4.2 POPULATION AND HOUSING

4.2.1 Environmental Setting

4.2.1.1 Regulatory Setting

California Environmental Quality Act

Referencing Section 21000(g) of CEQA, "it is the intent of the Legislature that all agencies of the State government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian." As further indicated in Section 21001(d) of CEQA, the State Legislature finds and declares that it is the policy of the State to "[e]nsure that the long-term protection of the environment, consistent with the provisions of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions." Referencing Section 15021(d) of the State CEQA Guidelines, "CEQA recognizes that in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian."

California Government Code

The CGC reinforces the existence of an overarching Statewide housing goal. As indicated in Section 65580 of the CGC: "The Legislature finds and declares as follows: (a) The availability of housing is of vital statewide importance, and the early attainment of decent housing and a suitable living environment for every California family is a priority of the highest order. (b) The early attainment of this goal requires the cooperative participation of government and the private sector in an effort to expand housing opportunities and accommodate the housing needs of Californians of all economic levels. (c) The provision of housing affordable to low- and moderate-income households requires the cooperation of all levels of government. (d) Local and state governments have a responsibility to use the powers vested in them to facilitate the improvement and development of housing to make adequate provisions for the housing needs of all economic segments of the community. (e) The Legislature recognizes that in carrying out this responsibility, each local government also has the responsibility to consider economic, environmental, and fiscal factors and community goals set forth in the general plan and to cooperate with other local governments and the state in addressing regional housing needs."

As required under California law, each municipality is required to prepare a comprehensive general plan as a guide for its physical development. Each general plan is required to contain seven mandatory elements, including a housing element. As specified in Section 65581 of the CGC, in requiring the preparation of that element, it is the intent of the State Legislature to: (1) assure that counties and cities recognize their responsibilities in contributing to the attainment of the State housing goal; (2) assure that counties and cities will prepare and implement housing elements which, along with federal and State programs, will move toward attainment of the State housing goal; (3) recognize that each locality is best capable of determining what efforts are required by it to contribute to the attainment of the State housing goal; and (4) ensure that

each local government cooperates with other local governments in order to address regional housing need, including special needs.

In order to address regional housing needs, the CGC contains specific requirements for regional housing needs assessments (RHNA). Section 65581 of the CGC requires cities and counties to recognize their responsibilities in contributing to the attainment of the State's housing goal and acknowledges that each locality is best capable of determining what efforts are required. As indicated in Section 65584(a) of the CGC: "For purposes of subdivision (a) of Section 65583, the share of a city or county of the regional housing needs includes that share of the housing need of persons at all income levels within the area significantly affected by a general plan of the city or county. . .The appropriate council of governments shall determine the share for each city or county consistent with the criteria of this subdivision and with the advice of the department [Department of Housing and Community Development] subject to the procedure established pursuant to subdivision (c) at least one year prior to the second revision, and at five-year intervals following the second revision pursuant to Section 65588. The council of governments shall submit to the department information regarding the assumptions and methodology to be used in allocating the regional housing need."

SCAG is mandated under Section 65584 of the CGC to determine the existing and projected housing needs for the five-county region, as well as the share of this need to be allocated to individual cities and counties in the SCAG region. The resulting RHNA serves, in part, as the basis for the preparation of local housing elements. Before local housing elements must be updated, the regional COG allocates to each local jurisdiction its fair share of the RHNA for the next five-year housing element period. Assembly Bill (AB) 2158 (Lowenthal), approved by the Governor on September 22, 2004, amended the system for determining each community's share of the regional need for housing. Additionally, AB 1233 (Jones), approved by the Governor on October 6, 2005, requires that any portion of a local government's share of a regional housing need that is not met during one planning period must be carried forward to the next round of fair-share housing allocations and, within the first year of the planning period for the new housing element, zone or rezone adequate sites to accommodate the unaddressed portion of the regional housing need allocation from the prior planning period.

The CGC further links housing with the provision of proximal employment opportunities. As indicated in Section 65890.1 of the CGC: the State Legislature "finds and declares that: (a) State land use patterns should be encouraged that balance the location of employment-generating uses with residential uses so that employment-related commuting is minimized. (b) Balance in employment and residential land use patterns reduces traffic congestion and may contribute to improvement of air quality in urban area. (c) Balancing of employment-generating land uses and residential land uses improves economic and housing opportunities and reduces loss of economic productivity caused by transportation delay. (d) The attainment of a more balanced land use pattern requires the cooperation of government agencies with the private sector to assure that public and private decisions affecting land use take into consideration the need to seek balance in the location of employment-generating land uses and residential land uses. (e) Local agencies and state agencies should cooperate to facilitate the balancing of employment-generating land uses and residential land uses and provisions of transportation to serve these uses. (f) Local governments have the primary responsibility to plan for local land use patterns, within the parameters established by state law to achieve statewide needs. (g) Housing must be provided for the estimated 3 million new workers and their families expected to be added to the California economy in the 1990's. (h) It is the intent of the Legislature to move

toward the goal that every California worker have available the opportunity to reside close to his or her jobsite."[1]

City of Diamond Bar General Plan

Unlike other elements of the General Plan, the City's Housing Element must be updated every five years. The 2000 Housing Element contains numerous policies that relate, either directly or indirectly, to the provision of housing within the City. Those policies include, but are not necessarily limited to, the following:

- Maintain residential areas which provide for ownership of single family housing and require that new development be compatible with the prevailing character of the surrounding development (Strategy 1.24, Land Use Element);
- Provide opportunities for development of suitable housing to meet the diverse needs of existing and future residents (Goal 2, Housing Element);
- Promote the expeditious processing and approval of residential projects that meet General Plan policies and City regulatory requirements (Policy 4.2, Housing Element);
- Require that dwelling units and structures within hillside areas be sited in such a manner as to utilize ridgelines and landscape plant materials as a backdrop for the structures and the structures themselves to provide maximum concealment of cut slopes (Strategy 1.1.2, Resource Management Element).

City of Diamond Bar Municipal Code

The City's Municipal Code contains a number of regulations that, either directly or indirectly, related to population and housing. Those ordinances that appear most applicable to the proposed project are outlined below:

- As indicated in Sections 15.00.1110 (Uniform Housing Code – Adopted) and 15.00.1120 (Amendments) in Title 15 (Building and Construction Safety) of the Municipal Code, with the exception of Chapter 1, the "Uniform Housing Code" (1997 Edition) is adopted in its entirety as the Housing Code of the City of Diamond Bar, together with the amendments, additions, deletions and exceptions set forth in this division.[2]
- As authorized under Section 22.18.030 (Types of Bonuses and Incentives Allowed) in Chapter 22.18 (Affordable Housing Incentive/Density Bonus Provisions) in Title 22 (Development Code) of the Municipal Code, a residential development project that satisfies all applicable provisions of Chapter 22.18 shall be entitled to the following

[1]/ As further indicated in 65890.3 of the CGC, the California Department of Housing and Community Development (HCD) was directed to prepare a guidebook for use by cities, counties, councils of government, State agencies, and the private sector in the planning and development of a housing supply to meet the need created by employment growth. HCD has not, as of yet, prepared that guidebook.

[2]/ As specified in correspondence from Kim Strange, Deputy Director of the State of California, Business, Transportation, and Housing Agency, Department of Housing and Community Development, Division of Codes and Standards to City and County Building Officials (Information Bulletin 2007-04 - 2007 California Building Standards Code Effective Date, International Residential Code Information Update, Factory-Built Housing Procedures, July 5, 2007): "The 1997 Uniform Housing Code (UHC) with California amendments continues as the adopted reference in the State Housing Law, Title 25, CCR, Division 1, Chapter 1, subchapter 1, section 32. Only Chapters 4, 5, 6 and Sections 701.2 and 701.3 of the 1997 UHC are adopted and applicable for the enforcement of use, maintenance and occupancy requirements by local code enforcement agencies."

density bonus and other incentives[3]: (1) The density bonus allowed by this chapter shall consist of up to a 25 percent increase in the number of dwelling units normally allowed by the zoning district applicable to the parcel as of the date of the project land-use permit application; (2) A qualifying project shall be entitled to at least one of the following incentives identified by State law (Section 65915[b], CGC): (a) A reduction in the parcel development standards of the Development Code (e.g., coverage, setback, zero lot line and/or reduced parcel sizes, and/or parking requirements), (b) Approval of mixed-use zoning in conjunction with the housing project if non-residential land uses will reduce the cost of the housing project and the non-residential land uses are compatible with the housing project and surrounding development, and (c) Other regulatory incentives or concessions proposed by the developer or the city that will result in identifiable cost reductions. The City Council shall approve one or more of the above incentives, not withstanding the other provisions of this chapter, unless it makes a written finding that the additional concession or incentive is not required in order for the sales price or rent for the targeted dwelling units to be set in compliance with Section 65915(c) of the CGC.

4.2.1.2 Regional Setting

Regional Setting

With regards to population and housing, the California Department of Finance (DOF) indicates that, as of January 1, 2008, the population of the City was estimated to be 60,360 individuals, an increase of only 0.8 percent from January 1, 2007 (59,870 individuals).[4] Presented in Table 4.2-1 (Population and Housing Unit Inventory [January 2008]) is information concerning the population and the number, type, and occupancy rates for housing units with the County and the City, as reported by the DOF.

With regards to employment, as reported by SCAG: "The downswing in housing is clearly evident in the region as we saw a sharp decline in residential building permits of 25 percent. More importantly, the housing downturn has affected the distribution of employment growth across the region. Orange and Riverside-San Bernardino Counties saw slower growth in 2006 than in 2005 as their housing markets cooled. Los Angeles County, which did not experience as strong an upswing in employment in construction, financial services, and retail related to the housing sector, was the only county [in the SCAG region] to post an increase in employment growth in 2006. While the 1.2 percent growth rate appears small, Los Angeles County has over 4 million of the regions 7 million jobs and the growth rate translates into almost 50,000 new jobs, nearly half of the new jobs we expect in the region in 2006. . .Overall, the region is expected to generate two years [2007-2008] of steady employment growth, despite the housing downturn."[5]

Statewide Housing Plan

Section 50450 of the Health and Safety Code (H&SC) requires the development of a "California Statewide Housing Plan" (CSHP) to be developed in cooperation with the private housing

[3]/ If a density bonus and/or other incentives cannot be accommodated on a parcel due to strict compliance with the provisions of the Development Code, the City Council is authorized to waive or modify development standards as necessary to accommodate all bonus units and other incentives to which the development is entitled.

[4]/ California Department of Finance, Table E-1 (City/County Population Estimates with Annual Percent Change, January 1, 2007 and 2008), 2008.

[5]/ Southern California Association of Governments, The 10th Annual Regional Economic Forecast for Southern California 2007-2008, pp. 4-5.

industry as well as regional and local housing and planning agencies and other agencies of the State. The CSHP "serves as a state housing plan for all relevant purposes."

Table 4.2-1
POPULATION AND HOUSING UNIT INVENTORY
(January 2008)

		County of Los Angeles	City of Diamond Bar
Population	Total Population	10,363,850	60,360
	Residing in Households	10,183,439	60,242
	Residing in Group Quarters	180,411	118
Housing Units	Total	3,403,480	18,380
	Single – Detached	1,642,973	12,937
	Single – Attached	244,606	2,531
	Multiple – 2 to 4	292,421	823
	Multiple – 5+	1,166,794	1,756
	Mobile Homes	56,686	333
	Occupied	3,260,434	18,066
	Percent Vacant	4.20	1.71
	Persons/Household	3.123	3.335

Source: California Department of Finance, Table E-5 (City/County Population and Housing Estimates, 1/1/2008)

As indicated in the current CSHP update: "Few issues facing California are as important as the State being able to meet its future housing needs. Between 1997 and 2020, California will likely add more than 12.5 million new residents and should form approximately 5 million new households. Almost all of this growth will occur in metropolitan areas. To meet the housing needs of California's growing population, homebuilders and developers will have to build an average of 220,000 housing units each year between now and 2020. Achieving this level of production will be difficult."[6]

Regional Housing Needs Assessment

SCAG's current "Regional Housing Needs Assessment" (RHNA), as adopted on July 12, 2007, serves to quantify the need for housing within each jurisdiction within the SCAG region between January 1, 2006 and June 30, 2014.[7] The RHNA consists of the following two measurements of housing need: (1) existing need; and (2) future need. The "existing need" assessment simply examines key variables from the most recent United States Census to measure ways in which the housing market is not meeting the needs of current residents. The "future need" for housing is determined primarily by the forecasted growth in households in a community. Each new

[6]/ California Department of Housing and Community Development, Raising the Roof: California Housing Development Projections and Constraints, 1997-2020, May 2000, Chapter 1 (Summary).

[7]/ The Regional Housing Needs Assessment (RHNA) is mandated by State Housing Law as part of the periodic process of updating local housing elements of the general plan. The RHNA quantifies the need for housing within each jurisdiction during specified planning periods. Communities use the RHNA in land use planning, prioritizing local resource allocation, and in deciding how to address identified existing and future housing needs resulting from population, employment and household growth. The RHNA does not necessarily encourage or promote growth, but rather allows communities to anticipate growth, so that collectively the region and subregion can grow in ways that enhance quality of life, improve access to jobs, promotes transportation mobility, and addresses social equity, fair share housing needs.

household, created by a child moving out of a parent's home, by a family moving into a community, and so forth, creates the need for a housing unit. The housing need for new households is then adjusted to account for an ideal level of vacancy needed to promote housing choice, moderate cost, and acceptable levels of housing upkeep and repair.

SCAG's adopted housing needs for the City are presented in Table 4.2-2 (SCAG RHNA-2006: Existing Need – All Incomes Housing Problems Detail for the City of Diamond Bar).[8] Based on SCAG's assessment, the RNHA for the City is presented in Table 4.2-3 (SCAG RNHA-2006: Regional Housing Need Allocation Plan for the City of Diamond Bar).[9] As indicated therein, for the period 2006-2014, the City's housing needs total 1,090 dwelling units.

Table 4.2-2
SCAG RHNA-2006: EXISTING NEED
ALL INCOMES HOUSING PROBLEMS DETAIL FOR THE CITY OF DIAMOND BAR

Households		**Income Level** (Percent of Median)					
		<30%	**30- 50%**	**50- 80%**	**80- 95%**	**>95%**	**Total**
All Households	Renters	425	260	385	255	1,720	3,045
	Owners	530	515	1,065	635	11,845	14,590
	Total Households	955	775	1,450	890	13,565	17,635
Households with any Problems	Renters	295	250	320	205	420	1,490
	Owners	335	435	860	505	3,495	5,630
	Total Households	630	685	1,180	710	3,915	7,120
Households with Overpayments	Renters	200	170	205	155	175	905
	Owners	310	390	700	465	2,680	4,545
	Total Households	510	560	905	620	2,855	5,450
Households with Overcrowding	Renters	85	70	100	55	245	555
	Owners	10	45	145	40	765	1,005
	Total Households	95	115	245	95	1,010	1,560

Source: Southern California Association of Governments

Table 4.2-3
SCAG RNHA-2006: REGIONAL HOUSING NEED ALLOCATION PLAN
FOR THE CITY OF DIAMOND BAR

Income Category	**Construction Need**
Very-Low Income	284
Low Income	179
Moderate Income	188
Above Moderate Income	440
Total	1,090

Source: Southern California Association of Governments

[8]/ Southern California Association of Governments, Draft Regional Housing Needs Allocation Plan – Planning Period (January 1, 2006 – June 20, 2014), January 18, 2007, pp. 23,31, 41, 49.

[9]/ Southern California Association of Governments, Final Regional Housing Needs Allocation Plan – Planning Period (January 1, 2006 – June 30, 2014) for Jurisdictions within the Six-County SCAG Region, July 12, 2007, p. 2.

Jobs-Housing Balance

In 1997, SCAG conducted an assessment of regional jobs/housing balance. As indicated in SCAG's "The New Economy and Jobs/Housing Balance in Southern California," "a balance between jobs and housing in a metropolitan region can be defined as a provision of an adequate supply of housing to house workers employed in a defined area (i.e., community or subregion). Alternatively, a jobs/housing balance can be defined as an adequate provision of employment in a defined area that generates enough local workers to fill the housing supply."[10] The mean for the SCAG region in 1997 was 1.25 jobs per household. The projected mean for the SCAG region in 2025 is 1.43. The projected median for the SCAG region in 2025 is 1.31 jobs per household, up from the 1997 mean of 0.91.[11]

The SCAG region is divided into both areas governed by regional COGs and into regional statistical areas (RSAs). The project site is located within the area of the SGVCOG and within RSA 26 (Covina). RSAs include both "housing rich" communities and "jobs rich" communities. For the SGVCOG area, in 1997, the jobs-housing ratio was 1.33. In 2025, that ratio is projected to increase to 1.39.[12] SCAG defines both the SGVCOG region and RSA 26 as being "jobs rich" both in the 1997 and 2025 periods.[13] Although the project area can generally be described as being "housing rich" and "jobs poor,"[14] by 2025, the area will move closer to an equilibrium.

As indicated in California Department of Housing and Community Development's (HCD) "California's Inter-Regional Partnership Program – Jobs, Housing and Mobility Strategies": "Jobs-to-housing ratios are sometimes used to characterize jobs-housing balance, yet identifying an appropriate ratio for use as target is difficult. A crude measure of jobs-housing balance is sometimes presented as a jobs-to-employed residents' ratio, where a ratio of 1:1 represents one job for each household. Generally, when the ratio is below 1.0 the area is considered to have a jobs deficit and housing surplus. This is a general indication of the need of the community to commute out of the area for employment. When the ratio is above 1.0 the area is considered to have a housing deficit and jobs surplus. When the National Center for Smart Growth Research and Education analyzed U.S. Census data from 1980, 1990, and 2000, they found that the number of housing units per job was falling each decade. The jobs-housing ratio of the U.S. has grown increasingly larger since 1980, growing from 1.3, to 1.36, to 1.45. The 1.5 ratio often cited recently in California was based on an observation of the California Department of Finance (the ratio of jobs and housing units created in the decade of the 1990s, a decade lagging in housing construction). This 1.5 ratio reported by DOF was descriptive, and not intended to represent a prescriptive standard. California, as a whole, had in 2000 a ratio of jobs to households of 1.28 and a ratio of jobs to housing units of 1.20, based on 14.7 million jobs per the Employment Development Department 11.5 million households, and 12.0 million non-recreational housing units per the U.S. Census Bureau. Thus, the actual California ratios

[10]/ Southern California Association of Governments, The New Economy and Jobs/Housing Balance in Southern California, April 2001, p. 15.

[11]/ *Ibid*., p. 101.

[12]/ *Ibid*., Table 1, p. 12.

[13]/ *Ibid*., Maps 2 and 3.

[14]/ SCAG indicates that a balance between jobs and housing in a metropolitan region can be defined as a provision of an adequate supply of housing to house workers employed in a defined area (community or subregion). Alternatively, a jobs/housing balance can be defined as an adequate provision of employment in a defined area that generates enough workers to fill the housing supply. The definition of an area can be stated in term of an optimal "commute shed" around employment centers. Based on a commute time of 30 minutes and the average commute speed in the region of 28.4 miles per hour (mph), a commute sheds is generally described as an area having a radius of about 14 miles around employment centers. The City of Industry might be identified as one of a number of employment centers within the San Gabriel Valley located within the commute shed of the project site.

render impossible a 1.5 ratio in every county, or even a 1.3 ratio. Since those 1.2 and 1.28 ratios from the 2000 data came from a year that was a boom for jobs but extremely low housing vacancy rates, a desirable ratio would have more housing units to allow people to form households as they would wish, and thus a desirable ratio is probably closer to 1.1 jobs to housing units. Depending on the geographic context, use of target ratios larger than 1.3 may mislead users to underestimate the need for housing."[15]

As further indicated by the HCD's "California's Inter-Regional Partnership Program – Jobs, Housing and Mobility Strategies," citing a 2004 court case (Defend the Bay v. City of Irvine), the courts have "established precedent for a manner of addressing jobs-housing imbalance issues in environmental impact assessments pursuant to the California Environmental Quality Act. An environmental group challenged a city's approval of a general plan amendment and zoning for a proposed large-scale development. The court upheld the city's analysis, holding that adherence to any particular predetermined ratio was unnecessary, and that balance does not require equivalence, but rather a weighting of pros and cons to achieve an acceptable mix."[16]

4.2.1.3 Local Setting

With regards to population, as indicated in the Local Agency Formation Commission of Los Angeles County's (LAFCO) "Draft Municipal Service Review, Water Service – East San Gabriel Valley," east San Gabriel Valley is primarily developed with urban land uses and significant growth is not projected. Growth over the next twenty years will come from infill development and redevelopment. Eastern San Gabriel Valley is predicted to grow at an annual rate of about one percent, in keeping with the overall County growth projection.[17]

With regards to employment, preliminary labor force data for March 2008 for both the County and the City, as reported by the California Economic Development Department (EDD), is presented in Table 4.2-4 (Labor Force Data for Sub-County Areas [March 2008]). As noted, in March 2008, the unemployment rate in the City (4.1 percent) was substantially lower than the County as a whole (5.8 percent).[18]

Table 4.2-4
LABOR FORCE DATA FOR SUB-COUNTY AREAS
(March 2008)

Area	Labor Force	Employment Number	Unemployment Number	Unemployment Rate
Los Angeles County	4,962,300	4,674,800	287,500	5.8
City of Diamond Bar	33,300	32,900	1,400	4.1

Source: California Economic Development Department

[15]/ California Department of Housing and Community Development, California's Inter-Regional Partnership Program – Jobs, Housing and Mobility Strategies, June 2005, p. 14.

[16]/ *Ibid*., p. 6.

[17]/ Local Agency Formation Commission of Los Angeles County (Dudek and Associates, Inc.) "Draft Municipal Service Review, Water Service – East San Gabriel Valley, May 2005, p. 29.

[18]/ It is acknowledged that employment statistics both within the City and the County are constantly changing and that a single "snap shot" may not reflect current conditions. Since March 2008, unemployment numbers and rates may have increased. It is not known whether that increase reflects a short-term or long-term trend and when or if conditions will improve. As such, the Lead Agency's advisory and decision-making bodies should not place undue reliance upon information reflecting a single point in time.

The project site is located in Census Tract 4033.25 (Block Group 2021). The census tract extends south to the Los Angeles County line, east to the San Bernardino County line, west to the SR-57 Freeway, and north to Diamond Bar Boulevard. The East San Gabriel Valley area extends from the City of Azusa on the north, the Cities of Industry and Irwindale on the west, the areas of Hacienda Heights and Rowland Heights on the south, and the San Bernardino County line on the east. Census information concerning the East San Gabriel Valley, the City, and Census Tract 4033.25 is presented in Table 4.2-5 (2000 United States Census Tract Data). As noted, owner-occupancy rates, average household size, and median household and family incomes exceed those for the City as a whole.

Table 4.2-5
2000 UNITED STATES CENSUS TRACT DATA

Subject	East San Gabriel Valley		City of Diamond Bar		Census Tract 4033.25	
	Number	Percent	Number	Percent	Number	Percent
Total Population	933,557	100	56,287	100	4,684	100
Median Age	31.6	-	36.5	-	37.5	-
Under 5 years	70,715	7.6	3,216	5.7	225	4.8
18 Years and Over	655,068	70.2	41,104	73.0	3,313	70.7
65 Years and Over	84,113	9.0	4,213	7.5	302	6.4
Average Household Size	3.47		3.18	-	3.43	-
Total Housing Units	-	-	-	-	-	-
Occupied Housing Units	263,504	100	17,651	100	1,358	100
Owner-Occupied Housing Units	180,683	68.6	14,572	82.6	1,243	91.5
Renter-Occupied Housing Units	82,655	31.4	3,079	17.4	115	8.5
Vacant Housing Units	-	-	-	-	-	-
Median Household Income	51,877	-	$68,871	-	$77,042	
Median Family Income	55,423	-	$71,911	-	$77,098	-
Per Capita Income	18,574	-	$25,472	-	$24,944	-

Source: United States Census Bureau

In the preparation of the 2008 RTP, SCAG formulated population, housing, and employment projections for the region, smaller subregions, and for individual census tracts. SCAG-generated data for Census Tract 4033.25 is presented in Table 4.2-6 (Southern California Association of Governments – Population, Housing, and Employment Projects for Census Tract 4033.25). As noted, only minimal localized growth is projected between 2005 and 2010.

4.2.2 Threshold of Significance Criteria

Presented herein is the threshold of significance criteria identified by the Lead Agency relative to this topical issue. In accordance therewith, the proposed project would normally be deemed to produce a significant population and/or housing impact if the project or if project-related activities were to:

Table 4.2-6
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS POPULATION, HOUSING, AND EMPLOYMENT PROJECTS FOR CENSUS TRACT 4033.25

Year	Population	Households	Employment
2003	4,911	1,366	595
2005	4,949	1,368	610
2010	5,060	1,395	649
2015	5,192	1,433	679
2020	5,319	1,470	697
2025	5,442	1,499	718
2030	5,560	1,527	741
2035	5,669	1,549	763

Source: Southern California Association of Governments

- Induce substantial[19] population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., extension of roads or other infrastructure).
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.[20]

In addition, other standards relative to population and housing have been formulated by other agencies, published in source documents, or reflect acceptable industry standards. As indicated in Section 65580(a) of the CGC, the State has established a housing goal of "decent housing and a suitable living environment for every California family." In recognition and in furtherance of goal, the proposed project would normally be judged to produce a significant population and housing impact if the project or project-related activities were to:

- Conflict with or impede the attainment of the Statewide housing goal of providing a decent home and suitable living environment for every California household.
- Conflict with or impede the attainment of the housing goals and objectives of the City.

The Lead Agency has not identified other applicable or potentially applicable standards that can appropriately be extracted from other related policy or other environmental documents and used as the basis for assessing the potential significance of project-related and cumulative population and housing impacts.

4.2.3 Impact Analysis

4.2.3.1 Construction Impacts

Population and Housing Impact 2-1*. Project construction will increase the local labor force and, through job creation and the possibility of worker relocation, has the potential to induce population growth in the general project area.*

[19]/ Certain terms, such as "substantial," are neither defined in CEQA nor in the State CEQA Guidelines and require a local determination whether a proposed action would meet or exceed the stated standard.
[20]/ State of California, State CEQA Guidelines, Section XII (Population and Housing).

***Level of Significance before Mitigation**. Less-than-significant impact.*

As indicated in the URBEMIS2007 user's guide, construction-worker commute trip generation can be estimated by using the following equations: (1) multi-family residential trips = 0.36 trips/unit x number of units; (2) single-family residential trips = 0.72 trips/unit x number of units; (3) commercial and retail trips = 0.32 trips/1,000 square feet x number of 1,000 square feet; and (4) office and industrial trips = 0.42 trips/1,000 square feet x number of 1,000 square feet.[21] Assuming, for the purpose of this analysis, that each "building construction worker commute trip" equates to a construction worker, an estimated 73 construction workers would be associated with the project's 202 multi-family housing units and an estimated 49 construction workers would be associated with the project's 153,985 square feet of commercial use.

As indicated in EDD's employment report for Los Angeles County, as of March 2008, the civilian labor force in the County was preliminarily reported as 4,962,300 individuals. The unadjusted unemployment rate for the County was 5.8 percent. The comparable national and Statewide estimates were 5.2 percent and 6.4 percent for that same period, respectively. Between March 2008 and March 2007, the construction industry lost 11,400 jobs (dropping form 158,400 to 147,000 jobs over that period). As reported, construction recorded the largest year-over employment losses. Within that time period, specialty trade contractors posted the greatest decline, losing 7,900 jobs.[22]

As indicated in Table 4.2-7 (Industry Employment Projections [2004-2014), between 2004 and 2014, the California Economic Development Department projects that construction-related employment will increase about 8.0 percent. The short-term reduction in the construction labor force, therefore, does not constitute a long-term trend but likely a short-term anomaly resulting from current market conditions.

