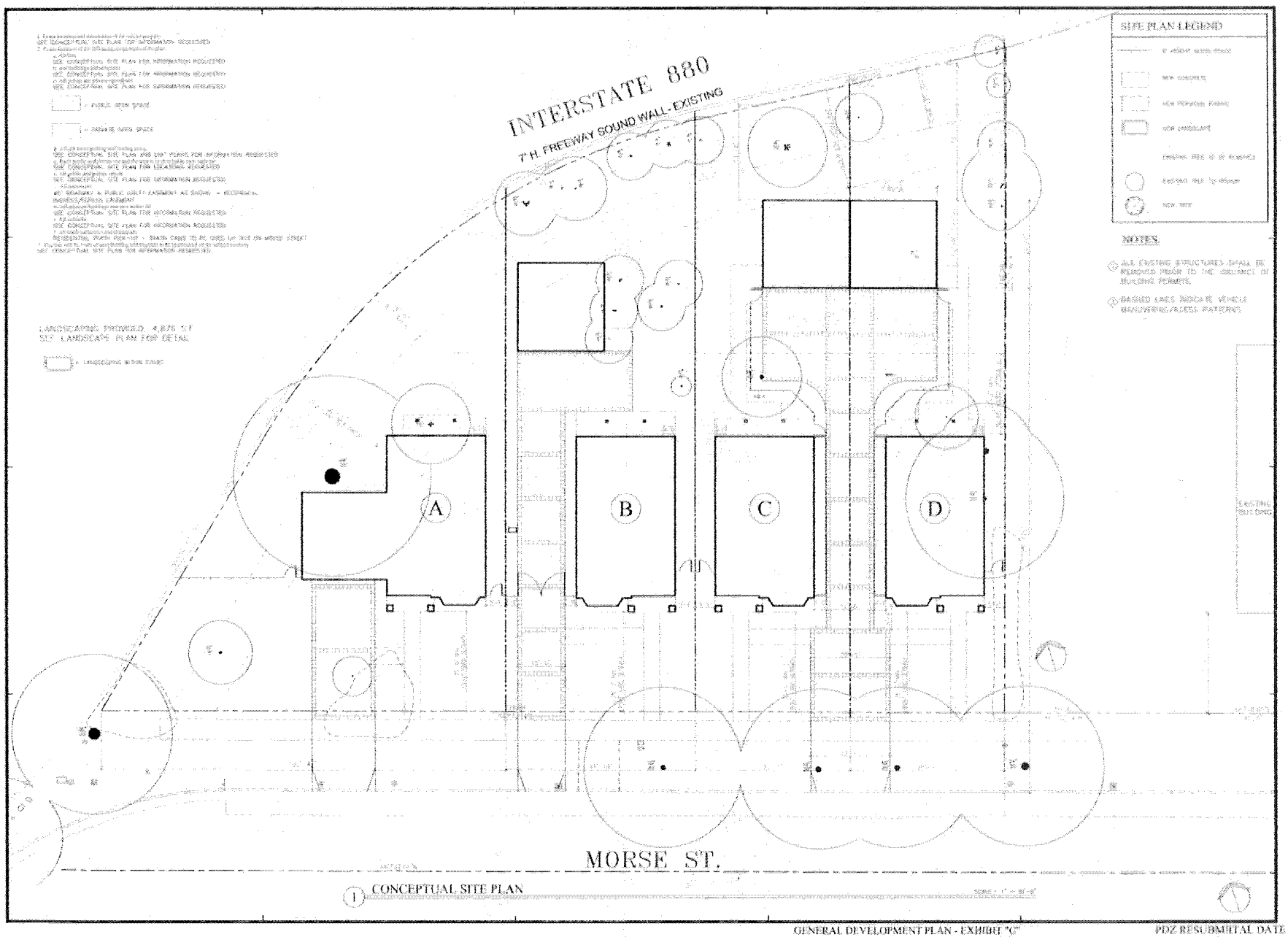
The implementation of the above recommended measures will reduce excess noise exposures to achieve compliance with the 45 dB DNL interior noise exposure standard of the City of San Jose Noise Element.