Table 4.2-7
INDUSTRY EMPLOYMENT PROJECTIONS (2004-2014)

NAICS Code	Industry Title	Annual Average Employment		Employment Change	
		2004	2014	Numerical	Percent
23	Construction	140,200	151,400	11,200	8.0
236	Construction of Buildings	33,400	36,800	3,400	10.2
2361	Residential Building Construction	20,900	22,400	1,500	7.2
2362	Nonresidential Building Construction	12,500	14,400	1,900	15.2
237	Heavy and Civil Engineering Construction	13,200	14,000	800	6.1
238	Specialty Trade Contractors	93,600	100,600	7,000	7.5
2381	Foundation, Structure, and Building Exterior Cont.	22,600	24,300	2,200	6.0
2382	Building Equipment Contractors	35,100	37,200	2,100	6.0
2383	Building Finishing Contractors	27,200	28,700	1,500	5.5
2389	Other Specialty Trade Contractors	9,300	10,400	1,100	11.8

Source: California Economic Development Department

[21]/ South Coast Air Quality Management District (Jones & Stokes Associates), Software User's Guide: URBEMIS2007 for Windows, Version 9.2 – Emissions Estimation for Land Use Development Projects, November 2007, p. A-11.

[22]/ California Economic Development Department, Los Angeles-Long Beach-Glendale Metropolitan Division (Los Angeles County), April 18, 2008, pp. 1-3.

Although some percentage of the available construction labor force may have left the area, it can be assumed that most of these workers remain within the metropolitan area. As a result, the majority of the project's construction-term workforce will be derived from individuals already residing within the County. Since the workforce required for the project's construction can be drawn from the available labor pool, based on the limited number of workers required for the project's construction, no substantial in-migration of workers from outlying areas is expected.

Construction workers may impose short-term demands on local businesses, such as nearby restaurants. A wide range of businesses now exists near the project site. Construction-term demand on those businesses is not anticipated to be so substantial as to warrant business expansion based on project-related activities. Since construction jobs are, by definition, short-term in duration, they are generally not the type of employment that predicates substantial increased local demands for goods and services.

The California Building Industry Association (CBIA) reports that every dollar spent on new housing construction in California generates approximately $1.95 in total economic activity, inclusive of all total direct, indirect, and induced activity.[23,24] Once inhabited, jobs associated with housing include, but are not limited to, landscape and pool maintenance, interior designers, and associated construction trades. Jobs indirectly related to housing include medical professionals, manufacturers and retailers, and associated service providers. Each new residence will, therefore, incrementally increase existing demands for manufacturing, service-related, and professional jobs. Home purchasers typically spend money to furnish their new homes. Citing National Association of Homebuilders (NAHB) statistics, each new homebuyer spends $3,194 on property alterations, $3,632 on furnishings, and $2,079 on appliances during the first year after purchase, representing more than twice the amount that would be expended by non-moving homeowners during that period.[25] The increased demands for home furnishing and appliances would create an incremental demand for additional manufacturing, sales, and services jobs both locally and nationally.

The incremental impact of the proposed project on long-term employment opportunities is not anticipated to be substantial. The resulting incremental contribution on localized, regional, and national employment opportunities, as associated with the proposed housing construction, would not, in and of themselves, create additional significant secondary housing impacts. Since none of the threshold criteria would be exceeded, the identified impact would be less than significant and no project conditions or mitigation measures are recommended or required.

4.2.3.2 Operational Impacts

Population and Housing Impact 2-2*. Project implementation will result in the addition of up to 202 dwelling units to the City's existing housing stock and will increase the City's population by*

[23]/ As defined by the CBIA, "direct benefits" consist of economic activity contained exclusively within the new housing construction sector. This includes all expenditures made by homebuilders and all employees who work directly for builders. "Indirect benefits" defines the creation of additional economic activity which results from linked businesses, suppliers of goods and services, and provision of operating inputs. Examples of this include wholesale trade, where builders purchase lumber, roofing, electrical, plumbing, and other components; motor freight firms which deliver the components to the wholesaler and to the construction site; management and consulting services, engineering and architectural services who participate in the design and planning of housing. "Induced benefits" measure the consumption expenditures of direct and indirect sector employees. Examples include owner-occupied dwellings, State and local government, wholesale trade, doctors and dentists, banking, insurance, and retail.

[24]/ Sacramento Regional Research Institute, The Economic Benefits of California's Housing Industry, December 2002, pp. 4 and 14.

[25]/ National Association of Home Builders, Housing: The Key to Economic Recovery, Fall 2002, p. 4.

approximately 662 individuals, based on the California Department of Finance's existing (January 2008) Citywide vacancy rates and average household size (3.335 persons/unit) and vacancy rate (1.71 percent).

***Level of Significance before Mitigation**. Less-than-significant impact.*

As indicated in California Department of Finance estimates, in January 2008, the City's population was estimated to be 60,360 individuals. The total number of dwelling units was estimated to be 18,380 units. Project implementation would increase the City's total population and housing inventory by approximately 1.1 percent.

Total number of dwelling units now proposed (202 units) is less than the adopted SCAG 2006-2014 RHNA for new construction for "above moderate" income households (440 units) and only slightly more than SCAG's identified new construction need for "moderate" income households (188 units). The project represents about 18.5 percent of the projected housing needs for the period 2006-2014. As such, since the projected increase appears generally consistent with regional projections for housing need within the City, the project will further the attainment of SCAG's regional housing demand.

Since none of the threshold criteria would be exceeded, the identified impact would be less than significant and no project conditions or mitigation measures are recommended or required.

***Population and Housing Impact 2-3**. Project implementation will result in the construction of 153,985 square feet of commercial use, directly creating about 462 new permanent jobs.*

***Level of Significance before Mitigation**. Less-than-significant impact.*

Job growth occurs when the demand for goods and services increases and, as a result, the demand for workers to produce these goods and services also increases. Commercial development, constructed in response to an identified demand, will create new employment opportunities associated with the provision of those goods and services. The number of jobs a commercial use may generate is, however, difficult to predict. Employment generation rates ranging from one job for every 250 to 500 square feet of new commercial use are typically used. Assuming a factor of three jobs for every 1,000 square feet of retail development, a total of approximately 462 direct new jobs would be created by the project's commercial component.

Based on the projected number of direct new jobs (462 jobs) and the number of housing units associated with the proposed project (202 dwelling units), the project's projected on-site jobs-to-housing ratio is about 2.3, indicating the project (when examined in isolation) is "jobs rich." The relatively small number of jobs and housing units, however, is not significant in the broader regional context. While the jobs to housing ration may remain imbalanced, the inclusion of both residential and commercial uses on the same site serve to further attainment of the primary intent of jobs-housing balance, namely the reduction of VMT and the corresponding air quality benefits.

Since none of the threshold criteria would be exceeded, the identified impact would be less than significant and no project conditions or mitigation measures are recommended or required.

4.2.3.3 Cumulative Impacts

Population and Housing Impact 2-4*. Absent a corresponding and proportional increase in long-term employment opportunities, projects that increase the City's housing stock would contribute to the perpetuation of the existing Citywide jobs-housing imbalance.*

Level of Significance before Mitigation*. Less-than-significant impact.*

The intent of a jobs-housing discussion is to promote reductions in vehicle miles traveled (VMT) by creating opportunities for residents to find employment close to home and for workers to find housing in proximity to their place of employment.

As indicated in Table 3-2 (Population, Household, and Employment Forecast for the City of Diamond Bar – 2008 Regional Transportation Plan) between 2010 and 2030, the jobs-housing ratio for the City will decrease from only 0.86 to 0.82. As a result, the City will remain "housing rich" and "jobs poor." Since the jobs-housing ratio will remain <1.0 during the 2010-2030 timeframe, the City will not achieve a jobs-housing balance.

Because SCAG's jobs-housing policies promote job formation over new residential development in "housing rich" areas, individual development projects that do not further the attainment of that desired outcome would impede progress toward a jobs-housing balance. Based on the projected number of direct new jobs (462 jobs) and the number of housing units associated with the proposed project (202 dwelling units), the project's projected on-site jobs-to-housing ratio is about 2.3 and the proposed project would be categorized as being "jobs rich." As a result, the proposed project promotes the attainment of SCAG's jobs-housing policies and would not incrementally contribute to the existing imbalance.

4.2.4 Project Conditions and Mitigation Measures

Conditional of Approval

- No project conditions have been identified herein.

Mitigation Measures

- No mitigation measures have been identified herein.

4.2.5 Significant Unavoidable Adverse Effects

The approval, construction, operation, occupancy, use, and habitation of the proposed project will not result in any significant unavoidable adverse project-related or cumulative population and housing impacts.

4.3 GEOTECHNICAL HAZARDS

The Applicant has submitted and the Lead Agency has independently reviewed a site-specific study providing information concerning the site's existing geologic, geotechnical, and seismic setting. That study, as prepared by KFM GeoScience (KFM), entitled "Preliminary Geotechnical Report: Site D – Mass Grading, Walnut Valley Unified School District, Diamond Bar, California" (April 24, 2009), as augmented by KFM's "Response to Third Party Geotechnical Review" (April 23, 2009), is included in Appendix C (Preliminary Geotechnical Investigation) herein.

In addition, the Applicant has submitted and the Lead Agency has independently reviewed a site-specific Phase I environmental site assessment (ESA). That study, as prepared by LOR Geotechnical Group (LOR), entitled "Phase I Environmental Site Assessment and Limited Site Characterization – Site D Property APN's 8714-002-900, -901, -902, and -903, 28± Acres of Vacant Land, City of Diamond Bar, Los Angeles County, California" (April 30, 2004), is included in Appendix D (Phase I Environmental Site Assessment) herein.

4.3.1 Environmental Setting

4.3.1.1 Regulatory Setting

Resource Conservation and Recovery Act

The federal law that governs hazardous waste management is the Resource Conservation and Recovery Act (42 U.S.C. 6901 *et seq*.) (RCRA). RCRA is the major federal statute addressing the management of the nation's wastes, including hazardous, municipal, industrial, and other types of solid waste. RCRA gave the United States Environmental Protection Agency (USEPA) the authority to control hazardous waste from the "cradle-to-grave," including the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. RCRA focuses only on active and future facilities and does not address abandoned or historical sites.

RCRA defines "solid waste" as "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, or from community activities, but does not include solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under Section 402 of the Federal Waster Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or bvproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923)." Under RCRA, a "hazardous waste" is defined as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed" (Section 1004[5], RCRA).

Under RCRA, a waste is hazardous if it is a "listed" waste or exhibits a hazardous "characteristic." Wastes are listed by the USEPA if they contain significant amounts of toxic constituents identified in Appendix VIII and the USEPA has determined that these toxic

constituents are persistent and mobile to some degree, such that they pose a potential and substantial threat to human health and the environment. Until the USEPA lists the wastes in Subpart D of Part 261, they would not be considered hazardous, even if the waste contains one or more of the hazardous constituents listed on Appendix VIII, unless the waste would exhibit one or more of the hazardous waste characteristics.

Comprehensive Environmental Response, Compensation and Liability Act

In 1980, the United States Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601 *et seq*.) (CERCLA), commonly known as Superfund, to regulate "hazardous substances," as codified in Part 40, Section 302.4 of the Code of Federal Regulations (CFR). CERCLA requires persons or businesses that spill or release hazardous substances to immediately notify the federal government that they have released hazardous substances into the environment. CERCLA uses the term "release" because that term can be more broadly interpreted that "spill."

CERCLA establishes a comprehensive procedure for cleaning up sites where hazardous substances have been released. In addition, under CERCLA, the USEPA compiles a list of the sites of hazardous substance releases presenting the greatest threat to human health or the environment (i.e., National Priorities List [NPL]). Through the act, the USEPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup. The law authorizes two kinds of response actions: (1) short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response; and (2) long-term remedial response actions, that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on the USEPA's NPL.

California Hazardous Waste Control Law

The California Hazardous Waste Control Law (HWCL), codified in Title 22, Chapter 6.5 of the CCR, is the basic hazardous waste regulation in the State. The HWCL implements the RCRA as a "cradle-to-grave" waste management system in California. HWCL specifies that generators have the primary duty to determine whether their wastes are hazardous and to assure its proper management and disposal. The HWCL exceeds federal requirements by mandating source reduction planning, recycling, treatment, or incineration of certain wastes and permitting for facilities that treat hazardous waste. HWCL also regulates a number of types of wastes that are not covered by the federal law under RCRA. The California Department of Toxic Substances Control (DTSC) is the agency responsible for enforcing the HWCL. In 1992, California was granted authorization by the USEPA to also enforce the federal RCRA hazardous waste laws and regulations.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (SHMA), codified in Sections 2690-2699.6 in Division 2, Chapter 7.8 of the PRC, was adopted for the purpose of protecting the public from the effects of strong ground shaking, liquefaction, landslides or other ground failure, and other hazards caused by earthquakes. As required therein, the California Department of Conservation,

Division of Mines and Geology (DMG), now the California Geological Survey (CGS), was directed to delineate the various "seismic hazard zones" located throughout the State. The State Mining and Geology Board's (SMGB) "Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication No. 117"[1] provides guidelines for evaluating and mitigating seismic hazards (other than surface fault rupture) and for recommending mitigation measures as required under Section 2695(a) of the PRC.[2]

The State's minimum criteria for projects within zones of required investigation are defined in Title 14, Section 3724 of the CCR. As indicated, in part, therein, a project shall be approved only when the nature and severity of the seismic hazards at the site have been evaluated in a geotechnical report and appropriate mitigation measures have been proposed. When required, the geotechnical report shall: (1) be prepared by a registered civil engineer or certified engineering geologist; (2) contain a site-specific evaluation of the seismic hazard affecting the project; (3) identify portions of the project site containing seismic hazards; and (4) identify any known off-site seismic hazards that could adversely affect the site in the event of an earthquake. Prior to approving the project, the Lead Agency must independently review the report to determine the adequacy of the hazard evaluation and proposed mitigation measures and to determine whether the requirements of Section 3724(a) are satisfied.

The project site is located within Section 29, Township 2 South, Range 9 West, San Bernardino Base and Meridian (SBBM), as shown in the United States Geological Survey's (USGS) 7.5-Minute Yorba Linda Topographic Quadrangle.[3] The 7.5-minute maps are generally a 1:24,000-scale (1 inch = 2,000 feet) quadrangle series.

The applicable section of the State map is presented in Figure 4.3-1 (Official Seismic Hazard Zone Map - Portion of the 7.5-Minute Yorba Linda Quadrangle). As illustrated, portions of the project site contain the following zone of required investigation: (1) "Liquefaction – Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicated a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required"; and (2) "Earthquake-Induced Landslides – Areas where previous occurrence of landslide movement or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation, as defined in Section 2693(c) of the PRC, would be required."

The CGS has published a seismic hazard zone report for the Yorba Linda Quadrangles. As indicated in the "Seismic Hazard Zone Report 010: Seismic Hazard Zone Report for the Yorba Linda 7.5-Minute Quadrangle, Los Angeles, Orange, and San Bernardino Counties, California": "Liquefaction-induced ground failure historically has been a major cause of earthquake damage

[1]/ State Mining and Geology Board, Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication No. 117, March 13, 1997.

[2]/ As defined in Section 2693(c), "mitigation" means those measures that are consistent with established practice and that will reduce seismic risk to acceptable levels." As defined in Section 3721(a), "acceptable level" means that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project."

[3]/ The Yorba Linda Quadrangle encompasses about 60 square miles in eastern Los Angeles, northern Orange, and western San Bernardino Counties in the eastern part of the Los Angeles Basin. The northern two-thirds of the quadrangle is made up of the Puente and Chino Hills, which are crossed by Brea, Tonner, Carbon, and Telegraph Canyons. These major canyons and many smaller intervening ones dissect the upland area and provide drainage to the southwest. The quadrangle lies within the northwestern part of the Santa Ana Mountains in the Peninsular Ranges geomorphic province of southern California. The Whittier Fault transects the quadrangle near the southwestern base of the Puente Hills. The Puente and Chino Hills comprise the upland area north of the fault.

in southern California. During the 1971 San Fernando and 1994 Northridge earthquakes, significant damage to roads, utility pipelines, buildings and other structures in the Los Angeles area was caused by liquefaction-induced ground displacement. Localities most susceptible to liquefaction-induced damage are underlain by loose, water-saturated, granular sediment within 50 feet of the ground surface. These geological and ground-water conditions exist in parts of southern California, most notably in some densely populated valley regions and alleviated floodplains. In addition, the potential for strong earthquake ground shaking is high because of the many nearby active faults. The combination of these factors constitutes a significant seismic hazard in the southern California region in general, including areas in the Yorba Linda Quadrangle."[4]

As further indicated therein: "Landslides triggered by earthquakes historically have been a significant cause of earthquake damage. In California, large earthquakes such as the 1971 San Fernando, 1989 Loma Prieta, and 1994 Northridge earthquakes triggered landslides that were responsible for destroying or damaging numerous structures, blocking major transportation corridors, and damaging life-line infrastructure. Areas that are most susceptible to earthquake-induced landslides are steep slopes in poorly cemented or highly fractured rocks, areas underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. These geologic and terrain conditions exist in many parts of California, including numerous hillside areas that have already been developed or are likely to be developed in the future. The opportunity for strong earthquake ground shaking is high in many parts of California because of the presence of numerous active faults. The combination of these factors constitutes a significant seismic hazard throughout much of California, including the hillside areas of the Yorba Linda Quadrangle."[5]

With regards to structural geology, the CGC notes that the oldest rock units exposed in the Yorba Linda Quadrangle belong to the late Miocene Puente Formation, which underlies the Puente and Chino Hills. As illustrated in Figure 4.3-2 (Cenozoic Formations of the Coyote-Puente Hills Province),[6] the Puente Formation is comprised of four members: the Sycamore Canyon (which consists of predominately sandstones), Yorba (which consists of predominantly siltstone), Soquel (which consists of predominately sandstone), and La Vida (which consists of predominately siltstones) Members.

As illustrated in Figure 4.3-3 (Quaternary Geologic Map - Portion of the Yorba Linda Quadrangle), quaternary deposits are located in the canyon bottoms and the low valley areas. They are comprised of Holocene and late Pleitocene alluvium and colluvium (Qvofa), floodplain, stream terrace deposits, and Holocent to modern alluvium (Qya, Qyf), artificial fill (Qaf), and landslides (Qls, Qyls). These materials are poorly sorted and crudely layered. Minor amounts of alluvium occur along the bottom of all canyons in the Puente and Chino Hills.

The CGC has prepared a landslide inventory for the Yorba Linda Quadrangle, a portion of which is depicted in Figure 4.3-4 (Landslide Inventory - Portion of the Yorba Linda Quadrangle). All documented slope failures, whether or not surface expression currently exists, are included in the inventory.

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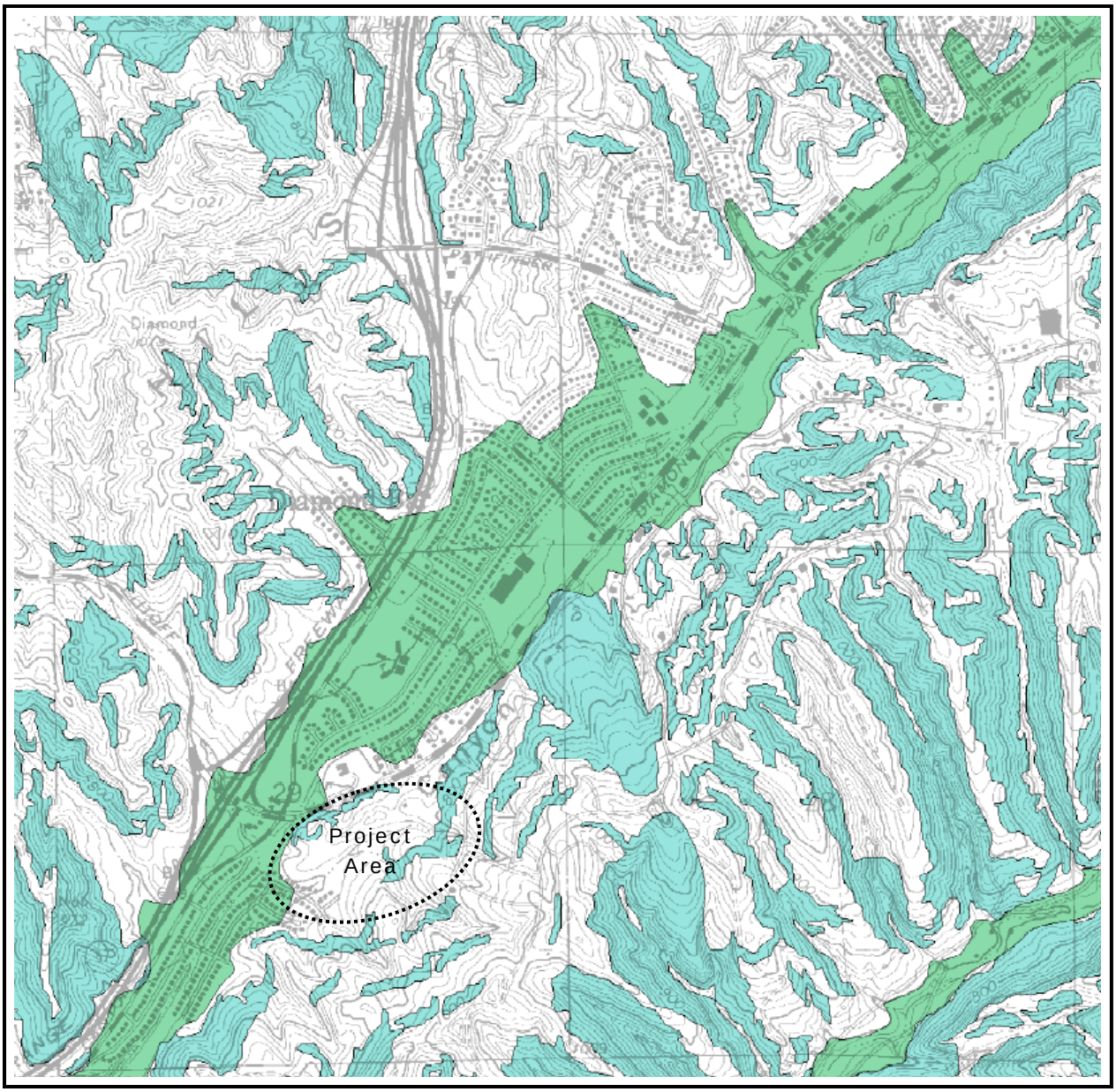
[4]/ California Department of Conservation, Division of Mines and Geology, 2005 Seismic Hazard Zone Report 010: Seismic Hazard Zone Report for the Yorba Linda 7.5-Minute Quadrangle, Los Angeles, Orange, and San Bernardino Counties, California, Division of Mines and Geology, 2005, p. 4.

[5]/ *Ibid*., p. 20.

[6]/ Eisentraut, Phyllisa and Cooper, John, Final Report – Development of a Model Curation Program for Orange County's Archaeological and Paleontological Collections, Part IV, Orange County Archaeology and Paleontology Guidelines, October 2002.



MAP EXPLANATION

Zones of Required Investigation:

Liquefaction

Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground-water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.

Figure 4.3-1
OFFICIAL SEISMIC HAZARD ZONE MAP PORTION OF THE YORBA LINDA QUADRANGLE
Source: California Department of Conservation, Divisions of Mines and Geology

STATE OF CALIFORNIA
SEISMIC HAZARD ZONES
Delineated in compliance with
Chapter 7.8, Division 2 of the California Public Resources Code
(Seismic Hazards Mapping Act)

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NOT TO SCALE

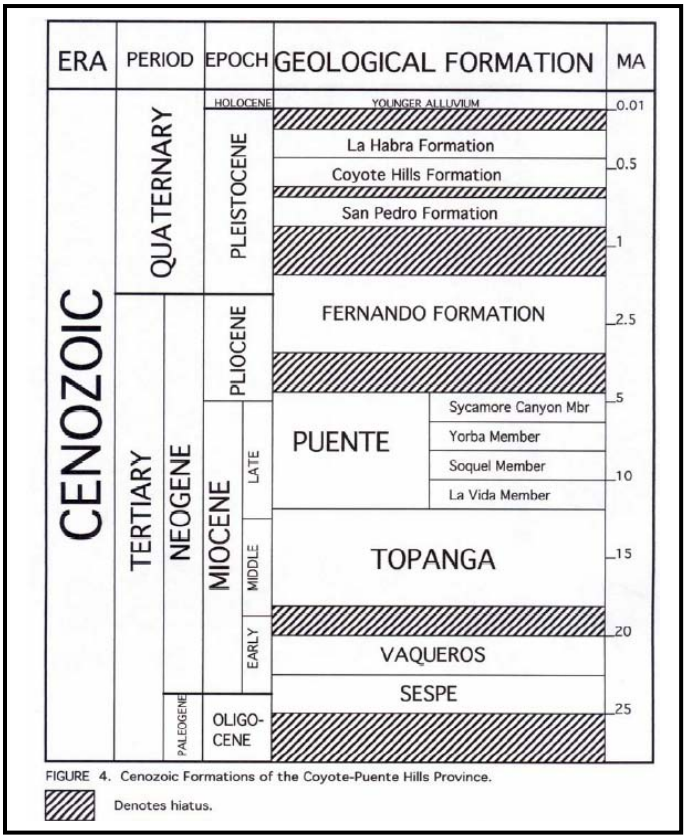


Figure 4.3-2
CENOZOIC FORMATIONS OF THE COYOTE-PUENTE HILLS PROVINCE
Source: County of Orange

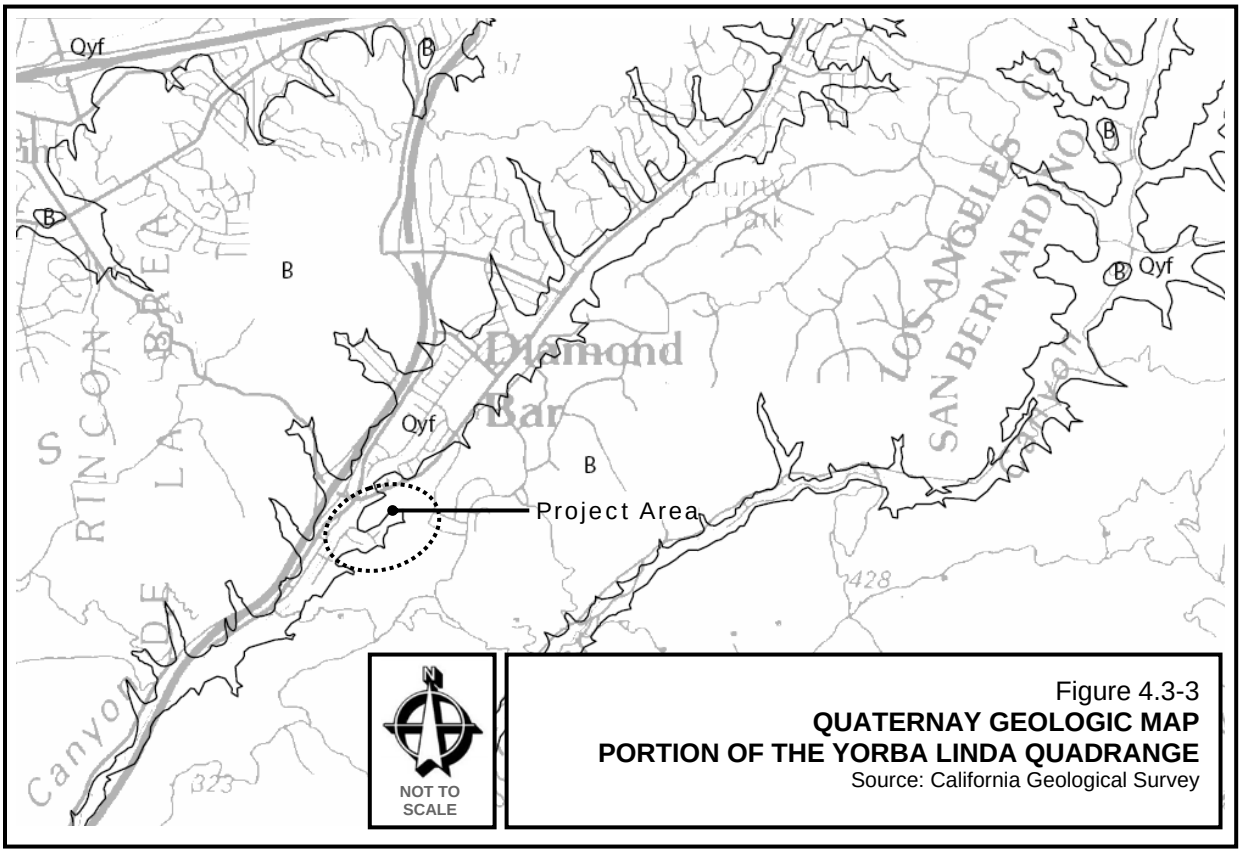


Figure 4.3-3
QUATERNAY GEOLOGIC MAP PORTION OF THE YORBA LINDA QUADRANGE
Source: California Geological Survey

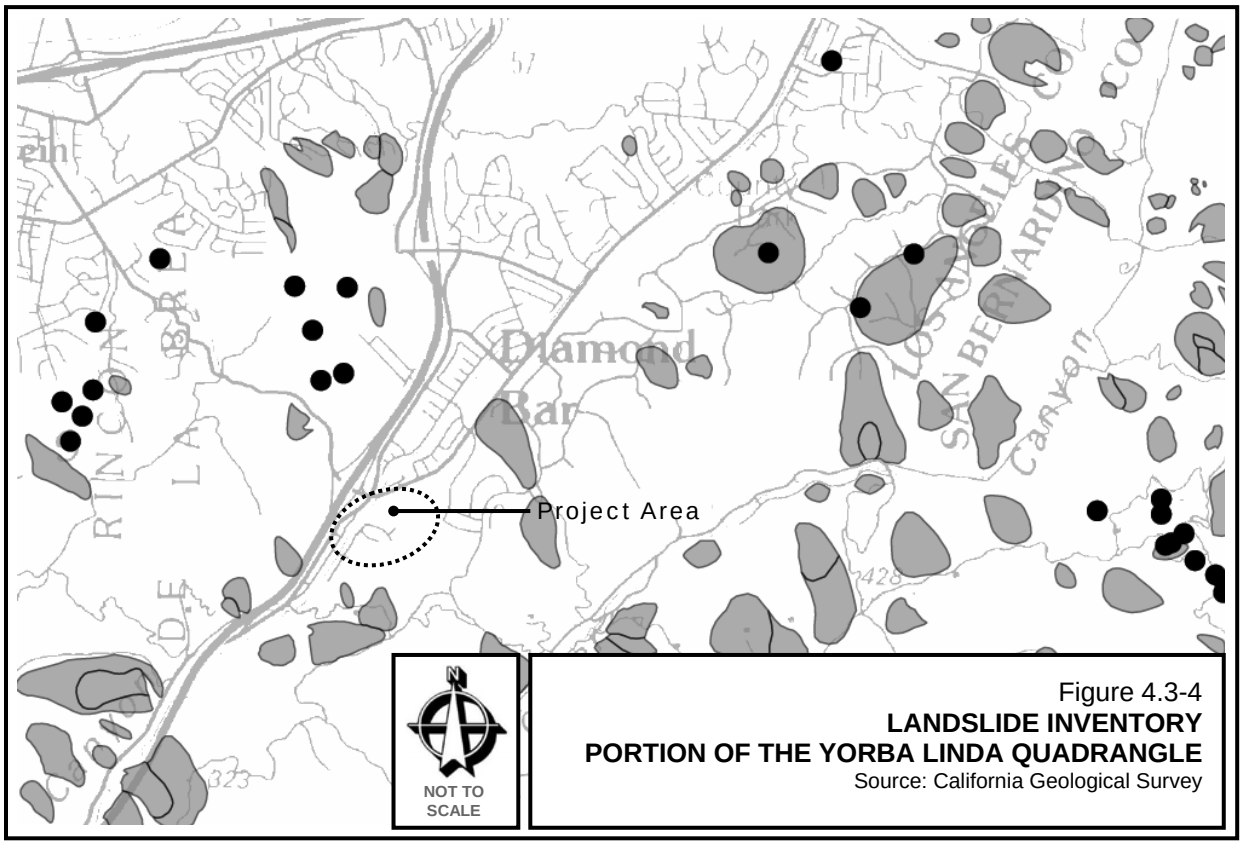


Figure 4.3-4
LANDSLIDE INVENTORY
PORTION OF THE YORBA LINDA QUADRANGLE
Source: California Geological Survey

Alquist-Priolo Earthquake Fault Zoning Act

In 1973, the State Legislature passed the Alquist-Priolo Earthquake Fault Zoning Act (APEFZA), formerly the Alquist-Priolo Special Studies Zone Act, as codified in Section 2621 *et seq*. in Chapter 7.5 of Division 2 of the PRC. The APEFZA was adopted to "provide policies and criteria to assist cities, counties, and State agencies in the exercise of their responsibilities to prohibit the location of developments and structures for human occupancy across the trace of active faults."[7] As defined, an "active fault" is one along which surface displacement has occurred within Holocene time (during the past 11,000 years).

The purpose of the APEFZA is to regulate land development near active faults in an effort to mitigate the hazard of surface fault rupture. The law requires the State Geologist to establish regulatory zones, known as earthquake fault zones,[8] around the surface traces of active faults and to issue appropriate maps. The maps are then distributed to all affected cities, counties, and State agencies for use in planning and controlling development activities. Under the

[7]/ Section 2621.5(a), Chapter 7.5, Division 2, PRC.

[8]/ Earthquake fault zones are regulatory zones that encompass surface traces of active faults that have a potential for future surface rupture. Areas that are so designated contain active faults that may pose a risk of surface rupture to existing or future structures. If a property is undeveloped, a fault study may be required before the parcel can be subdivided or before most structures can be permitted. If a property is developed, the APEFZA requires that all real estate transactions within the earthquake fault zone must contain a disclosure of those potential hazards by the seller to prospective buyers.

APEFZA, local agencies must regulate activities within those zones, as defined by an appropriate setback from the fault trace.

Pursuant to Section 2623 of the PRC, "cities and counties shall require, prior to the approval of a project, a geologic report defining and delineating any hazard of surface fault rupture. If the city or county finds that no undue hazard of that kind exists, the geologic report on the hazard may be waived, with the approval of the State Geologist." The geologic report required under the APEFZA must meet the criteria and policies established by the SMGB, as codified in Sections 3600-3603, Article 3, Title 14, CCR.

The applicable APEFZA map is presented in Figure 4.3-5 (Special Studies Zones - Portion of the Yorba Linda Quadrangle). As illustrated therein, the nearest earthquake fault zone is located south of the project site and is associated with the Whittier fault zone, located about 2.2 miles south of the project site.

Uniform Building Code

The "Uniform Building Code" (UBC) is published by the International Conference of Building Officials (ICBO), now the International Code Council (ICC), one of three model code groups in the country, and is used by most agencies in California as the basis for their building codes. The UBC defines criteria to be used in construction of structures based on the level of seismic activity in the region. The ICBO (ICC) has subdivided the United States into six seismic regions. The project site is located in UBC Seismic Zone 4.

As indicated in the code, building officials may require a geotechnical investigation addressing the potential for liquefaction in accordance with Section 1804.2 and 1804.5 when, during the course of investigation, all of the following conditions are discovered: (1) Shallow groundwater, 50 feet (15,240 mm) or less. (2) Unconsolidated sandy alluvium. (3) Seismic Zones 3 and 4."

Referencing Section 15.00.310 (California Building Code – Adopted) Title 15 (Building and Construction Safety) in the Municipal Code" "Except as hereinafter provided, the California Building Code, 2001 Edition (Part 2 of Title 24 of the California Code of Regulations), and the appendices thereto, which incorporates and amends the Uniform Building Code, 1997 Edition, published by the International Conference of Building Officials, is hereby adopted by reference and incorporated herein as though fully set forth herein and shall constitute the building code of the city. A copy of such code has been deposited in the office of the city clerk and shall be, at all times, maintained by the city clerk for use and examination by the public."

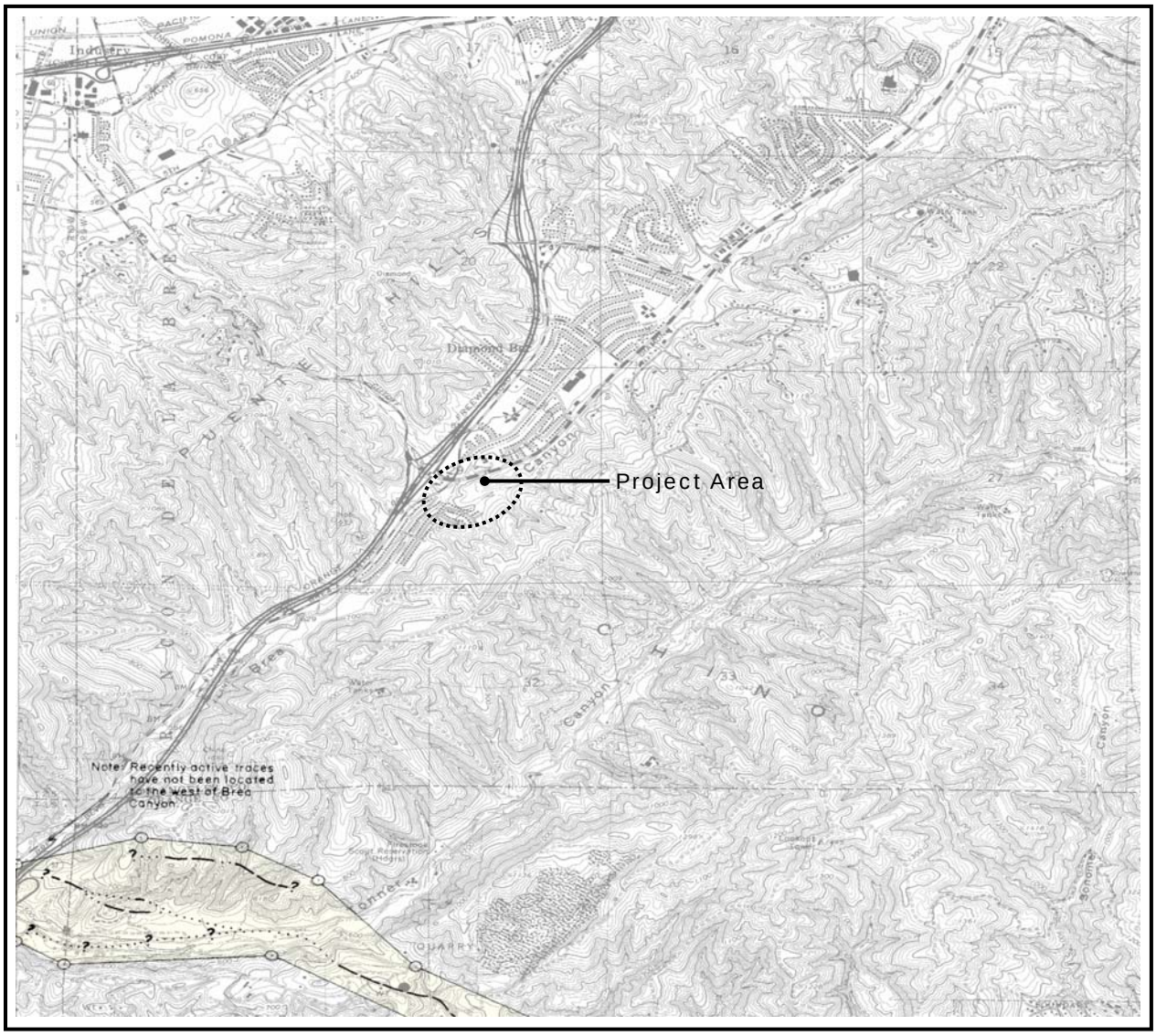
For projects that are not situated within an earthquake hazard zone, as designated by the APEFZA, the provisions of Chapter 16 (Structural Design Requirements) in Division IV of the code and the recommendations found in the "Recommended Lateral Force Requirements and Commentary, Seventh Edition"[9] are generally considered adequate for the design of structures.

California Building Code

Title 24 of the CCR, also known as the "California Building Standards Code" (CBSC), is a compilation of three types of building standards from three different origins: (1) building standards that have been adopted by State agencies without change from building standards

[9]/ Structural Engineers Association of California, Recommended Lateral Force Requirements and Commentary, Seventh Edition, 1999.

contained in national model codes; (2) building standards that have been adopted and adapted from the national model code standards to meet California conditions; and (3) building standards, authorized by the California legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns.



MAP EXPLANATION

Potentially Active Faults

06 C — Faults considered to have been active during Quaternary time; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep.

— — Aerial photo lineaments (not field checked); based on youthful geomorphic and other features believed to be the results of Quaternary faulting.

Special Studies Zone Boundaries

—○ These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.

—○ Seaward projection of zone boundary.

Figure 4.3-5
SPECIAL STUDIES ZONES PORTION OF THE YORBA LINDA QUADRANGLE
Source: California Department of Conservation

NOT TO SCALE

STATE OF CALIFORNIA
SPECIAL STUDIES ZONES
Delineated in compliance with Chapter 7.5, Division 2 of the California Public Resources Code
YORBA LINDA QUADRANGLE
OFFICIAL MAP
Effective: January 1, 1980

In January 2007, the California Building Standards Commission (CSC) adopted the 2007 CBSC, consisting of the twelve parts of Title 24. The 2007 CSBC (replacing the 2001 CBSC) applies Statewide on January 1, 2008, whether adopted at the local level or not. When local government develops a code adoption ordinance, it is permissible to make amendments by ordinance to the 2007 CBSC for more restrictive requirements, as permitted under Sections 17958, 17958.5, and 18941.5 of the H&SC. The local agency making more restrictive amendments must make a finding based on local geological, topographical, or climatic conditions. The findings, along with the amendment, must be adopted by local ordinance and filed with the CSC before it is effective or operative.

City of Diamond Bar General Plan

The City's General Plan includes a number of policies that address, either directly or indirectly, geotechnical hazards and which may be applicable at the project level. Relevant policies include, but may not be limited to, the following:

- Limit grading to the minimum necessary (Strategy 3.3.4, Land Use Element).
- Require that all manufactured slopes be landscaped and that, where practical, landform grading and planting techniques be implemented in the construction of manufactured slopes (Strategy 3.3.5, Land Use Element).
- Minimize the potential for loss of life, physical injury, and property damage from seismic groundshaking and other geologic hazards (Objective 1.1, Public Health and Safety Element).
- As required by the Uniform Building Code, require site-specific geotechnical investigation be performed to determine appropriate design parameters for construction of public and private facilities in order to minimize the effects of any geologic and seismic hazard on such development (Strategy 1.1.2, Public Health and Safety Element).

City of Diamond Bar Municipal Code

As stipulated under Section 22.16.030(a)(3) in Title 22 (Development Code) of the Municipal Code, the area disturbed by clearing, demolition, earth-moving, excavation operations, or grading shall be the minimum required to implement the allowed use. As indicated in Section 21.30.060 therein, new subdivisions shall be designed so that all proposed grading incorporates appropriate erosion and sediment control measures in compliance with Section 18.108.190.

As further stipulated in Section 22.22.080 (Grading) of the Municipal Code, landform grading techniques are promoted. Specified standards define basic grading techniques consistent with the intent of this chapter and avoid unnecessary cut and fill. Limitations on project grading amounts and configurations will be decided on a case-by-case basis under the conditional use permit process. Ordinance-specified landform grading techniques, grading standards, and grading guidelines are outlined in Section 22.22.080(a)-(c) of the Municipal Code.

4.3.1.2 Regional Setting

The project site is located near the northern margin of the Peninsular Ranges geomorphic province. This geomorphic province is an approximately 900-mile long northwest-southeast trending structural block extending southeasterly from the San Gabriel Mountains into Baja California, Mexico and includes the Los Angeles Basin. The Peninsular Ranges are distinguished from surrounding provinces by their northwest-trending mountains and valleys.

The Peninsular Ranges lie to the south and west of the northwest-trending San Andreas fault system. Active deformation is expressed as slip along a three-dimensional system of interacting faults. The site is located near several faults and blind thrusts with slip rates between 1-3 millimeters/year (mm/yr) and about 50 kilometers (km) from a section of the San Andreas fault with a slip rate between 25-35 mm/yr.[10]

As indicated in Figure 4.3-6 (Regional Fault Map),[11] the project site is located in the Puente Hills, a northwesterly trending series of hills located between the Chino Basin to the northeast and the active Whittier fault and coastal plain to the southwest. The Puente Hills are generally of moderate relief and are underlain primarily by marine sedimentary rocks, several thousands of feet thick, of tertiary age.

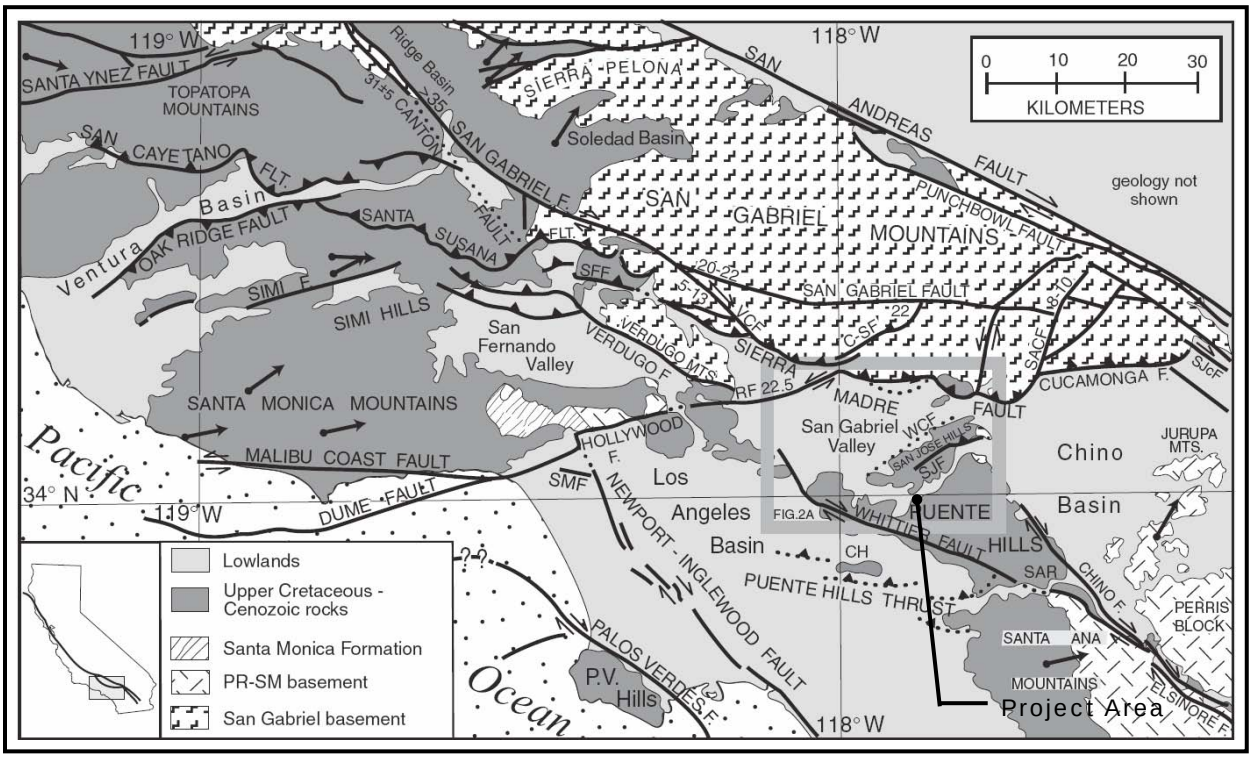


Figure 4.3-6
REGIONAL FAULT MAP
Source: Robert S. Yeats

The Puente Hills are located west and northwest of the Peninsular Ranges and southeast of the Central Transverse Ranges but are not clearly associated with either province. From north to south, the Puente Hills anticline, the Whittier fault, and the La Habra syncline characterize the structural setting of the Puente Hills. Basement rocks that underlie the Puente Hills exhibit as much as 14,000 feet of vertical separation due to folding and offset along the Whittier fault.[12]

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[10]/ Peterson, Mark D., *et al*., Open-File Report 96-08, Probabilistic Seismic Hazard Assessment for the State of California, California Department of Conservation, Division of Mines and Geology, 1996.

[11]/ Yeats, Robert S., Tectonics of the San Gabriel Basin and Surrounding, Southern California, Geologic Society of America Bulletin, September/October 2004.

[12]/ Bjorklund, Tom, The Whittier Fault Trend: Cross Sections, Structure Maps, and Well Tops in the Major Oil Producing Area of the Northeastern Los Angeles Basin, Search and Discovery Article #10038, 2003.

The Los Angeles and San Gabriel Basins are transitional between the east-trending Transverse Ranges on the north (dominated by reverse faulting) and the northwest-trending Peninsular Ranges on the south (dominated by right-lateral strike-slip faulting). As reported by Yeats: "The San Gabriel Basin gives way eastward to anticlinal hills of the northern Puente Hills and San Jose Hills, including the Walnut and San Jose anticlines, both of which plunge westward toward the basin. The anticlinal hills are separated from nearly flat-lying strata of the San Gabriel Basin by the left-lateral (?) Walnut Creek fault, discovered through analysis of water-well data. The Walnut Creek fault does not continue southwest across the northwest Puente Hills. The part of the Puente Hills may be anticlinal, too, but most of the south flank of the anticline is truncated at the Whittier fault. The northwest Puente Hills are cut by the northwest-striking Workman Hill and Whittier Heights faults and the north-striking Handorf fault all of which lose dip separation northward in the San Gabriel Basin."[13]

Active northwest-trending faults in the general project area include the Whittier-Elsinore, Newport-Inglewood, and Palos Verdes faults. Active east-west-trending faults include the Malibu-Santa Monica-Raymond Hills fault system located at the northern edge of the basin. These faults are believed to interact via a subsurface system of horizontal detachments and thrust ramps at a depth of about 10-15 kilometer. Several active fault zones in the region have produced damaging historic earthquakes, including the 1933 Long Beach earthquake, 1971 San Fernando earthquake, 1987 Whittier Narrows earthquake, and 1994 Northridge earthquake.[14]

A complex system of buried, low angle reverse (thrust) faults underlie the Los Angeles metropolitan area. These buried thrust faults have not caused past surface ruptures but have caused several historic earthquakes, including the 1987 Whittier Narrows. The Puente Hills blind-thrust system (PHT) is considered to comprise three segments (Los Angeles, Santa Fe Springs, Coyote Hills), each of which may behave independently or may break along their entire length in one event. In 2003, a study led by Southern California Earthquake Center (SCEC) found that the fault had ruptured at least four times in the last 11,000 years, with magnitudes ranging from 7.2 to 7.5.[15] Each of these three PHT segments is capable of generating a magnitude 6.5 - 6.6 earthquake individually or a magnitude 7.0 - 7.1 earthquake if they were to rupture simultaneously.[16] The PHT fits the classification of a "Type B" fault (magnitude $\geq$6.5).[17]

A portion of the "Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle" is included as Figure 4.3-7 (Geologic Map - Portion of the Santa Ana 30' x 60' Quadrangle) and Figure 4.3-8 (Fault Map - Portion of the Santa Ana 30' x 60' Quadrangle).[18] A portion of the "Geologic Map of the Yorba Linda/Prado Dam Quadrangles (Eastern Puente Hills), Los

[13]/ Yeats, Robert S., Tectonics of the San Gabriel Bain and Surroundings, Southern California, Geological Society of America Bulletin, September/October 2004, p. 10.

[14]/ Cooke, Michele L. and Kameda, Ayako, Mechanical Fault Interaction within the Los Angeles Basin: A Two-Dimensional Analysis using Mechanical Efficiency, Journal of Geophysical Research, Vol. 107, No. B7, July 26, 2002.

[15]/ Southern California Earthquake Center, Major Losses of Up to $250 Billion Projected on Earthquakes on Puente Hills Fault under Los Angeles (http://www.scec.org/research/050525puentehills.html).

[16]/ Pratt, Thomas L, *et al.*, Shallow Seismic Imaging of Folds above the Punte Hills Blind-Thrust Fault, Los Angeles, California, Geophysical Research Letters, Vol. 29, No. 9, 1304, 2002, p. 18-1; Shaw, John H., et al., Puente Hills Blind-Thrust System, Los Angeles, California, Bulletin of the Seismological Society of America, Vol. 92, No. 8, December 2002, pp. 2958-2959.

[17]/ Field, Edward H. *et al.*, Loss Estimates for a Puente Hills Blind-Thrust Earthquake, Los Angeles, California, Earthquake Spectra, Vol. 21, Issue 2, May 2005, pp. 329-338.

[18]/ Morton, D.M., Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California, Open-File Report 99-172, United States Geological Survey, 2004.

Angeles, Orange, San Bernardino, and Riverside Counties, California," is included in Figure 4.3-9 (Geology Map – Portion of the Yorba Linda/Prado Dam Quadrangles).[19]

As illustrated, the project site is predominately comprised of the La Vita Member (Miocene). The La Vida Member (TplV) is "primarily siltstone and subordinate sandstone and locally includes porcellaneous siltstone or shale and a few beds of vitric tuff. It was named fro exposures near La Vida Mineral Springs in the eastern Puente Hills. Siltstone in the unit is light-grey to black, massive to well-bedded, and generally friable. Weathered structures are typically white or pale grey. Rocks in this member contain widespread fish remains, abundant foraminifera, local phosphate nodules, and sparse limy siltstone. Interbedded sandstone beds range from two centimeters to over one meter in thickness. Reflecting its incompetent nature, the La Vida Member is commonly tightly folded in contrast to the other Puente members. The La Vida Member contains forminifera of Kleinpell's Mohian Stage. At the limited places the contact is exposed, the La Vida unconformably overlies the Topanga Formation."[20]

4.3.1.3 Local Setting

The Applicant submitted and the City has independently reviewed a Phase I ESA conducted to assess the presence of hazardous materials and petroleum products on the project site. That report, entitled "Preliminary Geotechnical Report: Site D – Mass Grading, Walnut Valley Unified School District, Diamond Bar, California" (KFM GeoScience, January 15, 2008), in combination with the City's independent analysis, serve as the basis for this environmental assessment.

Site and Subsurface Geologic and Geotechnical Conditions

The site is characterized as a relatively flat plateau with natural and graded slopes facing north and southeast. The site is bounded by the Brea Canyon Storm Drain Channel along the northwest portion of the property, descending cut slopes to Diamond Bar Boulevard to the north, and residential developments in the south and east. Pasado Drive, at the southwest extremity of the site, provides a secondary point of entry to the site.

The site ranges in elevation from approximately 670-feet AMSL near the western corner of the site to about 815-feet AMSL along the southeast boundary. The natural slopes below the residential development to the south and adjacent to Brea Canyon Storm Drain Channel are inclined from about 2.5:1 to 4.5:1 (H:V). During the construction of Diamond Bar Boulevard, portions of the northern boundary of the site adjacent to the street were cut to approximately 1.5:1. An ascending 15-foot to 20-foot high cut slope, inclined at about 1.5:1 is present adjacent to the housing development along the southern boundary of the site.

The site is underlain by marine sedimentary bedrock consisting of sandstone and siltstone of the Puente Formation. The bedrock units have been tilted and locally folded as the Puente Hills were being uplifted and deformed. Mapping indicates that the bedding in the Puente Formation exposed in the area generally dips shallowly towards the northwest producing apparent out-of-slope dips along the southeastern slopes on the site. No landslides are mapped at the site. Alluvial deposits are mapped in the area of Brea Canyon wash.

[19]/ Dibblee, T. W., Geologic Map of the Yorba Linda/Prado Dam Quadrangles (Eastern Puente Hills), Los Angeles, Orange, San Bernardino, and Riverside Counties, California, Dibblee Geological Foundation Map #DF-75, March 2001.

[20]/ Morton, Douglas M. and Miller, Fred K., Geological Map of the San Bernardino and Santa Ana 30' x 60' Quadrangle, California, United States Geological Survey, 2006, p. 46.