III. Site, Traffic and Project Descriptions

The proposed development site is located at 980 Morse Street in San Jose. The site presently contains one single-family home. The site is relatively flat and at-grade with Morse Street. I-880 is approximately 17 ft. below the elevation of the site. Surrounding land uses include single-family residential adjacent to the east and across Morse Street to the south. I-880 is adjacent to the site to the west and the freeway offramp to The Alameda is adjacent to the west and north.

The primary source of noise at the site is I-880 traffic, which carries an existing (2009) Average Daily Traffic (ADT) volume of 153,000 vehicles, as reported by CalTrans, Ref. (e).

The planned project includes the subdivision of the parcel into four lots and constructing four two-story single-family homes. Ingress and egress to the project will be by way of common driveways off of Morse Street. The Conceptual Site Plan is provided on the following page.



1 CONCEPTUAL SITE PLAN

MORSE STREET COURTHOMES
980 MORSE STREET, SAN JOSE, CA
APN: 230-19-010 PDC11-010

CONCEPTUAL SITE PLAN

PDZ-3

GENERAL DEVELOPMENT PLAN - EXHIBIT "C"

PDZ RESUBMITTAL DATE : AUGUST 18, 2011

IV. Analysis of the Noise Levels

A. Existing Noise Levels

Interstate 880 has recently been repaved using a less noisy asphalt compound. Therefore, new noise level measurements were made to determine the change in the noise environment at the site since the preparation of the original noise study in June 2011. To determine the existing noise environment at the site, continuous recordings of the sound levels were made at a location 144 ft. from the centerline of I-880, 25 ft. from the existing soundwall near the property line of Morse Street. This location was the same measurement location as that for the original study. The measurements were made on October 12-14, 2011 for a continuous 48-hour period. The upper floor measurements were not redone as the topographic noise barrier effects for the upper floors had already been calculated. The noise levels were recorded and processed using a Larson-Davis Model 812 Precision Integrating Sound Level Meter, which yields, by direct read-out, a series of descriptors of the sound levels versus time, as described in Appendix B. The measured descriptors include the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels exceeded for 1%, 10%, 50%, and 90% of the time. Also measured were the maximum and minimum levels and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL. The results of the sound measurements are shown in Appendix C.

The results of the field survey revealed that the L_{eq}'s on the first day at the first floor measurement location 144 ft. from the centerline of I-880 ranged from 58.4 to 61.1 dBA during the daytime and from 51.2 to 60.4 dBA at night. On the second day of measurements, the L_{eq}'s ranged from 59.1 to 61.6 dBA during the daytime and from 50.3 to 60.8 dBA at night.

Traffic noise dissipates at the rate of 3 to 6 dB for each doubling of the distance from the source (centerline of the roadway) to the receiver. Thus, locations on the site at greater distances from I-880 will have lower noise levels. Additional noise shielding for the rear yards will be provided by the project structures and the greater setback from the freeway cut shoulder.

B. Future Noise Levels

Future traffic volume data for I-880 were not available from CalTrans. Therefore, reference was made to the 1989 traffic volumes reported by CalTrans, Ref. (f). The 1989 traffic volume on I-880 was 149,000 ADT. The 2009 traffic volume was 153,000 ADT. The annual average growth rate over those 20 years was calculated to be 0.13% per year. Using that same growth rate for the next 20 years, the 2029 traffic volume is estimated to be 157,107 vehicles ADT. This increase in traffic volume yields a less than 0.5 dB increase in the traffic noise levels, which is negligible.

V. Evaluation of the Noise Exposures

A. Exterior Noise Exposures

To evaluate the on-site noise exposures against the City of San Jose Noise Element standards and the exterior noise criterion allowed by the Planning Department, the DNL's for the survey location was calculated by decibel averaging of the L_{eq}'s as they apply to the daily time periods of the DNL index. The DNL is a 24-hour noise descriptor that uses the measured L_{eq} values to calculate a 24-hour time-weighted average noise exposure. The formula used to calculate the DNL is described in Appendix B. Adjustments were applied to the measured noise levels to account for the various setback distances from the measurement location using methods established by the Highway Research Board, Ref. (g).