The project site is predominantly underlain by Puente Formation bedrock which is locally overlain by alluvial deposits, relatively thin colluvium/topsoil, and an area of slope wash deposited from erosion of the adjacent fill slopes. Geologic data collected at the site are summarized on the Figure 4.3-10 (Project Site Geologic Map).

Interpretation of the available geologic data shown in Figure 4.3-10 (Project Site Geologic Map) and presented in the boring logs presented in the preliminary geotechnical investigation were used to develop models of the subsurface geologic conditions underlying the project site. These interpreted geologic models are presented as Figure 4.3-11 (Cross-Sections A-A' through D-D'). Generalized descriptions of the encountered units are provided below.

- Undocumented fill (af). Undocumented fill located on the project site is associated with surficial erosion of the adjacent rough graded tract during heavy rain fall in late 1978. Undocumented fill is approximately 4-feet to 6-feet thick and is isolated within the central portions of the site. The artificial fill consists predominantly of silty to sandy clays with abundant siltstone bedrock clasts from the La Vida Member of the Puente Formation. The silty and sandy clay materials were observed to be yellow brown to dark brown, dry to damp, and soft to stiff. In addition to the mapped undocumented fill, randomly located spoil piles of unknown origin are present in the central portion of the property.

- Colluvium/topsoil (Qcol). Colluvium within the project site consists of a relatively thin mantle of soil above the on-site bedrock materials and is generally located along the hillsides within the site. Colluvial deposits were observed to be approximately 1-foot to 3-feet in thickness. Where observed, these materials consisted of yellow to dark brown silty to sandy clays that were generally soft to firm, porous and damp to moist. Bedrock fragments were commonly encountered in the colluvial soils. The colluvium is moderately to highly expansive with Expansion Indices (EI) ranging from 84 to 93.

- Alluvium (Qal). Alluvium within the project site is generally located in the center portion of the property and adjacent to the Brea Canyon Storm Drain Channel. The alluvium generally consists of dark brown to yellowish orange brown silty to sandy clays. Alluvial materials were observed to be generally fine-grained, moist, firm to stiff and porous. Alluvial soils were observed to total depth of all the test pits which extended 10-feet to 12-feet below the undocumented fill. The total thickness of the alluvial deposits was not determined during the preliminary geotechnical investigation.

- Puente Formation – La Vida Member (Tplv). Sedimentary bedrock of the Puente Formation, La Vida Member (Tplv) underlies the entire site and generally consists of siltstone and fine-grained sandstone with medium-grained sandstone interbeds. Bedrock is highly weathered near the surface and, at contact with other units, with the degree of weathering decreasing with depth. Slightly to moderately weathered bedrock is generally orange to yellow brown and moderately fractured. Unweathered bedrock materials were generally olive gray and hard to extremely hard at depth. Below depths of 30-35 feet, drilling became generally difficult.

  The stratigraphy of the siltstone and sandstone unit consists of predominantly massive sandstone, silty fine sandstone beds interlayered with siltstone beds ranging from 1-foot to 3-feet thick. The interbedded relationship between the sandstone and siltstone layers often exhibit grading or fining-upwards sequence.

Also observed and sampled were occasional weak or soft claystone layers consisting of olive to gray brown clay. No significant shearing of the claystone or siltstone beds was observed in any of the borings. The weak and soft claystone layers are depicted in Figure 4.3-11 (Cross-Sections A-A' through D-D').

The geologic structure of the project site is characterized by a generally western dipping homocline dipping away from the northwest flank of the Puente Hills. Bedding in the Puente Formation, as observed in the borings and test pits, generally striking toward the northeast and typically dips 4-19 degrees towards the northwest, producing apparent shallow out-of-slope dips underlying most of the slopes. Dips towards the southwest were less common. No significant faults have been recognized at the project site.

Regional groundwater was not encountered within the bedrock units during the preliminary geotechnical investigation. A seep or apparent perched groundwater condition was encountered at a depth of 37-feet below ground surface elevation. This perched groundwater condition was observed to be resting on a cemented bed. No other perched groundwater conditions were encounter within the subsurface surficial or bedrock units during this investigation. No seeps were observed on the site during the field investigation. Minor subsurface seepage may occur on the project site, particularly during or after periods of heavy rainfall. The depth to groundwater may fluctuate depending on the rainfall and possible groundwater recharge or pumping activities within the general project vicinity.

General Seismic Setting

The southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the project site are generally capable of generating ground shaking of engineering significance to the proposed construction. The project area is located in the general proximity of several active and potentially active faults.[21]

Review of pertinent geologic maps of the area indicate that no known major active or potentially active faults are mapped within 2.2 miles of the project site. The closest mapped active faults to the site are: (1) the Whittier Fault, located about 2.2 miles southwest; (2) the Elsinore Fault, located approximately 16 miles southeast of the site; (3) the Cucamonga Fault, located approximately 18 miles to the northeast; (4) the San Andreas Fault, located about 29 miles northeast; and (5) the south-central segment of the San Jacinto Fault, located about 32 miles east of the site.

Notable damaging earthquakes in the region include the 1994 Northridge earthquake (M6.7) and the 1987 Whittier Narrows earthquake (M5.9), both attributed to blind-thrust faults (low angle faults that are not expressed at the ground surface); the 1971 San Fernando earthquake (M6.4) which occurred on the San Fernando Fault (the easternmost fault of the Sierra Madre system); the 1933 Long Beach earthquake (M6.3) on the Newport Inglewood fault; and the 1857 Fort Tejon earthquake (M7.9) on the south central segment of the San Andreas fault.

The engineering seismology study for the subject site included reviewing local and regional faulting maps and the review of historical earthquake data. The engineering seismology issues were addressed in that study are discussed below.

[21]/ Active faults are defined as those that have experienced surface displacement within Holocene time (approximately the last 11,000 years).

- Surface fault rupture. Official maps of earthquake fault zones were reviewed to evaluate the location of the project site relative to active fault zones. The site is not located within a designated Alquist-Priolo earthquake fault zone for fault surface rupture hazard. The surface traces of any active or potentially active faults are not known to pass directly through or project towards the project site. The potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is, therefore, considered low.

- Seismic hazard zones. Maps of seismic hazard zones are issued by the CSC (formerly California Department of Conservation, Division of Mines and Geology) in accordance with the SHMA. Based on the seismic hazard zone map for the Yorba Linda 7.5-Minute Quadrangle, the majority of the proposed development is underlain by dense bedrock and is not located within an area identified by the State as subject to the hazard of liquefaction. However, the west portion of the site, adjacent to Brea Canyon wash and east of Brea Canyon Road, is identified as being potentially liquefiable due to the presence of Quaternary alluvium (Qal) and potentially shallow groundwater. Several slope areas potentially susceptible to earthquake-induced landslide are identified.

Liquefaction and Dynamic Settlement

Liquefaction is a phenomenon wherein a saturated or near-saturated mass of soil looses a large portion of its shear resistance when subject to monotonic, cyclic, or shock loading, and flows in a manner resembling a liquid until the shear stresses acting on the mass are as low as the reduced shear strength. Liquefaction of soils can be caused by ground shaking during earthquakes. Research and historical data indicate that loose, relatively clean granular soils, are susceptible to liquefaction and dynamic settlement. The stability of the majority of clayey silts, silty clays and clays is not adversely affected by ground shaking.

Dynamic settlement occurs due to soil densification during cyclic or shock loading, typically due to earthquake shaking, and can occur in dry sands or as a consequence of liquefaction in saturated sands. Due to the presence of dense bedrock and the absence of groundwater within the depth of liquefaction significance, the potential for liquefaction and its adverse effects, including dynamic settlement, impacting most of the site is considered negligible. However, there is potential for liquefaction in the area of Brea Canyon wash.

Slope Stability Evaluation

Slope stability of representative cross-sections through the main manufactured slopes of the proposed development were performed to investigate the stability of the existing and proposed grades and to establish the extent of grading mitigation. The following sections provide the rationale, basis, and results of the analyses.

- Shear Strength of on-site materials. Strength parameters selected for the slope stability analyses considered the results of laboratory testing performed as well as observed condition of material types along the interpreted potential failure surfaces. The determination of the shear strength parameters along the weak clay layers encountered in the borings was based on residual shear strength obtained from direct shear tests of remolded weak clay layer materials. Additional direct shear tests were performed on undisturbed bedrock materials and anticipated remolded fill materials.

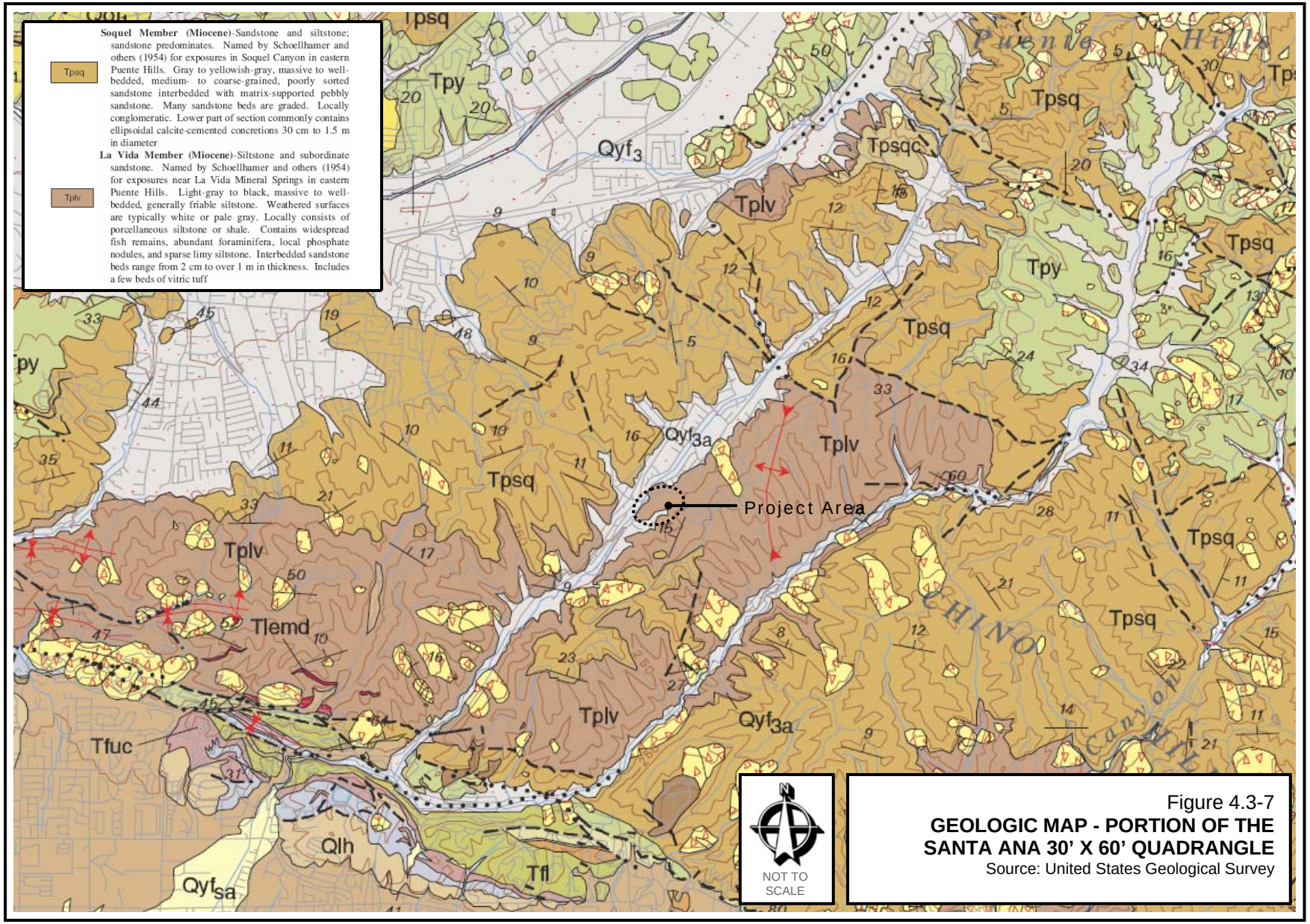


Figure 4.3-7
GEOLOGIC MAP - PORTION OF THE SANTA ANA 30' X 60' QUADRANGLE
Source: United States Geological Survey

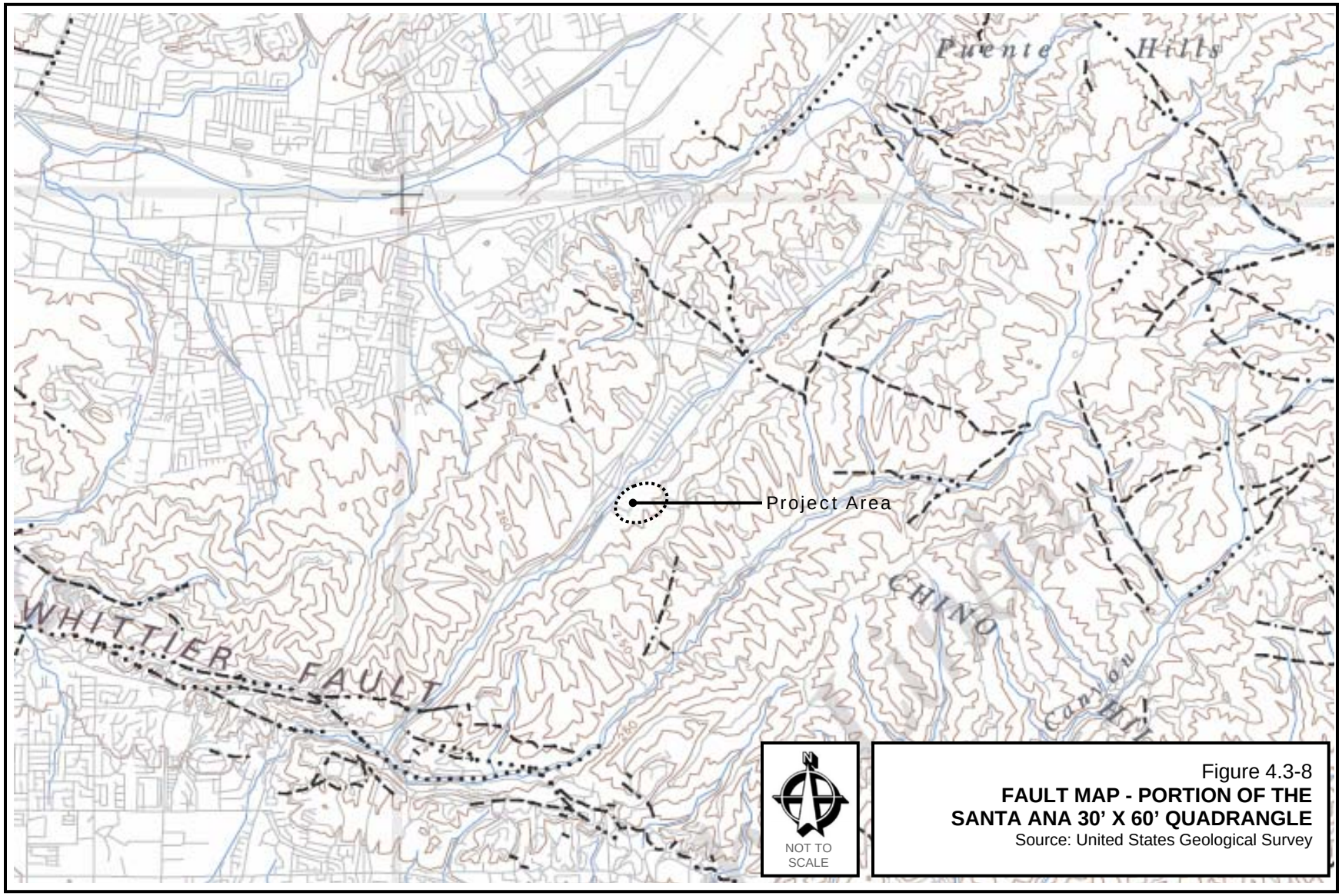
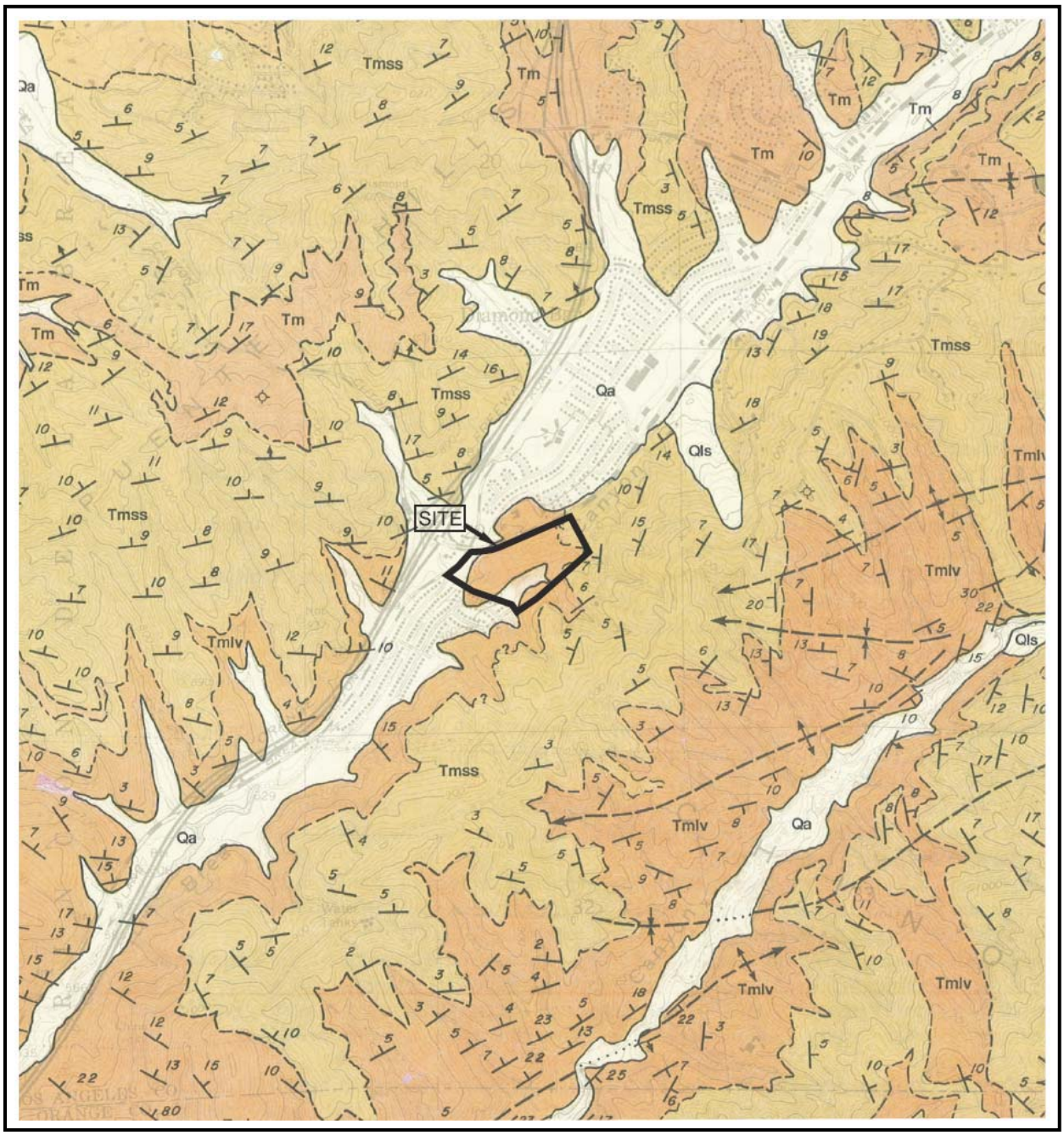


Figure 4.3-8
FAULT MAP - PORTION OF THE SANTA ANA 30' X 60' QUADRANGLE
Source: United States Geological Survey



NOT TO SCALE

Figure 4.3-9
GEOLOGY MAP
PORTION OF THE YORBA LINDA/PRADO DAM QUADRANGLES
Source: Dibblee Geological Foundation

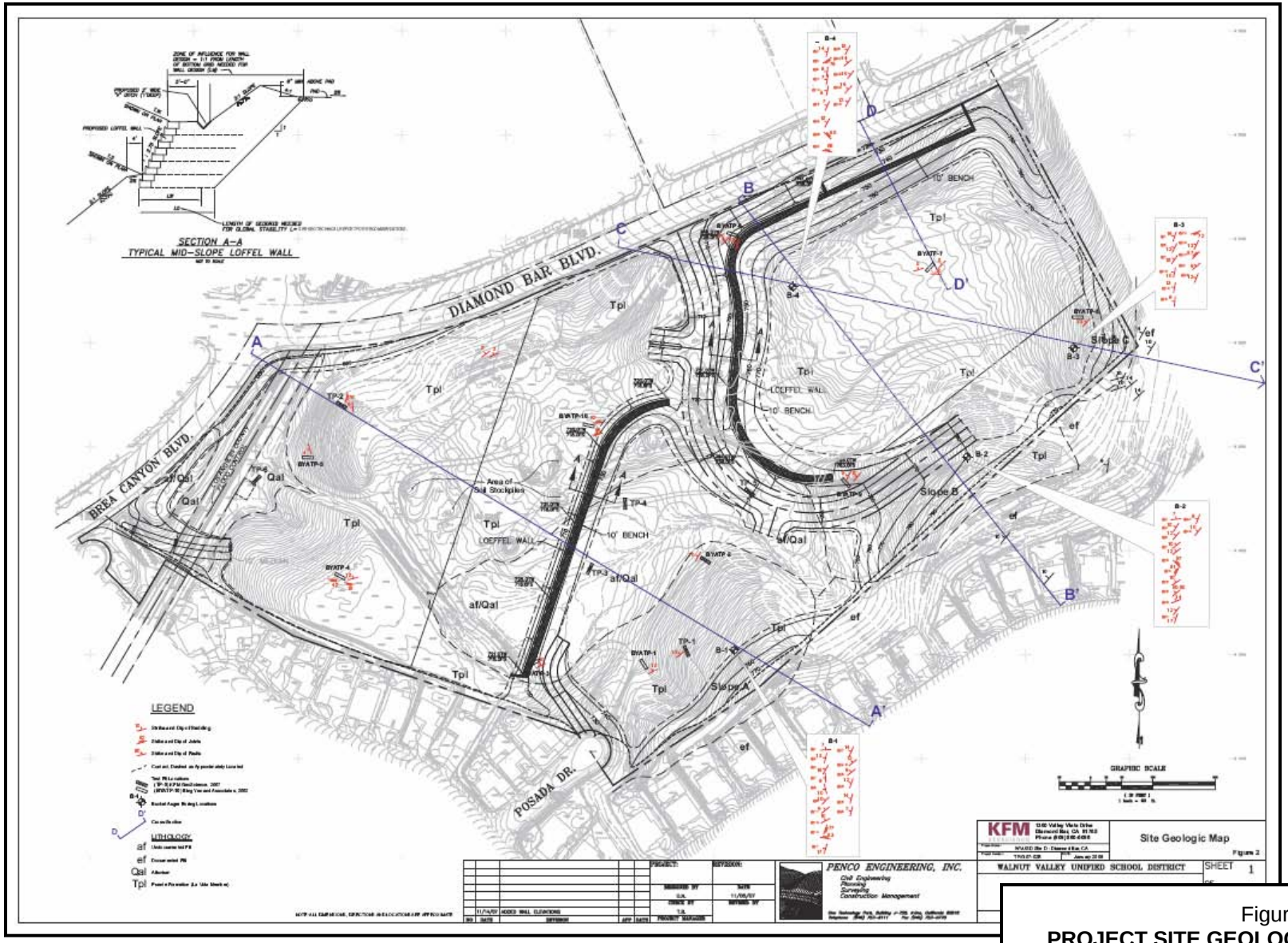
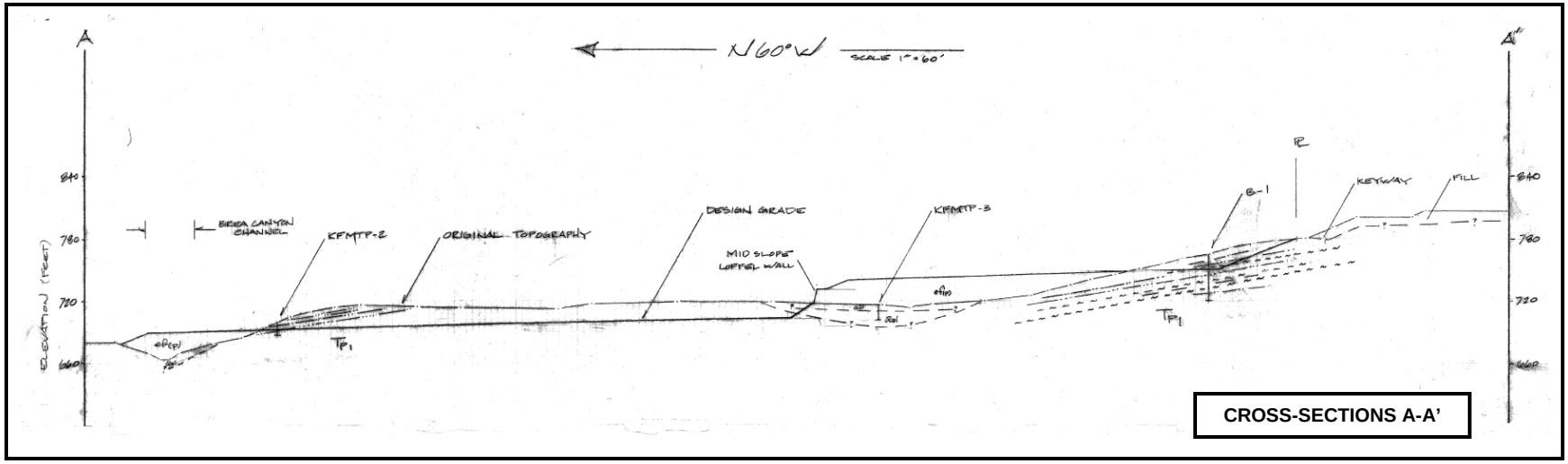