The results of the calculations indicate that the exterior noise exposures at the first floor measurement location, 144 ft. from the centerline of I-880, were 64 and 63 dB DNL on the first and second days, respectively.

At the most impacted planned first floor building setback and in the most impacted rear yard (Lot A), the noise exposure was calculated to be 64 dB DNL. Under future traffic conditions, the noise exposure was calculated to remain at 64 dB DNL. At the most impacted second floor elevation, the noise exposure was calculated to be 72 dB DNL for existing and future traffic conditions. Thus, the noise exposures will be up to 4 dB in excess of the City of San Jose Noise Element standards for the rear yard but will be within the 65 dB DNL limit allowed by the Planning Department. The first and second floor noise exposures for the remaining lots are provided in Table I.

The noise exposure improvement due to repaving of I-800 was measured to be 6 to 7 dB.

B. Interior Noise Exposures

To evaluate the interior noise exposures in project living spaces, a 25 dB reduction was applied to the exterior noise exposure at the building setback to represent the attenuation provided by the building shell under a closed window condition. The closed window condition assumes that windows have ½" dual-pane thermal insulating glass that are kept closed all of the time as 100% mechanical ventilation will be provided, as required for all residential structures lower than four stories in height.

The interior noise exposures in the most impacted first floor living spaces will be 40 dB DNL under existing and future traffic conditions. The interior noise exposures in the most impacted second floor living spaces will be up to 47 dB DNL. Thus, the interior noise exposures will be up to 2 dB in excess of the City of San Jose Noise Element standards.

As shown by the above evaluations, the exterior noise exposures will be within the 65 dB DNL criterion allowed by the City of San Jose Planning Department. The interior noise exposures will be up to 2 dB in excess of the standards at the second floor of the home on Lot A. Mitigation measures will be required for the noise impacted interior living spaces. The recommended measures are provided in Section II of this report.

This report presents the results of a noise assessment study for the planned "Morse Street" single-family development at 980 Morse Street in San Jose. The study findings for present conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise level predictions were based upon information reported by CalTrans and estimates made by Edward L. Pack Associates, Inc. Significant changes in future traffic volumes, or changes in speed limits, motor vehicle technology, noise regulations, or other changes beyond our control may produce long-range noise results different from our estimates.

If you have any questions or would like an elaboration on this report, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

Attachments: Appendices A, B, and C

APPENDIX A

References:

(a) Conceptual Site Plan, 980 Morse Street Courthomes, by Barry Swenson Builder, August 18, 2011

(b) "Traffic Noise Assessment Study for the Planned Single-Family Development, 980 Morse Street, San Jose", by Edward L. Pack Associates, Inc., Project No. 43-023, June 27, 2011

(c) San Jose 2020 General Plan, Focus on the Future, City of San Jose, Department of City Planning and Building, August 16, 1994

(d) Information on the City of San Jose Noise Element Policies and Allowable Noise Exposures Provided by Ms. Lesley Xavier, by email to Edward L. Pack Associates, Inc., September 23, 2011

(e) State of California Department of Transportation, Division of Traffic Operations

(f) 1989 Traffic Volumes on California State Highways, State of California Department of Transportation, Division of Traffic Operations, June, 1990

(g) Highway Research Board, "Highway Noise - A Design Guide for Highway Engineers", Report 117, 1971

APPENDIX B

Noise Standards, Terminology, Instrumentation and Building Shell Controls

1. Noise Standards

A. City of San Jose "Noise Element" Standards

The noise section of the San Jose 2020 General Plan, Focus on the Future, adopted August 16, 1994 identifies an exterior limit of 60 dB Day-Night Level (DNL) at outdoor living or recreation areas of residential developments. This standard applies at the property line of residential areas impacted by transportation related noise sources. For off-site noise sources, such as commercial and industrial operations, an exterior limit of 55 dB DNL for residential areas is specified. A long-term goal of 55 dB DNL from transportation sources anticipates future reductions in transportation noise due to improvements in design, such as quieter engines and improved muffler systems.

At interior living spaces of residential areas, the standards established an interior limit of 45 dB DNL for noise levels due to exterior sources.