Figure 4.3-10
PROJECT SITE GEOLOGY MAP
Source: KFM GeoScience



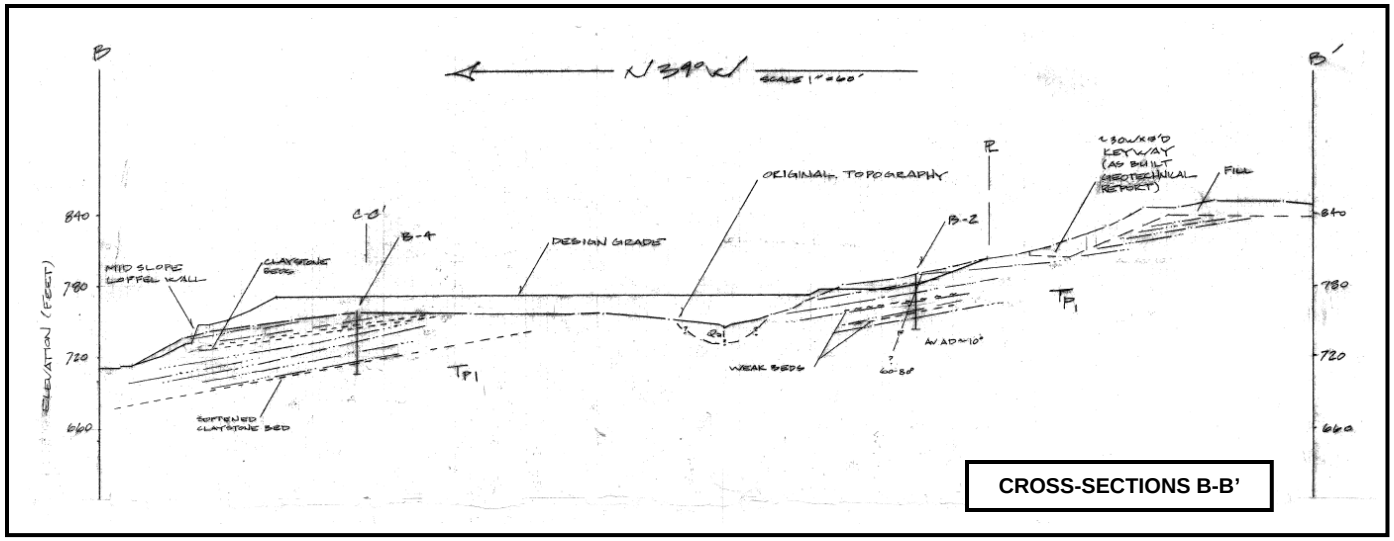
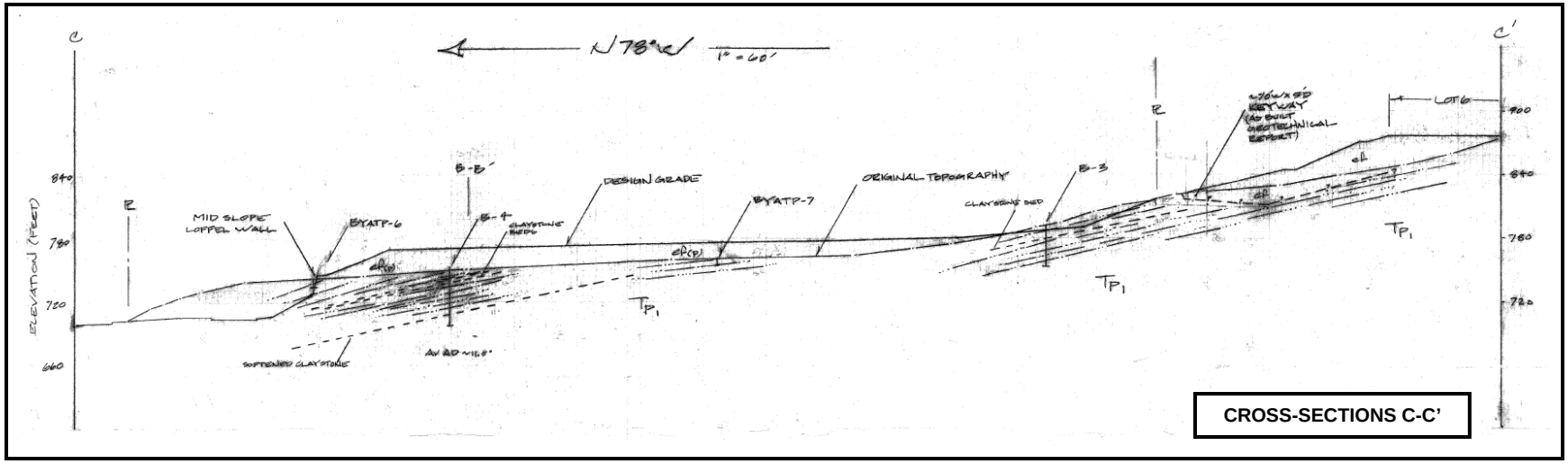
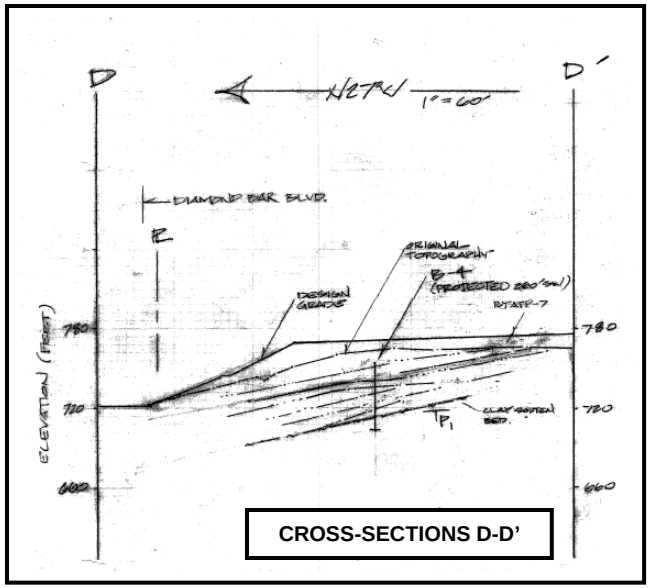


Figure 4.3-11 (1 of 2)
CROSS-SECTIONS A-A' THROUGH D-D
Source: KFM GeoScience



CROSS-SECTIONS C-C'



CROSS-SECTIONS D-D'

LEGEND

See Figure 2 for Cross-Section Locations

ef(p) - Engineered fill proposed
ef - Engineered fill
af - undocumented fill
Tpl - Puente Formation (La Vida Member)

- Sandstone and siltsone bedding

- Weak clay layer

Figure 4.3-11 (2 of 2)
CROSS-SECTIONS A-A' THROUGH D-D
Source: KFM GeoScience

In general, the selection of the appropriate shear strength parameters was based on the following premises: (1) for static analyses, shear strengths near the lower bound limits of the appropriate collected laboratory data were considered; (2) to verify the selected residual shear strength parameters, Atterberg Limits of pertinent materials were compared to published correlations; based on the range of Liquid Limits and Plasticity Indices between approximately 64-80 and 38-51 percent, respectively, of the weakened clay materials, the associated residual friction angle is correlated between 9.5-13.5 degrees with average value around 12 degrees; (3) for pseudo-static analyses, shear strength parameters were increased by 20 percent which resulted in increase of shear strength parameters closer to the average of the appropriate collected data.

- Slope stability analyses. The Factors of Safety were evaluated using the computer program SLOPE/W using Spencer's limit equilibrium method. Both static and pseudo-static analyses were performed on the four cross-sections representative of the site conditions. On Cross-Sections A-A' and B-B,' weak clay layers have been conservatively extrapolated in the stratigraphy based on the downhole logging of borings. In general, stability of the existing slopes was analyzed on failure planes that included the identified weak clay layers and potential failure planes along weaker bedding through the Puente Formation bedrock. As appropriate, if entry or exit configurations were unknown, a search for the critical configuration was undertaken.

- Static slope stability acceptance. In the static analyses, the calculated Factor of Safety is required to be at least 1.5 for the slope to be considered to possess adequate static stability. For temporary conditions during construction, a Factor of Safety of 1.25 is required.

- Seismic slope stability acceptance. A screening evaluation of the seismic slope stability of the adversely oriented bedding was performed in accordance with the Section 11.2 of the "Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California" (Southern California Earthquake Center, 2002). Based on this approach, the slope is required to perform adequately under the effects of a Design Basis Earthquake (DBE). The DBE is defined as an earthquake event having a 10 percent probability of exceedance during a 50-year time period.

  In order to evaluate the performance of the slope under DBE event, first a screening analysis was performed. The screening analysis consisted of pseudo-static analysis utilizing an earthquake coefficient based on seismic response specific to the site and on the acceptable magnitude of seismically induced slope movements. Based on the recommended procedures, it is required that the pseudo-static Factor of Safety is greater than 1 in order for the slope to pass the screening analysis and to be considered seismically stable. If the Factor of Safety <1, then deformation analysis is required.

  Based on the USGS' "Seismic Hazard Zone Report 010: Seismic Hazard Zone Report for the Yorba Linda 7.5-Minute Quadrangle, Los Angeles, Orange, and San Bernardino Counties, California" (1998, revised 2005) the DBE Peak Ground Acceleration (PGA) (also called Maximum Horizontal Acceleration [MHA]) for soft-rock conditions is 0.46g. Based on the de-aggregation analysis, the predominant earthquake magnitude (or mode magnitude [M_w]) and the associated modal distance are M_w6.8 and 2 kilometers (km), respectively. For the screening analysis, based on these de-aggregated parameters, a

horizontal seismic coefficient (k_{eq}) of 0.239 was estimated for 5 centimeter (cm) threshold displacement. The analysis offers the following observations and conclusions.

◊ Static Slope Stability. The static Factors of Safety for the existing slope conditions at the project site are generally close to or greater than 1.5. The lowest calculated Factor of Safety for the existing condition is 1.42 along a weak clay layer (within Slope B on Figure 4.3-10 [Project Site Geologic Map]). However, the proposed grading of the upper slopes (at Slope A and Slope B) to 2:1 generally creates a reduction in the static Factors of Safety below 1.5 along these slopes. Further, the additional loads imposed by the proposed Loffel walls at the toe of Section B-B' and C-C' on Figure 4.3-11 (Cross-Sections A-A' through D-D') result in Factors of Safety <1.5. Remediation measures (including shear keys to intercept the critical mapped weak clay layers, buttress fills at the toe of Slopes A and B, and buttress fill shear strength improvements) are required to achieve the minimum static Factors of Safety for the site slopes.

◊ Seismic Slope Stability. Using the site-specific seismic coefficient k_{eq} of 0.239, pseudo-static Factors of Safety of <1 were computed for many of the existing and proposed graded slopes at the project site. The high seismic coefficient is due to the close proximity of the design seismic source (Whittier fault) to the site. The remediation measures incorporate sufficient elements to achieve adequate pseudo-static stability with Factors of Safety >1. Consequently, the site passed the screening analysis and the design sections are considered stable.

Phase I Environmental Site Assessments

The Applicant submitted and the City has independently reviewed a Phase I ESA conducted to assess the presence of hazardous materials and petroleum products on the project site. That report, entitled "Phase I Environmental Site Assessment and Limited Site Characterization – Site D Property APN's 8714-002-900, -901, -902, and -903, 28± Acres of Vacant Land, City of Diamond Bar, Los Angeles County, California" (LOR Geotechnical Group, April 30, 2004), in combination with the City's independent analysis, serve as the basis for this assessment.

The goal of an ESA is to identify "recognized environmental conditions" (RECs), defined to mean the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicated the existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface waters of the property. The term hazardous substances or petroleum products is not, however, intended to include de minimus conditions that generally do not presence a material risk of harm to public health or the environment and that generally would not be subject to an enforcement action if brought to the attention of appropriate governmental agencies.

Typically, environmental site assessments are conducted in phases (i.e., literature search and site reconnaissance, soil sampling, remediation). A Phase I ESA typically focuses on the identification of toxic and hazardous materials and wastes, as defined in CFR (40 CFR 261 and 302.4), Title 22 of the CCR, and the American Society for Testing and Materials (ASTM) standard for environmental site assessment for commercial property. The format for a Phase I ESA is often patterned after guidelines and protocols developed by the ASTM and the Federal National Mortgage Insurance Association under CERCLA and the Superfund Amendment

Reauthorization Act of 1986 (SARA). Only in the event that the Phase I ESA identifies the presence or suspected presence of RECs is further analysis or remediation typically required.

The ASTM standard defines de minimus conditions as those that "generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies." At the time of its preparation, the Phase I ESA identified the following conditions that are not representative of RECs but are considered de minimus conditions:

- No drums, barrels, or other containers were noted on the project site. No distressed vegetation or stained soils were noted on the subject property. Some windblown and illegally dumped trash and debris were observed at the subject site.
- No environmentally impaired properties were identified within one mile of the subject site which would have an adverse environmental impact to the property.
- No reportable amounts of organochlorine pesticides were present in the site soils.
- The subject property exhibits no evidence of recognized environmental conditions that would prohibit its intended use.
- No further tests or investigations were deemed warranted.

The Phase I ESA does, however, note: "Based on information available from the California State Geotracker Database for the ARCO gasoline station (#6212) located at the southwest corner of Diamond Bar Boulevard and Brea Canyon Road, shallow groundwater in the local area of the subject site flows southwesterly. The groundwater elevation beneath the ARCO gasoline station is estimated at 657 feet above mean sea level, which is approximately 20 feet below the ground surface. The groundwater beneath this gasoline station is contaminated with benzene, ethylbenzene, xylenes, methyl tert-burtyl ether (MtBE), and tert-burtyl alcohol (tBA). These fuel constituents are not anticipated to impact the site based on the position of the subject up- to cross-gradient of the gasline station and higher topographic relief. Groundwater at the site will be variable depending on bedrock and drainage features present."[22]

4.3.2 Threshold of Significance Criteria

Presented herein is the threshold of significance criteria identified by the Lead Agency relative to this topical issue. In accordance therewith, the proposed project would normally be deemed to produce a significant geotechnical hazard impact if the project or if project-related activities were to:

- Expose people or structures to potential substantial[23] adverse effects, including the risk of loss, injury, or death involving: (1) rupture of a known earthquake fault, as delineated on the most recent APEFZA map issued by the State Geologist for the area or based on other substantial evidence of a known fault; (2) strong seismic ground shaking; (3) seismic-related ground failure, including liquefaction; and/or (4) landslides.
- 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-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

[22]/ LOR Geotechnical Group, Phase I Environmental Site Assessment and Limited Site Characterization – Site D Property APN's 8714-002-900, -901, -902, and -903, 28± Acres of Vacant Land, City of Diamond Bar, Los Angeles County, California, April 30, 2004, p. 4.

[23]/ Certain terms, such as "substantial," are neither defined in CEQA nor in the State CEQA Guidelines and require a local determination whether a proposed action would meet or exceed the stated standard.

- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risk to life or property.[24]

In addition, other standards relative to the exposure of people and property to potential seismic hazards have been formulated by other agencies, published in source documents, or reflect acceptable industry standards. In accordance therewith, the proposed project would normally be deemed to produce a significant impact if the project of if project-related activities were to:

- Result in the placement of habitable structures within an active fault zone, as delineated on the APEFZA map[25] or as delineated on "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada"[26] without effective mitigation.
- Expose site occupants to a causative fault with a Maximum Movement Magnitude equal to or greater than 6.5 and a slip rate >2 millimeters per year.[27]
- Result in the placement of habitable structures in an area containing a factor of safety against liquefaction for potentially liquefiable soils of <1.3 or subject to lateral ground displacements due to liquefaction-related ground softening of >0.5 meters (1.6 feet).[28]
- Result in the placement of habitable structures in an area subject to an earthquake-induced deformation of >100 centimeters (3.3 feet) for an existing on-site landslide and/or containing an existing on-site landslide with stability factors of safety <1.5 under static conditions and 1.1 under seismic loading conditions.[29]
- Result in the placement of habitable structures in an area containing soils that have an Expansion Index >20, as determined in accordance with UBC Standard 18-2.[30]

The Lead Agency has not identified other applicable or potentially applicable standards that can appropriately be extracted from other related policy or other environmental documents and used as the basis for assessing the potential significance of project-related and cumulative geotechnical hazard impacts.

4.3.3 Impact Analysis

4.3.3.1 Construction Impacts

Geotechnical Hazards Impact 3-1*. Conversion of the project site from a vacant property to an urban use will expose site occupants to regional seismic hazards and localized geologic and geotechnical conditions. Should development occur in the absence of an understanding of those regional and local conditions, site occupants may be subjected to unacceptable geotechnical hazards.*

Level of Significance before Mitigation*. Less-than-significant impact.*

[24]/ State of California, State CEQA Guidelines, Appendix G, Section VI (Geology and Soils).
[25]/ Hart, E. W., Bryant, W.G., Special Publication 42, Fault Rupture Hazard Zones in California, California Department of Conservation, Division of Mines and Geology, 1992 (Revised 1997).
[26]/ California Department of Conservation, Division of Mines and Geology, Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada, Seismic Mapping Bulletin No. 7, April 15, 1998.
[27]/ International Conference of Building Officials, Uniform Building Code, 1997.
[28]/ California Department of Conservation, Division of Mines and Geology, Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, adopted March 13, 1997.
[29]/ *Ibid*.
[30]/ *Op. Cit*., Uniform Building Code.

The following analysis and design recommendations have been extracted from "Preliminary Geotechnical Engineering Report: Site D-Mass Grading, Walnut Valley Unified School District, Diamond Bar, California" (KFM GeoScience, January 15 2008).[31]

Based on the results of the field explorations and engineering analyses, the proposed mass grading construction is feasible from a geotechnical standpoint, provided that the recommendations contained in the preliminary geotechnical investigation are incorporated into the design plans and implemented during construction. The following considerations are reflected in the design recommendations:

- Two of the three proposed cut slopes along the southeastern margin of the site (labeled Slopes A, B, and C on Figure 4.3-10 [Project Site Geologic Map]) will expose Puente Formation bedrock exhibiting adversely oriented bedding and weak clay layers. Slopes A and B (in the existing condition) generally exhibit static Factors of Safety of about 1.5 but do not meet current code requirements for seismic stability. When graded to 2:1, however, the static Factor of Safety falls below 1.5 and shear keys with buttress fills are required to achieve the minimum Factor of Safety for static and seismic conditions.

- The central portion of the project site (identified as af/Qal on Figure 4.3-10 [Project Site Geologic Map]) is underlain by slope wash, undocumented fill, and soft alluvium to the depth explored of 16 feet. These materials are considered compressible and unsuitable for support of foundations or additional fills and should be removed to firm bedrock, grubbed of unsuitable materials, and be replaced with a properly compacted fill.

- The mid-slope segmental retaining walls, identified as "Loffel walls" on Figure 4.3-10 (Project Site Geologic Map) and Figure 4.3-12 (Remedial Grading Plan), are generally shown founded above variable height, 2:1 inclination cut slopes and supporting variable height, 2:1 inclination fill slopes. Due to the presence of unfavorably oriented bedding within the bedrock, it is recommended that cut portions of the slopes be over-excavated to intercept the critical bedding, be keyed a minimum of 4-feet below the adjacent pad grades, and be replaced with engineered fill.

- Due to the presence of potentially medium to high expansive soils in the site vicinity, the proposed commercial and residential structures should be supported on structurally designed floor slab systems incorporating thickened edges and post-tensioned reinforcing ribs established in properly moisture-conditioned and placed engineered fill. The pads will need to be maintained, re-certified every 6-months and immediately before installation of the building slabs for moisture content and compaction. In order to confirm the design of foundations and slabs, additional testing of Expansion Index and water-soluble sulphates should be performed following completion of the rough graded pads.

- The alluvium present underlying Brea Canyon Wash and the Brea Canyon Storm Drain Channel is identified by CGS as having potential for liquefaction and liquefaction-induced settlement. Because of the presence of the flood control channel, it is anticipated that the area overlying the alluvium will only be used for paved parking. Future design-level geotechnical investigation in this area should address potential liquefaction and seismic-induced settlement.

[31]/ The precise language of those recommendations should be derived from that report. Additionally, the recommendations presented in the preliminary geotechnical investigation may be replaced, modified, or otherwise altered based on the findings of a design-level geotechnical investigation.

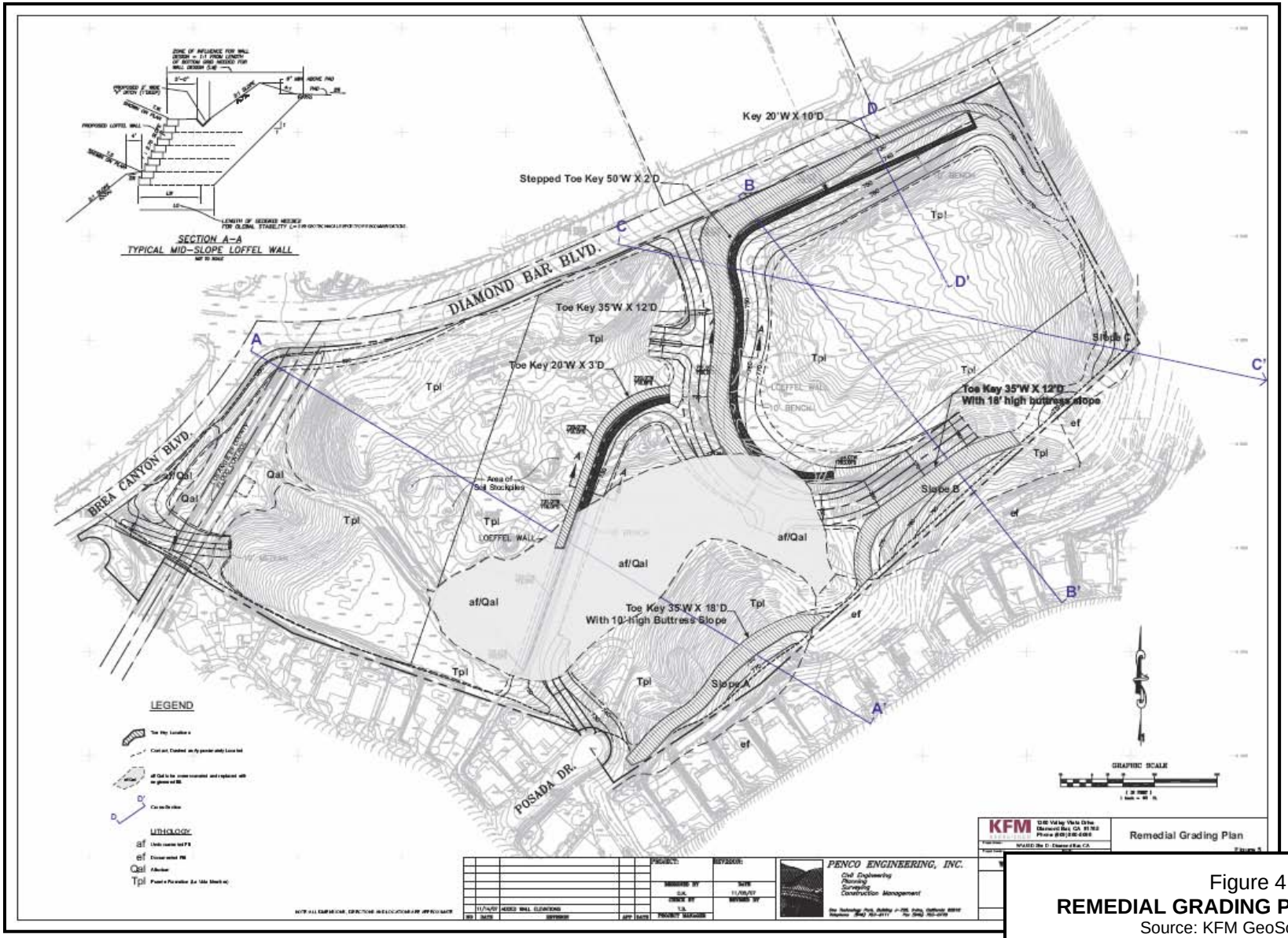


Figure 4.3-12
REMEDIAL GRADING PLAN
Source: KFM GeoScience

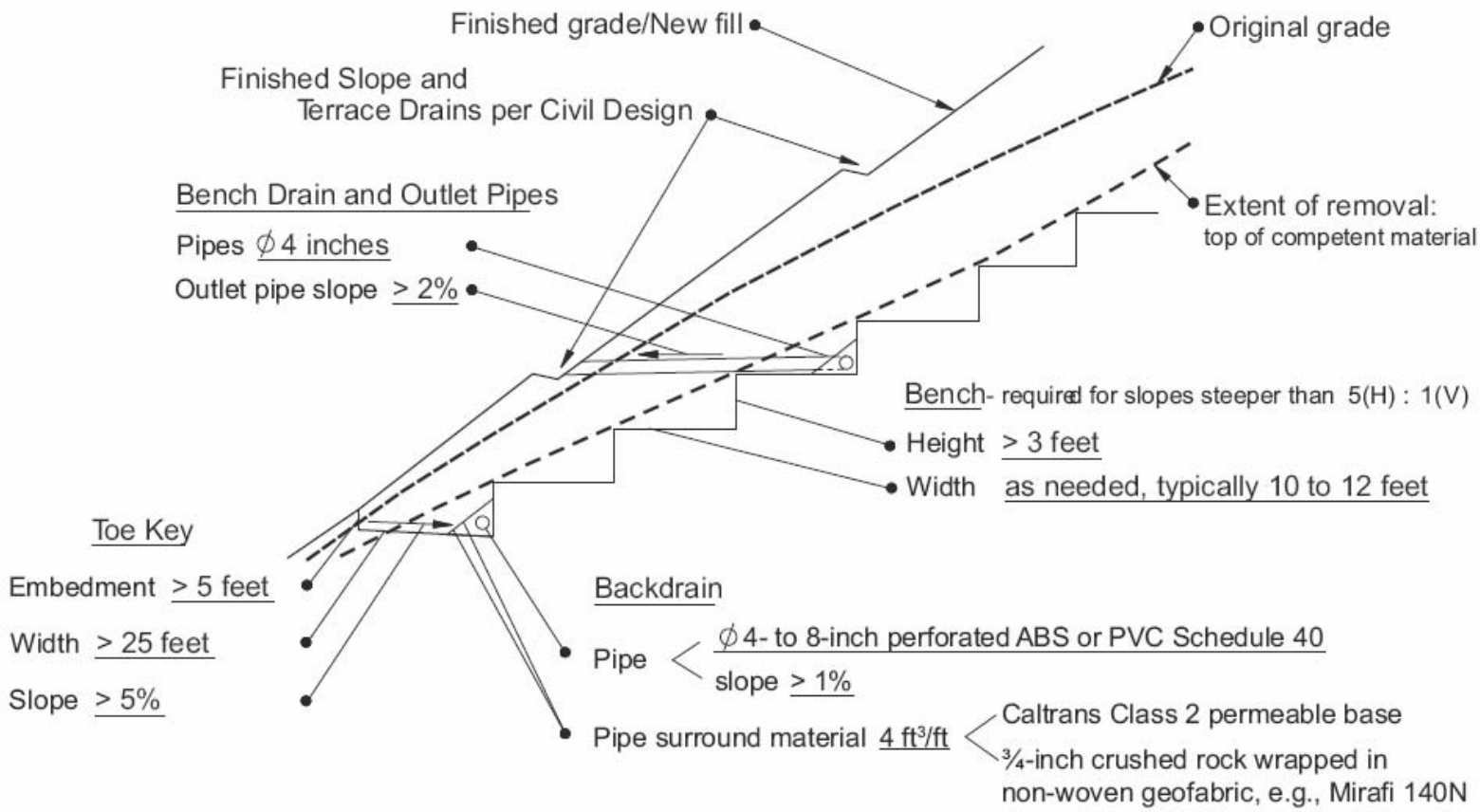


Figure 4.3-13
FILL SLOPE GRADING AND BENCHING RECOMMENDATIONS
Source: KFM GeoScience

Design Recommendations

The design recommendations presented below are based on KFM's current understanding of the project. Once the project configuration is finalized and the design is complete, a Geotechnical Engineer (or Engineering Geologist) should review the plans and specifications to evaluate if the geotechnical design recommendations have been incorporated as intended.

- Seismic Design Parameters. The seismic design of the project may be performed using criteria presented in the 2001 California Building Code (Volume 2, Chapter 16A, Divisions IV and V), using the seismic design parameters described in Table 4.3-1 (2001 California Building Code - Seismic Design Parameters).

Table 4.3-1
2001 CALIFORNIA BUILDING CODE - SEISMIC DESIGN PARAMETERS

Seismic Design Factor	Value
Seismic Zone	4
Soil Profile Type	S_D
Seismic Source / Type*	Whittier Fault / Type B
Distance to Source	2 km

Notes:
1. Faults are designated as Type A, B or C, depending on maximum moment magnitude and slip rates (Table 16A-U of 2001 California Building Code).

Source: KFM GeoScience

- Site Preparation and Earthwork. Prior to any grading activities, the surface of areas to be graded should be cleared of any existing structures, terrace drains, vegetation, trash, and debris. Site grading is not anticipated to encounter unusual excavation difficulties and it is anticipated that conventional excavation and grading equipment can be used. The following specific recommendations are provided for remedial grading of key areas.

  - ◊ The densely vegetated area in the central portion of "Site D" (identified as af/Qal) is underlain by slope wash, undocumented fill, and soft alluvium to the explored depth of 16 feet. These materials are considered compressible and unsuitable for support of foundations or additional fills and should be over-excavated to firm bedrock, grubbed of unsuitable materials, and be replaced with a properly compacted fill following specified recommendations. Following over-excavation of the unsuitable material, a subdrain should be installed in the low point of the excavated drainage course.

  - ◊ The proposed graded Slopes A and B will expose weak clay beds and will require toe shear keys and buttress fills to achieve the required static and pseudo-static Factors of Safety. A toe key 35-feet wide and 18-feet deep below the adjacent level pad will be required for Slope A. Slope B will require a toe key 35-feet wide and about 12-feet deep below the adjacent level pad. Because of the high seismic coefficient, buttress fills extending about 10-feet above the current toe for Slope A and 18-feet above the current toe for Slope B will also be required. The materials used to construct the Slope A and B buttress fills will need to achieve higher strength (c = 200 psf, ø = 36) than the general on-site fill.

The slopes should be constructed with compacted fill benched into competent bedrock as schematically shown on Figure 4.3-13 (Fill Slope Grading and Benching Recommendations).

◊ The proposed 1:1 backcuts needed to construct the toe keys and buttress fills for Slopes A and B result in temporary stability conditions that fall below the code required Factor of Safety of 1.25. To mitigate these conditions the toe keys will have to be excavated and backfilled following slot cut sequencing. For Slope A, the approximately 460-feet long toe key should be constructed in three, 150-foot long slot sequenced A-C-B. For Slope B, the approximately 380-feet long toe key should be constructed in three, 135-foot long slot sequenced A-C-B. Each slot should be backfilled above critical weak beds as determined during grading prior to initiating the subsequent slot.

◊ The proposed graded Slope C will not expose weak clay beds based on Boring B-3. Based on the slope stability analyses, the proposed slope will be stable without any remedial grading measures.

◊ The proposed 50-feet high fill slope located south of the intersection of Diamond Bar Boulevard and Crooked Creek Drive, as depicted on Cross-Section D-D' on Figure 4.3-11 (Cross-Sections A-A' through D-D'), produces a sliver fill over the natural slope. A toe key 20-feet wide and 4-feet deep is required to achieve the required static and seismic stability for the proposed fill slope. The fill slope above the key should be benched into competent material, as schematically shown on Figure 4.3-13 (Fill Slope Grading and Benching Recommendations).

◊ The areas of the segmental retaining walls, identified as Loffel walls, are located above 2:1 inclination cut slopes and supporting variable height, 2:1 fill slopes. Due to the presence of unfavorably oriented bedding and weak clay beds within the bedrock, it is recommended that cut portions of the slopes be over-excavated and keyed a minimum of 4-feet below the adjacent pad grades, and be replaced with engineered fill. The approximate key dimensions are shown on Figure 4.3-12 (Remedial Grading Plan). Additional subgrade preparation may be required by the manufacturer of the selected segmental wall system.

◊ All fill slopes steeper than 5:1 should be keyed into competent soil as indicated on Figure 4.3-13 (Fill Slope Grading and Benching Recommendations). Benching into competent material should continue as the fill progresses. All benching should be performed under the observation of the Geotechnical Engineer.

◊ Lightly loaded ancillary structures (e.g., site walls, trash enclosures, retaining walls) outside the fill areas and, therefore, located on native materials should be over-excavated to a depth of at least 1-foot below the bottom of the proposed footing or to competent soils, whichever is deeper. The excavation should extend a horizontal distance of at least 2-feet beyond the outside perimeter of the structure.

- ◊ Pavement/flatwork areas should be over-excavated to a depth of at least 1-foot below the bottom of the pavement section/flatwork or to competent subgrade, whichever is deeper.

- ◊ Disturbed soils at structural and non-structural areas will likely occur after demolition of existing site improvements and during construction activities. These soils should be over-excavated and recompacted to the total depth of the disturbed material.

- ◊ The subgrade soils exposed during excavation should be scarified to a depth of 6 inches, moisture-conditioned to at least 120 percent of optimum moisture content and compacted to at least 90 percent of the maximum dry density, as evaluated by the latest version of ASTM D1557.

- ◊ Fill should be placed in horizontal lifts not more than 8 inches in loose uncompacted thickness. In order to adequately compact the face of reconstructed fill slopes, it is strongly recommended to overbuild the slopes by 1 to 2 feet and to cut the slope back to the final configuration. If this method is not practical, the contractor must be prepared to skillfully compact the outer slope edge and face to meet the compaction requirements. The edge of the constructed slope should be placed slightly elevated and not be allowed to roll off. All fill should be moisture-conditioned to at least 120 percent of the optimum moisture content and compacted to at least 90 percent of the maximum dry density (ASTM D1557) for fills with vertical thickness of less than 45 feet and to at least 95 percent of maximum dry density for fills at depths below 45 feet and for the upper 1 foot below the pavement section. The moisture condition of the placed fill should be checked frequently and maintained or re-established as necessary during all phases of the placement of the fill.

- ◊ It is likely that oversize rocks derived from cemented layers within the Puente Formation will be encountered during the grading activities, placement of the fill, and subgrade preparation. Any oversize particles (i.e., sizes greater than 6 inches) should be disposed off site or buried in the fill as specified. The on-site soils may be re-used as compacted fill, except within the upper 5 feet below the finish grade, provided they are free of organics, deleterious materials, and debris. All fill material should comply with the oversize rock recommendations.

- ◊ In the event that fill soils are imported to meet the grading plan requirements, such fill soils should be sampled, tested, and approved by the Geotechnical Engineer prior to arrival on the site. In general, any soils imported to the site for use as fill should be predominantly granular and have an Expansion Index less than 20. Additional recommendations for site grading are provided in the preliminary geotechnical investigation.

- Expansive soils. The on-site soils are considered to possess a predominantly medium expansion potential. A significant reduction of post-construction expansion potential can be achieved by fill placement at moisture contents near 120 percent of optimum moisture content (ASTM D1557). Although there is no known economically feasible method of entirely preventing movement of expansive soils, current state-of-the-art practice in the southern California area dictates implementation of foundation designs

consisting of stiff mat foundations (e.g., post-tensioned slabs or heavily reinforced mats) which distribute differential movements over larger areas. In addition, deepened perimeter foundation embedment which acts as a moisture cut-off and limits moisture migration under the structure and increases confining stresses are beneficial to minimize the effects of expansive soils. In-grading moisture treatment and post-grading moisture maintenance of subgrade soils within the building pads are also considered critical factors in reducing post-construction movements.

Reasonable mitigation of expansive soil effects at this project site incorporating a combination of the above methods is considered feasible from a geotechnical standpoint. However, soil movements cannot be entirely precluded when building on expansive soils. Implementation of all of the following procedures is recommended to mitigate the effects of expansive soils: (1) stiffening of slab/foundation systems using post-tensioning; (2) use of deepened thickened edges to provide a moisture cut-off and confinement; (3) conditioning of fill soils by moisture addition and re-compaction; (4) maintaining moisture content of pads and re-certification of pads undeveloped longer than 6-months; and (5) the recommendations provided in the preliminary geotechnical investigation assume medium expansion potential of the foundation subgrade. Each pad should be tested before finalization and if the Expansion Index exceeds 90, lot-specific foundation and slab design should be provided.

The potential for expansion movements depends critically on maintenance of constant and uniform moisture distribution within the expansive materials. Judicious use of irrigation in close proximity to foundations and proper design of surface and subsurface drainage are considered critical to the adequate performance of foundations and slabs constructed on the project site.

- Import soils. The majority of near-surface on-site soils are not considered suitable for backfill behind retaining walls and for any applications which call for near-free draining material. Consequently, it should be anticipated that all segmental retaining wall backfill materials will likely have to be imported. Specific benchmark properties parameters for retaining wall backfill should be proposed by the manufacturer of the selected segmental wall system and be approved by the Geotechnical Engineer.

  Specific benchmark properties parameters for import fill soils for the buttress fills are provided in the preliminary geotechnical investigation. Alternatively, on-site soils reinforced with man-made fibers (e.g., "Geofibers") may be used to achieve the required strength properties for soils to be used in the buttress fills for Slopes A and B. Additionally, use of soil cement in strategic zones within the buttresses may be considered to mitigate the need for select import fill.

- Subddrainage provisions. Toe key drains should be installed at the heel of the toe keys. The toe key drains should consist of a 4-inch to 8-inch diameter perforated ABS or PVC Schedule 40 drain pipe or approved equivalent. The diameter of the pipe will depend on the length of the perforated section and the distance to the outlet pipe. The maximum length of the perforated drain pipe between discharge outlets should not exceed 200 feet, 400 feet, and 500 feet for 4-inch, 6-inch, and 8-inch diameter pipe, respectively. Multiple overlapping perforated-solid pipes may be considered to avoid using 8-inch diameter pipe. The drainage pipe should be sloped at least 1 percent towards the outlet pipe and surrounded by 4 cubic feet per foot of the Class II Permeable Material (Caltrans

Standard Specifications - Section 68) or by of ¾-inch crushed rock (Standard Specification for Public Works Construction - Section 200-1.2) wrapped in suitable non-woven filter fabric(e.g., Mirafi 140NL or approved equivalent).

Additional bench backdrains should be installed at vertical intervals of no more than 30 feet and at selected locations at the interface of bedrock and native soils or if seepage is encountered, as determined during construction by the Geotechnical Engineer. The bench backdrains should consist of a 4-inch-diameter perforated acrylonitrile butadiene styrene (ABS) or polyvinyl chloride (PVC) Schedule 40 drain pipe or approved equivalent. The maximum length of the drain pipe between discharge outlets should not exceed 200 feet. The drainage pipe should be sloped at least 1 percent towards the outlet pipe and surrounded by 3 cubic feet per foot of the Class II Permeable Material (California Department of Transportation [Caltrans] Standard Specifications - Section 68[32]), or by of ¾-inch crushed rock (Standard Specification for Public Works Construction - Section 200-1.2) wrapped in suitable non-woven filter fabric (e.g., Mirafi 140NL or approved equivalent). The outlet pipe should be sloped at least 2 percent towards suitable outlet locations.

Perforations in all drain pipes should have a maximum diameter of 0.25 inches or 3/8 inches for Class 2 Permeable Material or ¾-inch crushed rock drain material, respectively, spaced staggered 3 inches on center, and be arranged in 2 rows at a radial spacing of approximately 120 degrees. The axis of the included angle between the perforation rows should be positioned downward to form a flowline. The drain pipe should discharge through a solid pipe, sloped at least 2 percent, to appropriate outlets.

- Foundations and concrete slabs-on-grade. As indicated in the preliminary geotechnical investigation, the following recommendations have been formulated for building foundations, foundations for appurtenant structures, concrete slabs-on-grade, post-tensioned floor slabs, conventionally reinforced floor slabs, and exterior slabs.

  - ◊ Building foundations. The foundations for the proposed commercial and residential development may be supported on spread footings established in compacted fill. Grading recommendations have been provided to mitigate, albeit not eliminate, the effects of expansive soils, however, even with these measures and proper site drainage, the potential for some expansive soils-related ground movement still exists. A proper, structurally designed thickened edge post-tensioned slab with interior stiffening beams is considered an appropriate system of support for the proposed construction. The thickened edge around the perimeter of the structure should be extended at least 30 inches below the lowest adjacent grade and should be continuous to act as a moisture migration barrier to assist in minimizing of long-term changes in the moisture content of the foundation soils beneath the footprint of the buildings.

    Although the recommended post-tensioned floor slabs do not eliminate the potential for slab deflection, they provide for a strengthened, more rigid slab which tolerates differential movement with less cracking than a conventionally reinforced slab-on-grade. As a minimum, post-tensioned slabs should be designed in accordance with Post-Tension Institute design philosophy for post-

[32]/ California Department of Transportation, Standard Specifications, May 2006.

tension slabs on expansive soils (2001 California Building Code, Volume 2, Chapter 18, Division III).

The post-tension slab must be designed by a Structural Engineer to properly address the design and construction issues. Special care needs to be taken during construction to ensure that the perimeter thickened edges, as well as stiffening interior ribs, do not impede the transfer of stresses into the slab during post-tensioning.

To reduce potential for vapor transmission through the slabs, it is recommended that the concrete has a thickness of at least 5 inches, water cement ratio of 0.45 or less, and a slump of 4 inches or less. All underslab materials should be adequately compacted prior to the placement of concrete. The materials should be slightly moist and not be wetted or saturated prior to the placement of concrete. Care should be taken during placement of the concrete to prevent displacement of the underslab materials. The concrete slab should be allowed to cure properly prior to placing vinyl, hardwood, or other moisture-sensitive floor covering.

◊ Foundations for appurtenant structures. Shallow foundations for appurtenant structures (e.g., trash enclosures, perimeter walls, retaining walls less than 9 feet in height), should be designed using the geotechnical design parameters presented in the preliminary geotechnical investigation. Footings should be designed and reinforced in accordance with the recommendations of the Structural Engineer and should conform to the 2001 California Building Code. The total allowable lateral resistance can be taken as the sum of the friction resistance and passive resistance. The passive resistance values may be increased by one-third when considering wind or seismic loading. Footings should be designed and reinforced in accordance with the recommendations of the Structural Engineer and should conform to the requirements of the 2001 California Building Code.

◊ Concrete slabs-on-grade. The recommendations provided in the "Site Preparation and Earthwork" section of this report and in this section are intended to provide a firm bearing subgrade to help reduce the occurrence of cracks and fissures in concrete and to reduce their horizontal separation and vertical offset. However, it should be understood that the concrete slabs may still crack due to structural design or detailing, curing, construction execution or during its use even when these recommendations are implemented. Therefore, in order to minimize the cracking of the concrete, the reinforcement, placement of control joints, concrete mix, and curing specifications should be designed by the Structural Engineer and Concrete Specialist.

◊ Post-tensioned floor slabs. Good performance of post-tensioned slabs is dependant on both the proper design and proper installation. It is, therefore, recommended that a responsible Structural Engineer provide the design drawings, construction specifications. The Structural Engineer should be present during the post-tensioning of the slabs to verify that appropriate procedures described in the project specifications are followed to facilitate a proper transfer

of stresses into the slab. For slabs with thickened edges and interior reinforcing ribs, the stress transfer may be impeded if incorrect procedures are followed.

In order to provide a benchmark for evaluating the performance of the post-tensioned system and to evaluate the quality of installation, it is recommended that a floor-level survey of the slab surface be taken within 1 week of the post-tensioning of the slab.

◊ Conventionally reinforced floor slabs. For design of concrete slabs, presumably for appurtenant structures, a modulus of subgrade reaction (k) of 140 pounds per cubic inch may be used. Floor slabs should be designed and reinforced in accordance with the Structural Engineer's recommendations. The minimum reinforcement to reduce separation and offset of concrete cracks should consist of No. 4 reinforcing bars spaced at 16 inches on-center, each way, placed in the middle one-third of the section. Reinforcement should be properly placed and supported on "chairs." Welded wire mesh reinforcement is not recommended.

◊ Exterior slabs. Exterior slabs should be placed on subgrade prepared in accordance with the recommendations provided in the preliminary geotechnical investigation. As a minimum for exterior walkways, it is recommended that narrow strip concrete slabs (such as sidewalks) be reinforced with at least No. 4 reinforcing bars placed longitudinally at 16 inches on center. Wide exterior slabs should be reinforced with at least No. 4 reinforcing bars placed 16 inches on center, each way. The reinforcement should be extended through the control joints to reduce the potential for differential movement. To mitigate the adverse effects of expansive soils, the exterior slabs should be designed with thickened edges at least 12 inches deep to provide a moisture cut-off to stabilize the moisture content distribution under the slab. The provided recommendations are intended to reduce the occurrence of the cracks but not to eliminate them. In order to minimize the cracking of the concrete, the reinforcement, placement of control joints, concrete mix, and curing specifications should be designed by the Structural Engineer and Concrete Specialist.

- Foundation observations. To evaluate the presence of satisfactory foundation subgrade materials at design elevations, footing excavations should be observed to be clean of loosened soil and debris before placing steel or concrete and probed for soft areas. If soft or loose soils or other unsatisfactory materials are encountered, such materials should be removed and replaced with compacted fill prior to pouring the footing.

  During construction, the Geotechnical Engineer should specifically test and accept the slab subgrade for each lot. The testing should consist of verification of compaction, moisture content, and of sampling and testing of near-surface soils for expansion and corrosion potential. If Expansion Index greater than 90 is determined, a lot-specific foundation design should be provided. Since, at the time when concrete is placed at the construction site, the presence of the Geotechnical Engineer representative may not be continuous, it is the Construction Manager's responsibility to request the inspection and testing from the Geotechnical Engineer.

- Retaining walls. It is understood that two extensive segmental retaining walls ranging from about 10-feet to 23-feet high are proposed within slopes separating the three pads.

Although not shown on the plans, it is assumed that other relatively short concrete masonry unit (CMU) retaining walls, less than about 6-feet high, will likely be incorporated into the project's development plans. The following sections provide recommendations for retaining wall designs.

◊ MSE earth retaining wall design. The following recommendations are provided for mechanically supported earth (MSE) segmental retaining wall (SRW) identified as "Loffel walls." MSE walls are proposed for walls up to about 23-feet high supporting 2:1 fill slopes. Considering that many different MSE wall systems are available, the actual design of the wall is typically provided by the specialty MSE wall contractor, and the design is reviewed and accepted by the Geotechnical Engineer. The MSE wall designer should consider the following geotechnical parameters and recommendations in the design:

- The spacing and type of reinforcing geogrids, the MSE wall facing, and the internal stability of the wall should be evaluated and designed by a specialty contractor/supplier.

- MSE walls may be supported on a subgrade prepared in accordance with the recommendations in the preliminary geotechnical investigation.

- Allowable bearing capacity for MSE wall founded on competent native bedrock or engineered fill and keyed in a minimum of 3 feet below adjacent grade is 3,000 pounds per square foot (psf) or 2,000 psf, respectively (this value may be increased by 10 percent for each foot of embedment up to 6000 psf). The allowable bearing value may be increased by one-third for transient live loads from wind or seismicity. An adverse descending slope may exist in front of some of the MSE walls; consequently, additional reductions in bearing capacity may be appropriate.

- If an open face wall system (i.e., free draining) is used, only select very low or low expansive soils may be used within 7 feet of the wall facing. If closed face wall system is selected, in addition to the select material zone behind the facing of the wall, a drainage zone behind the facing of the wall as generally outlined in the preliminary geotechnical investigation must be installed. If suitable, alternatively a 12-inch wide zone of a ¾-inch crushed rock or Caltrans Class II Permeable Material separated from the backfill material by a non-woven geotextile (e.g., Mirafi 160N or approved equivalent) may be used.

- The shear strength of the general backfill material behind the zones should be taken as cohesion of 100 psf, friction angle of 30°, and unit weight of 120 pcf.

- The shear strength of the underlying bedrock material should be taken as cohesion (c) of 400 psf, friction angle of 30°, and unit weight of 120 pcf.

- The internal MSE wall design for the seismic condition should be based on horizontal seismic coefficient of 0.31. The global MSE wall design should be based on horizontal seismic coefficient of 0.239.

- ♦ As a preliminary guideline the following table provides a minimum distance to the critical global slip surface behind the toe of the wall. This distance is shorter than the necessary length of the geogrid reinforcement since the critical slip surface typically intersects several layers of the geogrids at the heel of the wall. For preliminary evaluations, it is anticipated that the geogrids will be at least 7 feet longer then the indicated distance.

- ♦ The target Factor of Safety of 1.5 and 1 should be used for global stability assessment for static and pseudostatic conditions, respectively. The internal stability of a MSE wall should be evaluated based on the manufacturer's guidelines. The Geotechnical Engineer should provide a final review and approval of the MSE wall design.

◊ CMU retaining wall design. The following recommendations are provided for CMU retaining walls less than 6-feet in height. Such retaining walls may be supported on spread footings constructed in accordance with the recommendations in the preliminary geotechnical investigation. If a drainage system is not installed, the wall should be designed to resist also the hydrostatic pressure. Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the walls. Walls supporting on-site materials that are free to rotate at least 0.04 radians (deflection at the top of the wall of at least 0.04 x H) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The effect of any surcharge (dead or live load) located within a 1:1 plane drawn upward from the heel of the wall footing should be added to the lateral earth pressures.

◊ Seismic lateral earth pressure. Retaining walls higher than 6 feet should be designed to support a seismic active pressure. The recommended seismic active pressure distribution on the wall is an inverted triangular with the maximum pressure equal to 19H pounds per square foot (psf) and 50H psf for level grade and 2:1 backslope, respectively, where H is the wall height in feet.

◊ Retaining wall backfill and drainage. Approved import material will likely be used for the retaining wall backfill. Suitable material should have a Sand Equivalent of about 30, an Expansion Index of less than 20, and fines content (passing #200 sieve) of less than 15 percent. The suitability of the on-site and/or import material for retaining wall backfill should be verified at the time of construction. This select backfill should extend at least 2.5 feet behind the back side of the wall.

If the surrounding native materials are granular and relatively permeable, the granular backfill may be densified by water jetting. However, this condition is not anticipated at this site. Otherwise the backfill should be moisture-conditioned to at least optimum moisture content and compacted in loose horizontal lifts not more than 8 inches in uncompacted thickness to at least 90 percent of the maximum dry density as evaluated by the latest version of ASTM D1557. The backfill should be capped with a concrete swale/slab or with at least 12 inches of relatively impervious clayey material and sloped to prevent ponding of water.

Retaining walls should be constructed to limit potential for hydrostatic pressure built-up behind the wall. If irrigation or precipitation infiltration is expected, adequate drainage is essential to provide a free-drained backfill condition to limit hydrostatic buildup behind the wall. In order to control efflorescence and/or staining on the air side of the wall due to percolation of the water through the wall, the wall should be appropriately waterproofed. Adequate drainage and waterproofing behind the wall may be provided by a backdrain consisting of geosynthetic drainage composite such as TerraDrain, MiraDrain, or approved equivalent, properly placed against the entire backside of the wall. The drainage composite should be connected to a 4-inch-diameter perforated ABS or PVC Schedule 40 drain pipe or approved equivalent. The drain pipe should be sloped at least 2 percent and surrounded by 1 cubic foot per foot of the Class II Permeable Material (Caltrans Standard Specifications - Section 68), or by of ¾-inch crushed rock (Standard Specification for Public Works Construction ("Greenbook") - Section 200-1.2) wrapped in suitable non-woven filter fabric (e.g., Mirafi 140NL or approved equivalent). Perforations in the drain pipe should have a maximum diameter of 0.25 inches or ⅜ inches for Class II Permeable Material or ¾-inch crushed rock drain material, respectively, spaced 3 inches on center, and be arranged in 2 rows at a radial spacing of approximately 120 degrees. The axis of the included angle between the perforation rows should be positioned downward to form a flowline. The drain pipe should discharge through a solid pipe to appropriate outlets (such as the storm drain system or through the wall). The maximum length of the drain pipe between discharge outlets should not exceed 200 feet. Alternatively, weep holes through the wall, at least 3-inches in diameter, spaced no more than 10 feet apart, may be considered.

- Temporary and trench excavations. All trench excavations should be performed in accordance with California Department of Industrial Relations, Division of Industrial Safety (CalOSHA) regulations. The on-site soils may be considered a Type C soil, as defined the current CalOSHA soil classification. Sloughing/raveling of exposed soil intervals should be anticipated. All applicable excavation safety requirements and regulations (including CalOSHA requirements) should be met.

  - ◊ Unsurcharged excavations. Temporary short-term (generally less than 5 days) unsurcharged excavations shallower than 4 feet may be excavated with vertical sides. Sides of temporary, unsurcharged, excavation deeper than 4 feet should be sloped back at an inclination of 1.5:1 or flatter. Where space for sloped sides is not available, shoring will be necessary.

  - ◊ Surcharge setback recommendations. Stockpiled (excavated) materials should be placed no closer to the edge of a trench excavation than a distance defined by a line drawn upward from the bottom of the trench at an inclination of 1:1.5 but no closer than 4 feet. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes. Alternatively, a shoring system may be designed to allow reduction in the setback distance.

  The Engineering Geologist should observe the excavation progress so that appropriate modifications to the excavation design may be recommended, if necessary due to encountered conditions differing from the design assumptions.

- Appurtenant structures within influence of fill slopes. Due to the presence of expansive high plastic clayey soils, the outer 5 to 10 feet of fill slopes will be susceptible to gradual long-term slope movements. Although these slope movements cannot be eliminated because gravity cannot be controlled, it is important to design the structures located within the zone of influence of these slopes to either resist or accommodate such movements. These movements generally diminish after 10 to 15 years while the majority of the movements occur within the initial 5 to 10 years. The cumulative magnitude of such movements can be up to several inches. This phenomena can manifest itself as downslope translation and rotation of rear yard walls and corner pilasters, separation between the top-of-slope walls and abutting walls, flatwork cracking and separations, separations between the flatwork and pool coping, tilting of swimming pools, pulling away of patio slabs from the building, and separations and cracking of sideyard walls. Although the list of potentially adverse near-slope effects is rather long, a proper design can successfully accommodate such movements with no effect on the use of the facilities. The following list provides guidance for installation and operation of appurtenances located within 30 feet or within a distance equivalent to ⅓ of the fill slopes height, whichever is greater, to the top of the slope.

    - ◊ Off-the-shelf designs for backyard improvements should not be utilized. Each element should be specifically designed with full incorporation of the design considerations described herein.
    - ◊ Top-of-slope walls should be offset at least 5 feet from the top of the slope.
    - ◊ The fill slope should be vegetated with drought-resistant, deep-rooted vegetation and judiciously irrigated.
    - ◊ To reduce the movements of top-of-slope walls, the walls should be supported on a grade beam embedded at least 18 inches below the adjacent subgrade and founded on 8-foot deep 16-inch diameter pilasters spaced 8 to 12 feet. If movements on the order of 2 inches can be tolerated, the top-of-slope wall may be founded on continuous footing at least 30 inches deep.
    - ◊ The wall adjacent to the top-of-slope walls (i.e., sideyard walls should not be connected to the top-of-slope wall to allow for as-needed movement and rotation of the top-of-slope wall without creating an unsightly separation).
    - ◊ Large continuous flatwork areas in the backyards are not recommended as they will likely crack and the cracks will shift, offset, and separate and become unsightly. The patios should be broken up into smaller areas separated by landscaping that readily accommodates lateral soil movements.
    - ◊ Whenever possible, abutting of flatwork and other appurtenances (e.g., patio-wall, pilaster-planter wall) should be eliminated and the elements should be separated by landscaping.
    - ◊ Pool coping should be designed to accommodate/mask lateral soil movements.
    - ◊ The homeowners should be notified of the likelihood of top-of-slope movements and mandated to retain qualified professionals for design of any lot improvements.

- Asphalt concrete pavement. As indicated in the preliminary geotechnical investigation, the following recommendations have been formulated for subgrade preparation, and pavement design.

    - ◊ Subgrade preparation. As described in the preliminary geotechnical investigation, pavement subgrade should be moisture-conditioned, scarified, and compacted

just prior to placement of the base course to 95 percent of maximum dry density. Positive drainage of the pavement and subgrade areas should be provided since moisture infiltration into the subgrade may decrease the life of pavements. Curbing located adjacent to paved areas should be founded in the compacted subgrade soils (not the aggregate base) in order to provide a cutoff to reduce water infiltration from adjacent irrigated parkways into the base course under the pavement.

◊ Pavement design. The required pavement surface and base thicknesses will depend on the expected wheel loads and volume of traffic (Traffic Index). Assuming that the pavement subgrade will consist of the on-site or comparable soils compacted as recommended, pavement structural sections provided in the preliminary geotechnical investigation may be used for design.

The pavement structural sections were established using Caltrans design criteria, an assumed R-value of 25, and the assumed Traffic Indices. Given the extensive proposed grading and the likelihood that intermixing of on-site soils will occur, confirmatory R-value tests on the subgrade soils during grading should be performed to verify the recommended design sections.

The base course should meet the specifications for Class II Aggregate Base as defined in Section 26 of Caltrans' Standard Specifications. Alternatively, the base course could meet the specifications for untreated base materials as defined in Section 200-2 of the "Standard Specifications for Public Works Construction"[33] (Greenbook). The base course should be compacted to at least 95 percent of the maximum dry density (ASTM D1557).

- Pavement construction observation. The preparation of the pavement subgrade and the placement of the pavement section should be observed by the Geotechnical Engineer. Careful observation is recommended to evaluate that the pavement subgrade is uniformly compacted and the recommended pavement and base course thicknesses are achieved and that good construction procedures are used.