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the sound measuring equipment. Some of the statistical levels used to describe community noise are defined as follows:

L_1 - A noise level exceeded for 1% of the time.

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing an "average" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent-energy level is that level of a steady-state noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e.. the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dB weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = [(L_d+10\log_{10}15) \,\&\, (L_n+10+10\log_{10}9)] - 10\log_{10}24$$

Where:

L_d = L_{eq} for the daytime (7:00 a.m. to 10:00 p.m.)

L_n = L_{eq} for the nighttime (10:00 p.m. to 7:00 a.m.)

24 - indicates the 24-hour period

& - denotes decibel addition.

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the sound analyzer listed below. The instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters were provided by microphones extended to a height of 5 ft. above the ground. The "A" weighting network and the "Fast" response setting of the meters were used in conformance with the applicable standards. The Larson-Davis meters were factory modified to conform with the Type 1 performance standards of ANSI S1.4. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer

4. Building Shell Controls

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required:

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter. Mail slots should not be used in these doors or in the wall of a living space, as a significant noise leakage can occur through them.

- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.

APPENDIX C

On-Site Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: BARRY SWENSON BUILDER
FILE: 43-023
PROJECT: MORSE ST. SUBDIVISION
DATE: 10/12-14/20116/8-9/2011
SOURCE: INTERSTATE 880

LOCATION 1	I-880			
Dist. To Source	144 ft.			
	After Repaving			
TIME	Leq	10^Leq/10		
7:00 AM	61.1	1288249.6		
8:00 AM	59.4	870963.6		
9:00 AM	58.8	758577.6		
10:00 AM	60.1	1023293.0		
11:00 AM	60.2	1047128.5		
12:00 PM	60.3	1071519.3		
1:00 PM	60.4	1096478.2		
2:00 PM	60.9	1230268.8		
3:00 PM	61.0	1258925.4		
4:00 PM	60.8	1202264.4		
5:00 PM	60.2	1047128.5		
6:00 PM	59.4	870963.6		
7:00 PM	59.0	794328.2		
8:00 PM	59.1	812830.5		
9:00 PM	58.4	691831.0	SUM=	15064750
10:00 PM	56.5	446683.6	Ld=	60.0
11:00 PM	54.3	269153.5		
12:00 AM	55.9	389045.1		
1:00 AM	52.3	169824.4		
2:00 AM	51.2	131825.7		
3:00 AM	57.4	549540.9		
4:00 AM	57.1	512861.4		
5:00 AM	57.4	549540.9		
6:00 AM	60.4	1099005.8	SUM=	4117481
			Ld=	56.6
	Daytime Level=	71.8		
	Nighttime Level=	76.1		
	DNL=	**64**		
	24-Hour Leq=	59.0		

LOCATION 1	I-880			
Dist. To Source	144 ft.			
	After Repaving			
TIME	Leq	10^Leq/10		
7:00 AM	61.6	1445439.8		
8:00 AM	60.2	1047128.5		
9:00 AM	59.5	891250.9		
10:00 AM	60.7	1174897.6		
11:00 AM	60.9	1230268.8		
12:00 PM	60.9	1230268.8		
1:00 PM	60.5	1122018.5		
2:00 PM	60.7	1174897.6		
3:00 PM	60.3	1071519.3		
4:00 PM	60.8	1202264.4		
5:00 PM	61.6	1445439.8		
6:00 PM	59.4	870963.6		
7:00 PM	59.6	912010.8		
8:00 PM	59.2	831763.8		
9:00 PM	59.1	812830.5	SUM=	16462963
10:00 PM	55.9	389045.1	Ld=	60.4
11:00 PM	54.0	251188.6		
12:00 AM	52.2	165958.7		
1:00 AM	51.0	125892.5		
2:00 AM	50.3	107151.9		
3:00 AM	51.1	128825.0		
4:00 AM	53.8	239883.3		
5:00 AM	55.9	389045.1		
6:00 AM	60.8	1202264.4	SUM=	2999255
			Ld=	55.2
	Daytime Level=	72.2		
	Nighttime Level=	74.7		
	DNL=	**63**		
	24-Hour Leq=	59.1		