- Drainage control. Presented herein is general information regarding the control of surface water. The control of surface water is essential to the satisfactory performance of any building construction and site improvements. Surface water should be controlled so that conditions of uniform moisture are maintained beneath the structure, even during periods of heavy rainfall. The following recommendations are considered minimal.

  ◊ Ponding and areas of low flow gradients should be avoided.
  ◊ Paved surfaces should be provided with a gradient of at least 1 percent sloping away from improvements.
  ◊ Unpaved areas (e.g., lawn) should be provided with a drainage gradient of at least 2 percent away from structures.
  ◊ Bare soil (e.g., planters) within 5 feet of the structure should be sloped away from the improvement at a gradient of 5 percent.
  ◊ Positive drainage devices (such as graded swales, paved ditches, and/or catch basins) should be employed to accumulate and to convey water to appropriate discharge points.

[33]/ BNi Building News, Standard Specifications for Public Works Construction, 14th Edition, 2006.

- ◊ Concrete walks and flatwork should not obstruct the free flow of surface water.
- ◊ Brick flatwork should be sealed by mortar or be placed over an impermeable membrane.
- ◊ Area drains should be recessed below grade to allow free flow of water into the basin.
- ◊ Enclosed raised planters should be sealed at the bottom and provided with an ample flow gradient to a drainage device. Recessed planters and landscaped areas should be provided with area inlet and subsurface drain pipes.
- ◊ Planters should not be located adjacent to the structure. If planters are to be located adjacent to the structure, the planters should be positively sealed, should incorporate a subdrain, and should be provided with free discharge capacity to a drainage device.
- ◊ Planting areas at grade should be provided with positive drainage. Wherever possible, the grade of exposed soil areas should be established above adjacent paved grades. Drainage devices and curbing should be provided to prevent runoff from adjacent pavement or walks into planted areas.
- ◊ Gutter and downspout systems should be provided to capture discharge from roof areas. The accumulated roof water should be conveyed to off-site disposal areas by a pipe or concrete swale system.
- ◊ Landscape watering should be performed judiciously to preclude either soaking or desiccation of soils. The watering should be such that it just sustains plant growth without excessive infiltration. Sprinkler systems should be checked periodically to detect leakage and they should be turned off during the rainy season.

- Soil corrosion. The corrosion potential of the on-site materials to buried steel and concrete was evaluated. Laboratory testing was performed on representative soil samples to evaluate pH, minimum resistivity, and soluble sulfate content. General recommendations to address the corrosion potential of the on-site soils are provided below. If additional recommendations are desired, it is recommended that a corrosion specialist be consulted. The corrosion potential of the on-site soils should be verified during construction for each encountered soil type. Imported fill materials should be tested to confirm that their corrosion potential is not more severe than assumed.

  Laboratory tests indicate that the potential of sulfate attack on concrete in contact with the on-site soils is "negligible" based on 2001 California Building Code (Table 19-A-4). Due to the presence of high plastic clays and experience in the area, concrete mix with Type V cement and maximum water/cement ratio of 0.45 should be used unless additional corrosion testing of building pad subgrade soils are performed following grading.

General Site Grading Recommendations

The following general site grading recommendations have been extracted from "Preliminary Geotechnical Engineering Report: Site D-Mass Grading, Walnut Valley Unified School District, Diamond Bar, California" (KFM GeoScience, January 15 2008).[34]

[34]/ The precise language of those recommendations should be derived from that report. Additionally, the recommendations presented in the preliminary geotechnical investigation may be replaced, modified, or otherwise altered based on the findings of a design-level geotechnical investigation.

This section provide general information regarding the site grading. Site grading operations should conform with applicable local building and safety codes and to the rules and regulations of those governmental agencies having jurisdiction over the subject construction. The grading contractor is responsible for notifying governmental agencies, as required, and the Geotechnical Engineer at the start of site cleanup, at the initiation of grading, and any time that grading operations are resumed after an interruption. Each step of the grading should be accepted in a specific area by the Geotechnical Engineer and, where required, should be approved by the applicable governmental agencies prior to proceeding with subsequent work. The following site grading recommendations should be regarded as minimal.

- Prior to grading, existing vegetation, trash, surface structures, and debris should be removed and disposed off the project site at a legal dumpsite. Any existing utility lines or other subsurface structures which are not to be utilized should be removed, destroyed, or abandoned in compliance with current governmental regulations.

- Subsequent to cleanup operations and prior to initial grading, a reasonable search should be made for subsurface obstructions and/or possible loose fill or detrimental soil types. This search should be conducted by the contractor, with advice from and under the observation of the Geotechnical Engineer.

- Prior to the placement of fill or foundations within the building area, the site should be prepared in accordance with the recommendations presented in the preliminary geotechnical investigation. All undocumented fill or disturbed soils and colluvium within the building areas should be removed and processed as recommended by the Geotechnical Engineer.

- Special attention should be given to compaction along the outer edges of the fill slopes as the fill is brought up. It is recommended that fill slopes be overbuilt by 1-2 feet and trimmed back to expose a uniform compacted core. If this method is not practical, the contractor must be prepared to skillfully compact the outer slope edge and face to meet the compaction requirements. It may be possible to backroll the fill slopes every 3 vertical feet with a short shank sheepsfoot roller or suitable alternate as the fill slope is constructed. Additional rolling and trimming may be required at the completion of the slope construction. The edge of the constructed slope should be placed slightly elevated and not be allowed to roll off. Compaction and processing should be such that 90 percent of maximum density (ASTM D1557) at the slope face is achieved.

  Even slopes which are properly compacted and maintained are not totally immune to local surficial slumping or erosion and may require periodic maintenance.

- The exposed subgrade and/or excavation bottom should be observed and approved by the Geotechnical Engineer for conformance with the intent of the recommendations presented in the preliminary geotechnical investigation and prior to any further processing or fill placement. Actual encountered conditions may warrant grading and/or subgrade preparation beyond the extent recommended and/or anticipated in the preliminary geotechnical investigation.

- Where building construction will not follow immediately after grading, the finished pad grade should be re-certified every 6 months and immediately before construction. A

consideration may be given to placement of a minimum of 6-inch protective soil cover to help maintain pad moisture.

- On-site inorganic granular soils that are free of debris or contamination are considered suitable for placement as compacted fill. Any rock or other soil fragments greater than 3 inches in size should not be used within 5 feet of the foundation subgrade.

Observation and field tests should be performed during grading by the Geotechnical Engineer in order to assist the contractor in obtaining the proper moisture content and required degree of compaction. Wherever, in the opinion of the Geotechnical Engineer, an unsatisfactory condition is being created in any area, whether by cutting or filling, then the work should not proceed in that area until the condition has been corrected.

Design Review and Construction Monitoring

Geotechnical review of plans and specifications is of paramount importance in engineering practice. The poor performance of many structures has been attributed to inadequate geotechnical review of construction documents. Additionally, observation and testing of the subgrade will be important to the performance of the proposed development. The following sections recommendations relative to the review of construction documents and the monitoring of construction activities.

- Plans and specifications. The design plans and specifications should be reviewed and approved by the Geotechnical Engineer prior to bidding and construction, as the geotechnical recommendations may need to be re-evaluated in the light of the actual design configuration and loads. This review is necessary to evaluate whether the recommendations contained in the preliminary geotechnical investigation have been incorporated into the project plans and specifications as intended.

- Construction monitoring. Site preparation, removal of landslides and unsuitable soils, locating of backdrains, assessment of imported fill materials, fill placement, foundation installation, and other site grading operations should be observed and tested. The soils exposed during the construction may differ from that encountered in the test borings. Continuous observation by the Geotechnical Engineer during construction allows for evaluation of the soil conditions as they are encountered, and allows the opportunity to recommend appropriate revisions where appropriate.

Provided that the recommendations contained in the preliminary geotechnical investigation are incorporated into the design plans and implemented during construction, t he proposed mass grading construction is feasible from a geotechnical standpoint. The Applicant has committed to undertaking each of the recommendations presented in the preliminary geotechnical investigation. As such, those recommendations are part of the proposed project, such that it is assumed that the design, construction, and operation of the proposed project will occur in conformity and compliance therewith.

Although not specifically required based on the absence of an identified significant effect, a project condition (Condition of Approval 3-1) has been formulated in order to ensure that each of the recommendations presented in the geotechnical investigation are incorporated into the design, development, and operation of the proposed project. In addition, in accordance with City requirements, the Applicant shall provide: (1) a detailed plan showing the location, planned

depth, and design of the recommended caissons/tiebacks along with structural calculations supporting their design with geotechnical input from the Geotechnical Engineer and similar plans for the planned retaining walls; and (2) design plans for the geogrid-stabilized slope. Further design-level review will be conducted by the City Engineer prior to the issuance of grading plans. Since none of the threshold of significance criteria would be exceeded, the identified impact would be less than significant and no further mitigation is recommended or required.

4.3.3.2 Operational Impacts

Geotechnical Hazards Impact 3-2*. During the life of the project, structures and other improvements constructed on the property will be subject to periodic ground shaking resulting from seismic events along earthquake faults located throughout the region.*

Level of Significance before Mitigation*. Less-than-significant impact.*

Based on the findings of the project's preliminary geotechnical investigation, the proposed project is feasible from a geotechnical perspective, provided that the recommendations presented in that investigation are incorporated into the project's design, construction, and operation. The Applicant has committed to undertaking each of the recommendations presented in the preliminary geotechnical investigation. As such, those recommendations are part of the proposed project, such that it is assumed that the design, construction, and operation of the proposed project will occur in conformity and compliance therewith.

In addition, design and development activities will occur in conformance with UBC, CSBC, and associated requirements. Compliance with those requirements will ensure that potential impacts from seismically-induced ground motion will be effectively reduced a less-than-significant level.

Although not specifically required based on the absence of an identified significant environmental effect, a project condition (Condition of Approval 3-1) has been formulated in order to ensure that each of the recommendations presented in the preliminary geotechnical investigation are incorporated into the design, development, and operation of the proposed project. Since none of the threshold of significance criteria would be exceeded, the identified impact would be less than significant and no further mitigation is recommended or required.

4.3.3.3 Cumulative Impacts

Geotechnical Hazards Impact 3-3*. Los Angeles County is located within a seismically active region. Since earthquakes have historically occurred throughout the region and can be expected to occur in the future, development activities that occur throughout the region, including their occupants and users, will remain subject to seismic forces.*

Level of Significance before Mitigation*. Less-than-significant impact.*

Those geotechnical impacts identified herein, including those affecting the southern California area as a whole, are generally site specific and project specific in nature. Implementation of the proposed project would, therefore, not result in any significant cumulative geotechnical impacts affecting or potentially affecting other off-site areas. Similarly, implementation of other related projects would neither result in any further project-related geotechnical impacts nor increase the severity of those impacts addressed herein.

Adequate control measures have been formulated by State and local governmental entities to ensure that all public and private structures are constructed and maintained in recognition of site-specific, area-specific, and regional geologic, geotechnical, seismic, and soils conditions. Compliance with applicable UBC and CSBC standards and associated permit-agency requirements will mitigate any potential cumulative impacts to below a level of significance. Since none of the threshold of significance criteria would be exceeded, the identified impact would be less than significant and no project conditions or mitigation measures are recommended or required.

4.3.4 Project Conditions and Mitigation Measures

Conditional of Approval

- **Project Condition 3-1**. Prior to the issuance of grading and building permits, the Applicant shall demonstrate, to the satisfaction of the City Engineer, that each of the recommendations contained in the project's preliminary geotechnical investigation and in any supplemental reports as may be prepared by the Applicant's Geotechnical Engineer or by others have been incorporated into the project's design, development, and operation. The project shall be constructed, operated, and maintained in accordance with those recommendations and with such additional geologic, geotechnical, seismic, and soils recommendations as may result from further analyses that may be presented to, imposed, or adopted by the City.

Mitigation Measures

- No mitigation measures have been identified by the Lead Agency.

4.3.5 Significant Unavoidable Adverse Effects

The approval, construction, occupancy, use, and habitation of the proposed project will not result in any significant unavoidable adverse project-related or cumulative geologic, geotechnical, seismic, soils, or hazardous materials impacts. The project is not located on a site that is included on any of the lists compiled pursuant to Section 65962.5 of the CGC.

4.4 HYDROLOGY AND WATER QUALITY

The Applicant has submitted and the Lead Agency has independently reviewed a site-specific and project-specific study providing information concerning the site's existing hydrologic and water quality setting. That study, entitled "Preliminary Drainage Report for Site 'D' Improvements at Intersection of Diamond Bar Boulevard and Brea Canyon Road, Diamond Bar, California" (PENCO Engineering, Inc., February 7, 2008, revised April 6, 2009), is included in Appendix E (Preliminary Hydrology and Water Quality Analysis) herein.

4.4.1 Environmental Setting

4.4.1.1 Regulatory Setting

Federal Clean Water Act

The Federal Water Pollution Control Act, more commonly known as the Clean Water Act (CWA), requires National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants to waters of the United States (WoUS) from any point source. The United States Environmental Protection Agency's (USEPA) regulations require that municipal separate storm sewer system (MS4) discharges to surface waters be regulated by a NPDES permit. Under the implementing regulations, storm water pollution must be controlled to the maximum extent practicable (MEP).

The USEPA has delegated to the State Water Resources Control Board (SWRCB) the authority for the implementation of the State's NPDES program, where it is administered by the nine regional water quality control boards (RWQCBs). The project site is located within the jurisdiction of the Regional Water Quality Control Board, Los Angeles Region (LARWQCB).

Water bodies not meeting water quality standards are deemed "impaired" and, under Section 303(d) of the CWA, are placed on a list of impaired waters for which a Total Maximum Daily Load (TMDL) must be developed for the impairing pollutant(s). Section 303(d) listed waters represent those waters for which effluent limitations are not sufficient to meet water quality standards. The project site is located in the Diamond Bar Creek watershed, a portion of the San Jose Creek Subwatershed of the San Gabriel River watershed. Diamond Bar Creek conveys storm water runoff in a northwesterly direction toward San Jose Creek. As indicated in Table 4.4-1 (San Gabriel River Watershed 303[d] Listed Waters), various reaches of San Jose Creek are on the Section 303(d) list due to algae, coliform, toxicity, and metals.

Federal Emergency Management Agency

The Federal Emergency Management Agency's (FEMA) flood insurance rate maps (FIRM) identify those areas located within the 100-year flood boundary, termed "Special Flood Hazard Areas" (SFHAs). A 100-year flood does not refer to a flood that occurs once every 100 years but refers to a flood level with a one percent chance of being equaled or exceeded in any given year. The SFHAs are subdivided into insurance risk rate zones. Areas between the 100-year and 500-year flood boundaries are termed "moderate flood hazard areas." Areas located outside the 500-year flood boundary, are termed "minimal flood hazard areas."

Table 4.4-1
SAN GABRIEL RIVER WATERSHED 303(D) LISTED WATERS

303(d) Listed Water/Reach	Impairment
San Gabriel River Reach 1 (Estuary to Firestone)	Abnormal fish histology Algae Coliform Toxicity
San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam)	Coliform Copper, dissolved Lead Zinc, dissolved
San Jose Creek (San Gabriel Confluence to Temple Street)	Algae Coliform
San Jose Creek (Temple Street to 1-10 at White Avenue)	Algae Coliform

Source: Regional Water Quality Control Board, Los Angeles Region

As illustrated in Figure 4.4-1 (Portion of FIRM No. 0637C1725F), the project site is located in "Zone X," defined as those areas determined to be outside the 0.2 percent annual chance floodplain. No portion of the project site is, therefore, located within a designated SFHAs.

Water Quality Control Plan – Los Angeles Region

The LARWQCB has jurisdiction over all coastal drainages flowing to the Pacific Ocean between Rincon Point (on the coast in western Ventura County) and the eastern Los Angeles County line, the drainages of five coastal islands, and all coastal waters within three miles of the continental and island coastlines. The LARWQCB's 1994 "Water Quality Control Plan – Los Angeles Region" (Basin Plan)[1] designates beneficial uses for surface and ground waters, sets narrative and numerical water quality objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy, and describes implementation programs to protect all waters in the region.

For the larger water bodies within the region, the Basin Plan typically designates specific beneficial uses and sets forth specific quantitative and narrative criteria for water quality pollutants. The Basin Plan's beneficial uses, in combination with water quality objectives (WQOs), form water quality standards, mandated for all water bodies throughout the State under the Porter-Cologne Water Quality Act (Porter-Cologne). Designated beneficial uses for San Jose Creek (Hydrologic Units 405.41 and 405.51) include Municipal and Domestic Supply (MUN) and Water-Contact Recreation (REC1) (potential beneficial use), GWR (Ground Water Recharge), REC2 (Non-Water-Contact Recreation), and Warm Freshwater Habitat (WARM) (intermittent beneficial use), and Wildlife Habitat (WILD) (existing beneficial use).[2] Under the tributary rule, the same set of beneficial uses would likely be applicable to the regulation of discharges to Diamond Bar Creek.

Referencing the County's "Development Planning for Storm Water Management: A Manual for the Standard Urban Storm Water Mitigation Plan," water quality assessments conducted by the LARWQCB have identified impairment of a number of water bodies in Los Angeles County. The

[1]/ California Regional Water Quality Control Board, Los Angeles Region, Water Quality Control Plan – Los Angeles Region, adopted June 13, 1994.
[2]/ *Ibid.*, Table 2-1, Beneficial Uses of Inland Surface Waters, p. 2-13.

beneficial uses of certain water bodies identified in these assessments are either impaired or threatened to be impaired. Pollutants found causing impairment include: heavy metals, coliform, enteric viruses, pesticides, nutrients, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, organic solvents, sediments, trash, debris, algae, scum, and odors. The LARWQCB, therefore, considers storm water and urban runoff discharges to be significant sources of pollutants that may be causing, threatening to cause, or contributing to the impairment of the water quality and beneficial uses of the receiving water bodies in Los Angeles County.[3]

General Municipal Separate Storm Sewer System NPDES Permit

To comply with the CWA, on August 9, 2007, the LARWQCB adopted Order No. R4-2007-0042 and issued the fourth-term General NPDES permit (NPDES No. CAS004001)[4] for discharges to the municipal separate storm sewer system (MS4) in Los Angeles County to Los Angeles County, the Los Angeles County Flood Control Division (Principal Permittee), and 84 Los Angeles County cities (Co-Permittees). The MS4 permit details requirements for new development and significant redevelopment projects, including specific sizing criteria for treatment Best Management Practices (BMPs).

To implement the requirements of the MS4 permit, the Principal Permittee and Co-Permittees must implement and enforce the provisions of the Stormwater Quality Management Program (SQMP) to control water quality of discharges from MS4s. The objective of the SQMP is to reduce pollutants in urban storm water discharges to the MEP in order to attain WQOs and to protect the beneficial uses of receiving waters in the County. The requirements of the SQMP are divided into various categories, including development planning, development construction, and construction inspection activities.

In accordance with the MS4 permit and the SQMP, the development planning category of the SQMP requires that new development projects and significant redevelopment projects shall prepare a storm water/urban runoff pollution control plan specifying the BMPs that will be implemented with the project to reduce the discharge of pollutants in storm water to the MEP and to protect receiving water quality. Pursuant to the MS4 permit, project-specific runoff water quality control plans must implement BMPs that are consistent with the standard urban storm water mitigation plan (SUSMP) requirements of the MS4 permit. These requirements are described and explained in the County's "Manual for the Standard Urban Storm Water Mitigation Plan"[5] (SUSMP Manual), as adopted by the County in September of 2002 and subsequently approved by the LARWQCB.

The SUSMP Manual outlines the necessary BMPs that must be incorporated into design plans for new development, including housing developments of 10 units or more. The emphasis of the MS4 and SUSMP requirements is first pollution prevention through education, public outreach, planning, and implementation of source control BMPs and then structural and treatment control BMPs. The post-construction treatment control BMPs must meet certain criteria specified by

[3]/ Los Angeles County Department of Public Works, Development Planning for Storm Water Management: A Manual for the Standard Urban Storm Water Mitigation Plan, September 2002, pp. 1-1 and 1-2.

[4]/ California Regional Water Quality Control Board, Los Angeles Region, Order No. 01-182, NPDES Permit No. CAS004001, Waste Discharge Requirements for Municipal Storm Water and Urban Runoff Discharges within the County of Los Angeles, and the Unincorporated Cities Therein, Except the City of Long Beach, December 13, 2001, amended on September 14, 2006 by Order R4-2006-0074 and on August 9, 2007 by Order R4-2007-0042.

[5]/ *Op. Cit.*, Development Planning for Storm Water Management: A Manual for the Standard Urban Storm Water Mitigation Plan, September 2002.

the SUSMP, including specified design criteria and other selection factors based upon pollutants of concern expected from a project site and any impairment of the project's receiving waters.

Two of the most important requirements of the SUSMP are the specific treatment and design sizing criteria for BMPs (SUSMP Manual, Appendix A). These criteria require that developments shall contain BMPs to infiltrate or treat the storm water runoff (volume or flow rate) generated from 0.75 inches of rainfall over 24 hours (determined to represent the 85th percentile of storm in Los Angeles County). The SUSMP also includes the following eight general requirements: (1) maintain pre-development peak storm water runoff discharge flows where increases in flows or rates will result in increased potential for downstream erosion; (2) conserve natural areas; (3) minimize storm water pollutants of concern; (4) protect slopes and channels; (5) provide storm drain system stenciling and signage; (6) properly design outdoor material storage areas; (7) properly design trash storage areas; and (8) provide proof of ongoing BMP maintenance.

Under the provisions of the NPDES permit, the following specific requirements, designed to reduce the impact of development on natural areas, have been established for single-family hillside homes: (1) conserve natural areas; (2) protect slopes and channels; (3) provide storm drain system stenciling and signage; (4) divert roof runoff to vegetated areas before discharging unless the diversion would result in slope instability; and (5) direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.[6] Projects requiring SUSMPs (e.g., 10+ home subdivisions) are required to submit a drainage concept and storm water quality plan. Details of those facilities and those measures identified to mitigate impacts on water quality are to be shown on the improvement plans and reviewed as part of those plans.[7]

Post-development peak storm water runoff discharge rates shall not exceed estimated pre-development levels for developments where an increased peak storm water discharge rate may result in a foreseeable increased potential for downstream erosion.

Construction Activity NPDES Permit Requirements

Pursuant to Section 402(p) of the CWA, the SWRCB has issued a Statewide general NPDES permit for storm water discharges from construction sites (NPDES No. CAS000002)[8] (Construction General Permit). Under this permit, discharges of storm water from construction sites with a disturbed area of one or more acres are required to either obtain individual NPDES permits for storm water discharges or be covered by the Construction General Permit.

Each applicant under the Construction General Permit must ensure that a storm water pollution prevention plan (SWPPP) is prepared prior to grading and implemented during construction. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction. The Principal Permittees and Co-Permittees are further required to conduct monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of pollutants.

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[6]/ *Ibid*., pp. 1-4, 2-2, and 3-11.
[7]/ *Ibid*., p. 2-1.
[8]/ California Water Resources Control Board Resolution No. 2001-046; Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System General Permit for Stormwater Discharges Associated with Construction Activity, adopted by the SWRCB on April 26, 2001.

Consistent with the requirements of the Construction General Permit, the MS4 permit contains provisions that impose requirements on local agencies to not only require the preparation of a SWPPP prior to issuance of a grading permit but to inspect construction sites for compliance with the SWPPP and Construction General Permit. These provisions also provide further guidance with respect to implementation of construction BMPs, including the following: (1) treatment controls or structural BMPs; (2) construct-related materials, wastes, spills or residues shall be retained at the project site to avoid discharge to streets, drainage facilities, receiving waters or adjacent properties; and (3) erosion from slopes and channels shall be controlled by implementing an effective combination of BMPs.

The Construction General Permit also addresses authorized construction-related non-storm water discharges. Under the general permit, non-storm water discharges necessary for the completion of construction projects, including irrigation of vegetative erosion control measures, pipe flushing and testing, street cleaning and dewatering, are allowed, provided that they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials on site and so long as they comply with the non-storm water discharge requirements of the Construction General Permit. These non-storm water discharge requirements mandate that non-storm water discharges shall: (1) be infeasible to eliminate; (2) comply with BMPs which must be set forth in the SWPPP; (3) not cause or contribute to a violation of water quality standards; and (4) are permitted by the local RWQCB.

Los Angeles County Department of Public Works

The Los Angeles basin is periodically subject to devastating floods resulting in substantial property damage. Such damage is intensified by debris flows resulting from the destruction to affected watersheds caused by major brush fires. In recognition of and in response to those conditions, the Los Angeles County Department of Public Works (LACDPW) operates and maintains those major flood control facilities located throughout the County. The LACDPW maintains those flood control facilities that are part of the County's flood control system but provides no review, management, or on-going maintenance of private facilities.

The LACDPW's "Hydrology/Sedimentaion Manual" establishes the County's hydrologic design procedures and policies on levels of flood protection. On January 31, 2005, the County adopted the LACDPW's "Interim Peak Flow Standard,"[9] applicable to "discretionary priority projects" (e.g., housing developments of 20 or more units) located in areas tributary to the San Gabriel River and certain other areas. Under those standards, the County stipulates that all post-development runoff from a 2-year, 24-hour storm and 50-year capital storm shall not exceed the pre-development peak-flow rate. These interim standards are intended to protect against increased streambed erosion resulting from post-development increases in peak flows and flow durations and changes in the riparian habitat resulting from increases in the low flows and flow durations from development.

As indicated in the LACDPW's "Hydrology/Sedimentation Manual," the Los Angles Basin has been divided into zones, identified as "debris (sediment) potential area" (DPA), that yield similar volumes of sediment under similar conditions. As illustrated in Figure 4.4-2 (Yorba Linda Quadrangle 50-Year 24-Hour Isohyet Map), as extracted from the County "Hydrology/ Sedimentation Manual," the project site is depicted as being located generally within the vicinity

[9]/ County of Los Angeles, Department of Public Works, Interim Peak Flow Runoff Criteria for New Development, January 31, 2005, as contained in correspondence from Donald L. Wolfe, Acting Direct of Public Works to Jonathon Bishop, Executive Officer, Los Angeles Regional Water Quality Control Board.

of 6.2-inch to 6.4-inch 50-year, 24-hour isohyetal line.[10] The site's DPA is classified as "DPA-6" and the site's predominant soil classification is described as "Altamont Clay Loam" (002).[11]

The Brea Canyon Storm Drain Channel, which traverses the project site, is under the jurisdiction of the Los Angeles County Flood Control District (District), a division of the LACDPW. The County has developed "guidelines" for uses of the District's rights-of-way by other parties for "overbuilding open channels and covering storm drains to create surface areas, to identify and resolve areas of incompatibility, and to provide the basic requirements for specific proposals that will maximize the long-range benefits to the public and the District."[12] As indicated therein, for operating rights-of-way, overbuilding will be allowed provided the District's needs for flood control and all existing foreign uses authorized by the District are protected or provided for. Proposed uses must accommodate recreational, utility, transportation, public housing, and open space requirements that are programmed for the channel in question.[13]

County guidelines indicate that, in order to optimize safety and ensure the hydraulic and structural integrity of a particular flood control channel, the District and the ACOE have a number of operational requirements that must be met by every joint-use proposal. Those requirements include, but may not be limited to, the following: (1) Access into a covered channel is required every 500 feet; this access is usually of a pedestrian nature and could be in the form of manholes and ladders; (2) Adequate clearance inside the channel (a minimum height of channel wall) must be maintained throughout the channel for the transportation of heavy equipment used in channel repair, bridge, and bridge abutment repair; and (3) In the event the channel is covered, adequate ventilation must be provided to prevent the build-up of noxious or volatile fumes; a short reach of the channel shall remain uncovered, thereby aiding channel maintenance and repair.[14]

City of Diamond Bar General Plan

The City's General Plan contains numerous policies that address, either directly or indirectly, "hydrology and water quality" and that may be applicable to the proposed project. Those policies include, but are not necessarily limited to, the following:

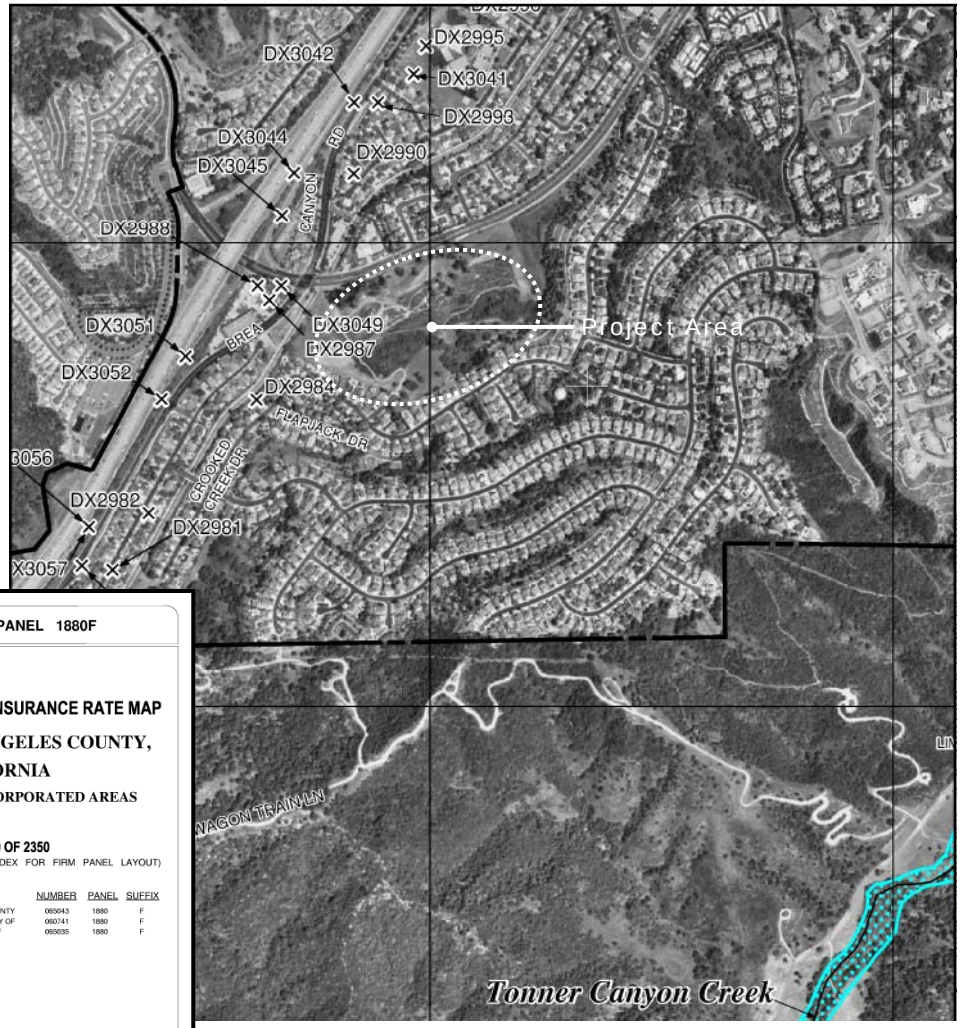
[10]/ Los Angeles County Department of Public Works, Hydrology/Sedimentation Manual, Hydraulic/ Water Conservation Division, June 1993, Appendix A.; Los Angeles County Department of Public Works, Hydrologic Method – Addendum to the 1991 Hydrology/Sedimentation Manual, June 2002, Appendix C (50-Year 24-Hour Rainfall Isohyetal Maps) and Appendix G (Soil Classification Maps), 2003.

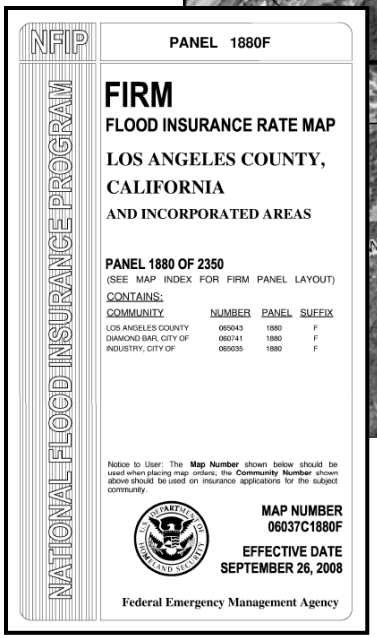
[11]/ The soil numbers indicated are to be used in accordance with the 1991 "Hydrology/Sedimentation Manual" (Appendix D) which describes the application of the soil numbers as it applies to hydrology. Runoff coefficient curves are provided for each soil types, representing the soil infiltration characteristics from a study performed by the LACDPW.

[12]/ Los Angeles County Department of Public Works, Los Angeles County Flood Control District, Guidelines for Overbuilding and Air Rights, revised June 2004, p. 2.

[13]/ The District is developing a Property Use Plan (PUP) for each major flood control channel to ensure that the channel rights-of-way are developed in a manner compatible with the adjoining properties and yield the maximum benefit to the local community. Proposals should be in conformance with the PUP; however, if a desired use is different, the project proponent will be required to submit a change (amendment) to the PUP for approval. An amendment may be acceptable, provided the change for a particular reach of channel is between successive streets and approved by the local planning agency. In addition, all environmental requirements need to be fulfilled to the satisfaction of the Lead Agency.

[14]/ *Ibid*., pp. 6-7.





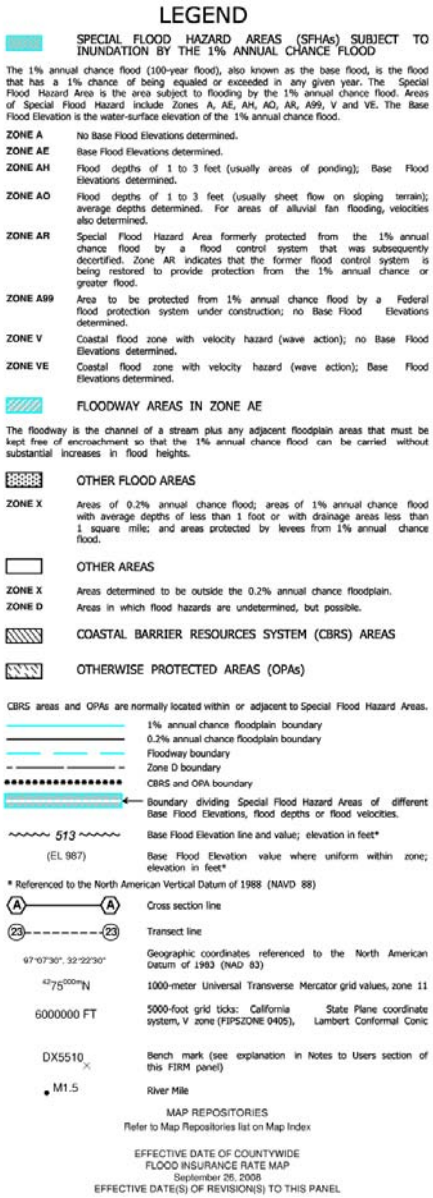
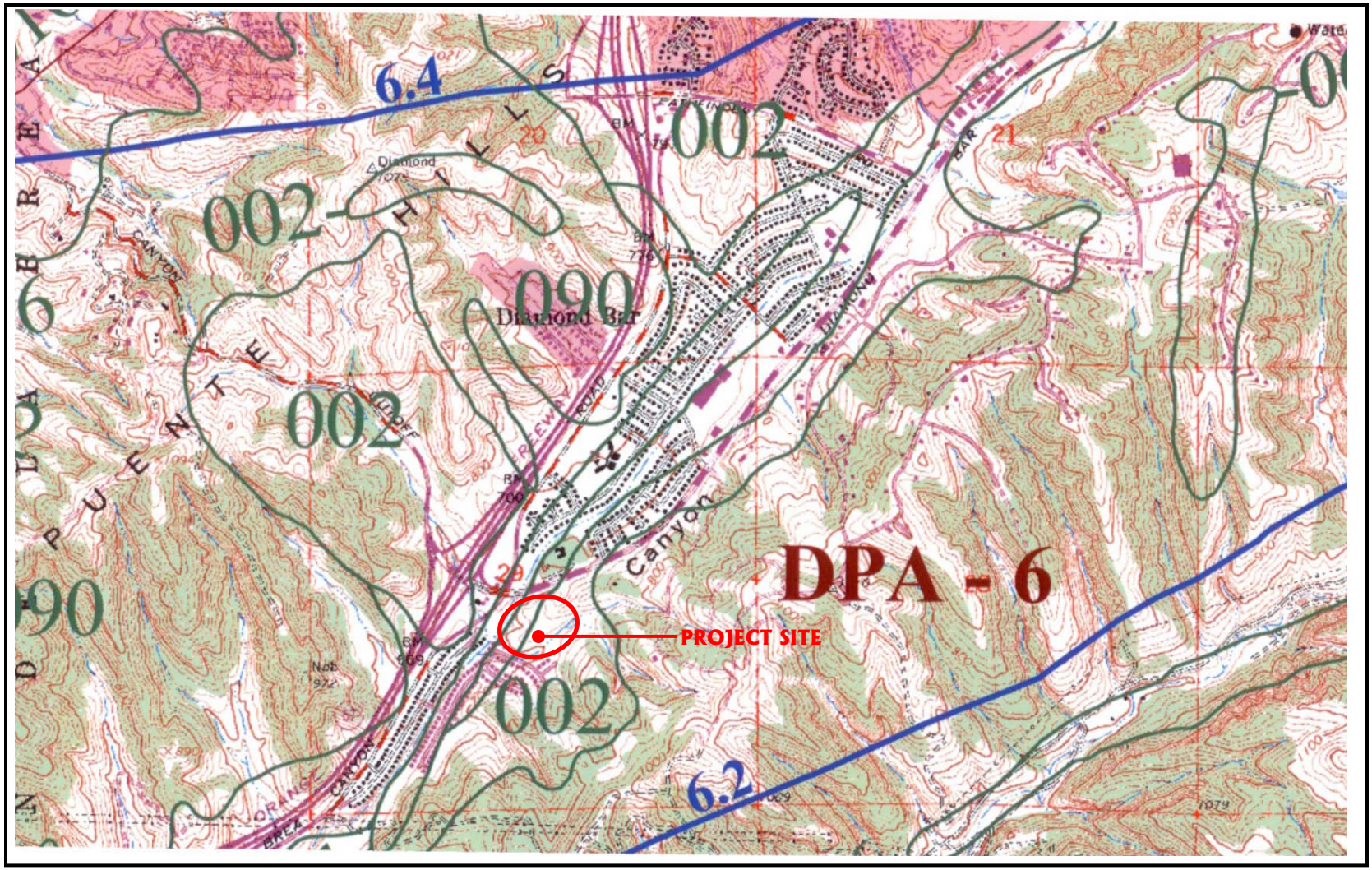


Figure 4.4-1
PORTION OF FIRM NO. 0637C1880F
Source: Federal Emergency Management Agency



LEGEND

— — — SOIL CLASSIFICATION AREA
····· DEBRIS POTENTIAL AREA
(K) RAINFALL ZONE
—12— 50-YEAR ISOHYET (MAX. 24-HOUR AMOUNT)

Figure 4.4-2
YORBA LINDA QUADRANGLE
50-YEAR 24-HOUR ISOHYET MAP
Source: Los Angeles County Department of Public Works

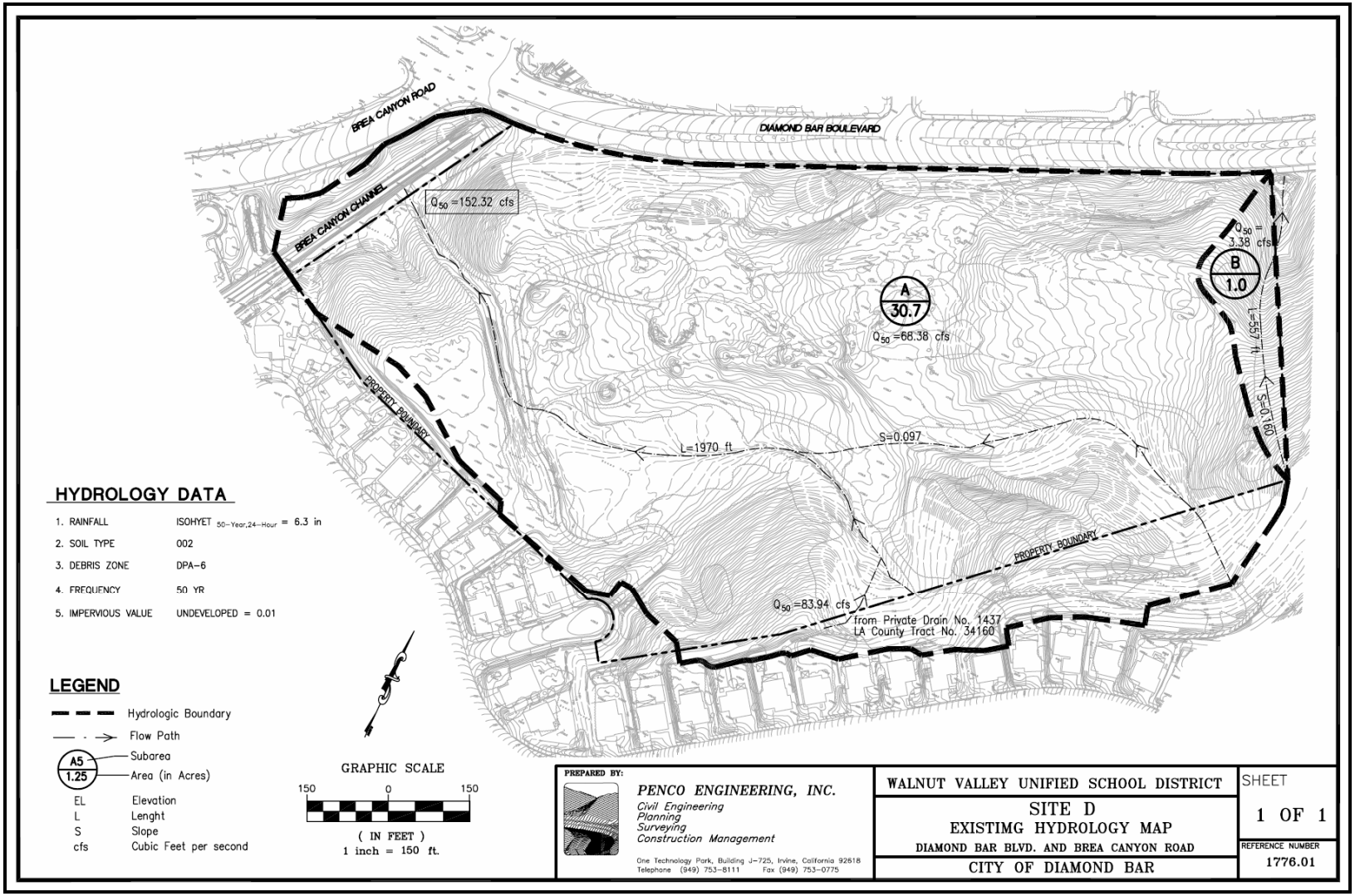


Figure 4.4-3
EXISTING HYDROLOGY MAP
Source: PENCO Engineering, Inc.

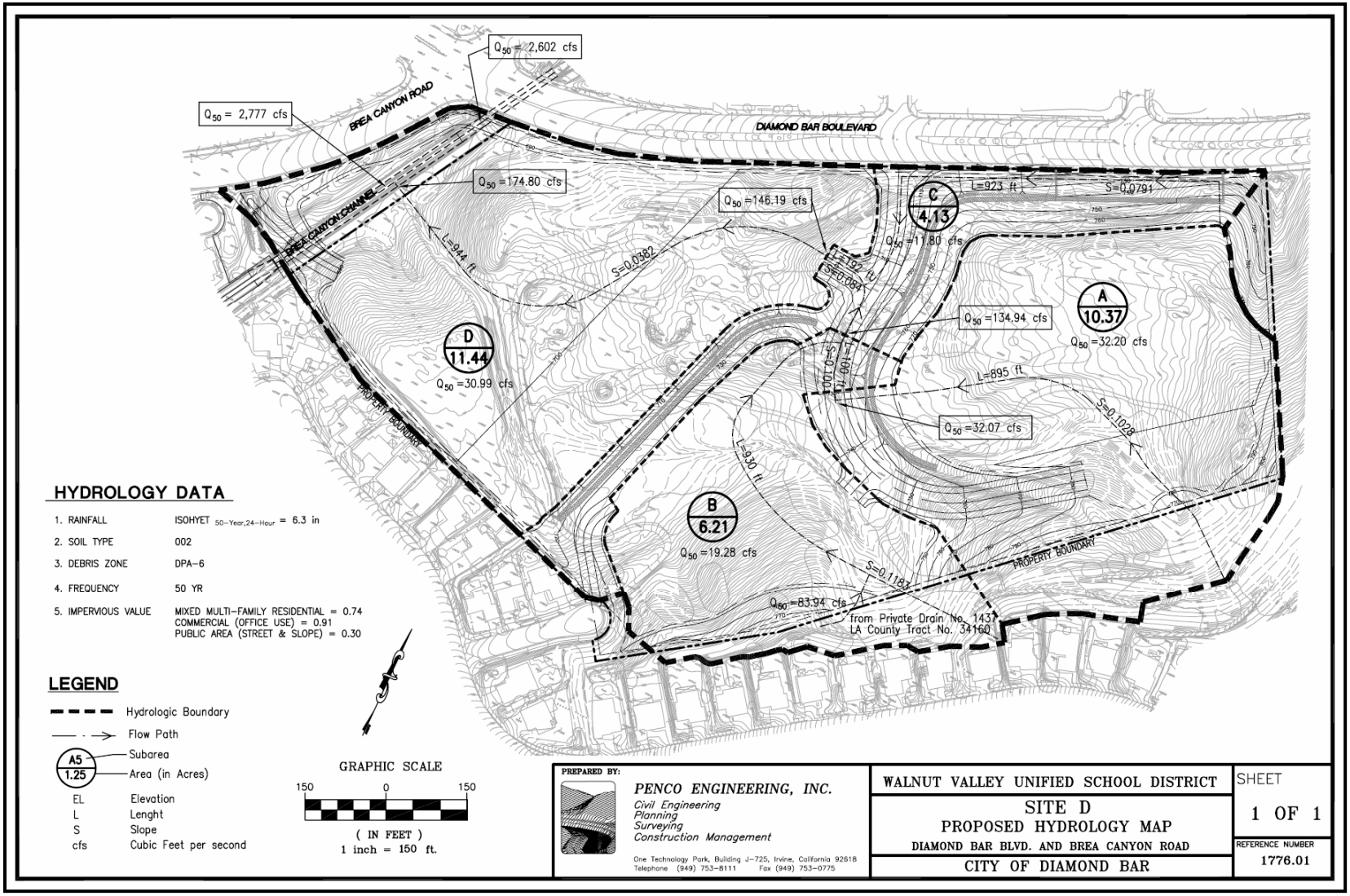


Figure 4.4-4
PROPOSED HYDROLOGY MAP
Source: PENCO Engineering, Inc.

- Minimize the potential for loss of life, physical injury, property damage, public health hazards, and nuisances from the effects of a 100-year storm and associated flooding (Objective 1.2, Public Health and Safety Element).
- Where applicable, as a prerequisite to new development or the intensification of existing development, ensure that a drainage study has been completed by a qualified engineer, certifying that the proposed development will be adequately protected, and that implementation of the development proposal will not create new downstream flood hazards (Strategy 1.2.1, Public Health and Safety Element).
- Require development to meet the requirements of the County's urban storm water discharge permit (Strategy 1.8.3, Public Health and Safety Element).

City of Diamond Bar Municipal Code

Division 5 (Storm Water and Urban Runoff Pollution Control) in Title 8 (Health and Safety) of the Municipal Code contains the "Storm Water Management and Discharge Control Ordinance." As stipulated in Section 8.12.1630 (Purpose and Intent) therein, the purpose of this ordinance is to ensure the future health, safety and general welfare of the citizens of the City and the water quality of the receiving waters of the County and surrounding coastal areas by: (1) reducing pollutants in storm water discharges to the maximum extent practicable; (2) regulating illicit connections and illicit discharges and thereby reducing the level of contamination of storm water and urban runoff into the MS4; and (3) regulating non-storm water discharges to the MS4.

The ordinance sets forth the requirements for the construction and operation of certain commercial development, new development, and redevelopment and other projects which are intended to ensure compliance with the storm water mitigation measures prescribed in the current version of the SUSMP approved by the LARWQCB. As required under Section 8.12.1695 (Standard Urban Storm Water Mitigation Plan Requirements for New Development and Redevelopment Projects) of the Municipal Code, certain new development and redevelopment projects, including those involving ten or more unit homes (includes developments of single-family homes, condominiums and apartments), if subject to discretionary project approval, shall require a storm water mitigation plan that complies with the most recent SUSMP and the current municipal NPDES permit. As specified therein:

(1) An applicant for a new development or a redevelopment project identified in paragraph a of this section shall incorporate into the applicant's project plans a storm water mitigation plan ("SWMP"), which includes those best management practices necessary to control storm water pollution from construction activities and facility operations, as set forth in the SUSMP applicable to the applicant's project. Structural or treatment control BMPs (including, as applicable, post-construction treatment control BMPs) set forth in project plans shall meet the design standards set forth in the SUSMP and the current municipal NPDES permit.

(2) If a project applicant has included or is required to include structural or treatment control BMPs in project plans, the applicant shall provide verification of maintenance provisions. The verification shall include the applicant's signed statement, as part of its project application, accepting responsibility for all structural and treatment control BMP maintenance until such time, if any, the property is transferred.

(3) A new single-family hillside home development or redevelopment shall include mitigation measures to: (a) Conserve natural areas; (b) Protect slopes and channels; (c) Provide storm drain system stenciling and signage; (d) Divert roof runoff to vegetated areas before discharge unless the diversion would result in slope instability; and (e) Direct surface flow to vegetated areas before discharge unless the diversion would result in slope instability.

(4) Numerical design criteria. Post-construction treatment control BMPs for all projects must incorporate, at a minimum, either a volumetric or flow based treatment control design standard, or both, as identified below to mitigate (infiltrate, filter or treat) storm water runoff:

a. Volumetric treatment control BMP.
   1. The 85th percentile 24-hour runoff event determined as the maximized capture storm water volume for the area, from the formula recommended in urban runoff quality management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998); or
   2. The volume of annual runoff based on unit basin storage water quality volume, to achieve 80 percent or more volume treatment by the method recommended in California Stormwater Best Management Practices Handbook-Industrial/ Commercial, (1993); or
   3. The volume of runoff produced from a 0.75-inch storm event, prior to its discharge to a storm water conveyance system; or
   4. The volume of runoff produced from a historical-record based reference 24-hour rainfall criterion for "treatment" (0.75-inch average for the Los Angeles County area) that achieves approximately the same reduction in pollutant loads achieved by the 85th percentile 24-hour runoff event.

b. Flow based treatment control BMP.
   1. The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or
   2. The flow of runoff produced from a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the county; or
   3. The flow of runoff produced from a rain event that will result in treatment of the same portion of runoff as treated using volumetric standards above.

As further required under Section 8.12.1695(c), no discretionary permit may be issued for any new development or redevelopment project until the authorized enforcement officer confirms that the project plans comply with the applicable storm water mitigation plans and enumerated design criteria requirements.

4.4.1.2 Regional Setting

The project site is located in the Los Angeles-San Gabriel Hydrologic Unit (Hydrologic Unit [HU] 405.00) which covers most of Los Angeles and a portion of southeastern Ventura Counties. This drainage area totals 1,608 square miles. The Los Angeles River, San Gabriel River and Ballona Creek are the major drainage systems in this area.

The San Gabriel River receives drainage from a 689 square mile area of eastern Los Angeles County and has a main channel length of approximately 58 miles; its headwaters originate in the San Gabriel Mountains with the East, West, and North Forks.[15] The river empties to the Pacific Ocean at Los Angeles/ Orange Counties boundary in the City of Long Beach. The main tributaries of the San Gabriel River are Big and Little Dalton Wash, San Dimas Wash, Walnut Creek, San Jose Creek, Fullerton Creek, and Coyote Creek.[16]

As indicated in the "County of Los Angeles All-Hazard Mitigation Plan," flooding has been identified as a "high priority hazard" in Los Angeles County."[17] As further indicated therein: "Over the last 125 years, the average annual rainfall in Los Angeles is 14.9 inches. But the term 'average' means very little as the annual rainfall during this period has ranged from only 4.35 inches in 2001-2002 to 38.2 inches in 1883-1884. In fact, in only fifteen of the past 125 years, has the annual rainfall been within plus or minus 10% of the 14.9 inch average. And in only 38 years has the annual rainfall been within plus or minus 20% of the 14.9 inches. This makes the Los Angeles basin a land of extremes in terms of annual precipitation."[18]

4.4.1.3 Local Setting

As illustrated in Figure 4.4-3 (Existing Hydrology Map), the site is mostly comprised of natural hillside and canyons. Only a small area at the eastern portion of the property drains northerly to Diamond Bar Boulevard, following its natural flow path to an existing low point. The runoff from the rest of the area flows westerly to the Brea Canyon Storm Drain Channel, owned and operated by the LACDPW.

Currently, the Brea Canyon Storm Drain Channel is a trapezoidal concrete-lined drainage facility at this reach. Under Diamond Bar Boulevard, a double 8-foot by 8-foot reinforced concrete box (RCB) serves as roadway culvert. Between the existing channel and Brea Canyon Road, an area of about 0.93 acres, owned by the City, is draining to this channel.

The 50-year storm event creates approximately 68.38 cubic feet per second (cfs) of stormwater runoff from the west portion of the site, including the slope area adjacent to the existing residential area abutting the southern portion of the property. In addition to the existing runoff generated from the site, an existing 33-inch diameter reinforced concrete pipe (RCP), located to

[15]/ As directed by the United States Congress in July 2003 (P.L. 108-042), the National Park Service (NPS) is conducting a "special resource study" of portions of the San Gabriel River and its tributaries, extending from the City of Santa Fe Springs, eastward to the San Bernardino County line, and northward to encompass the San Gabriel Mountains. The purpose of this special resource study is to determine whether that area or a portion thereof is eligible to be designated as a unit of the national park system. Initial scoping meetings have been conducted by the NPS but no formal actions have yet to be taken.

[16]/ California Regional Water Quality Control Board, Los Angeles Region, State of the Watershed – Report on Surface Water Quality, June 2000, p. 1.

[17]/ County of Los Angeles (Dimensions Unlimited, Inc.), County of Los Angeles All-Hazard Mitigation Plan, Version 1.0, October 2004, Section 4a, p. 126.

[18]/ *Ibid*., Section 4a, p. 182.

the south of the project site, conveys off-site runoff of 83.94 cfs. The sum of these two discharges totals 152.32 cfs at the Brea Canyon Storm Drain Channel. In addition, on the eastern portion of the site, runoff of 3.38 cfs from a 50-year storm event is currently discharged to Diamond Bar Boulevard.

4.4.2 Threshold of Significance Criteria

Presented herein is the threshold of significance criteria identified by the Lead Agency relative to this topical issue. In accordance therewith, the proposed project would normally be deemed to produce a significant hydrology and/or water quality impact if the project or if project-related activities were to:

- Violate any water quality standards or waste discharge requirements.
- Substantially[19] deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on the site or off the site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on the site or off the site.
- Create or contribute to runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Substantially degrade water quality.
- 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.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flow.
- 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.
- Result in inundation by seiche, tsunami, or mudflow.[20]

Pursuant to Article 13241 of Porter-Cologne, "[e]ach regional board shall establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of the beneficial uses and the prevention of nuisance." In accordance therewith, the proposed project would normally be deemed to create a significant hydrologic and water quality impact on the environment if the project or if project-related activities were to:

- Violate any water quality objectives promulgated by the LARWQCB and contained in that water quality control plan applicable to the project site.

[19]/ Certain terms, such as "substantially," are neither defined in CEQA nor in the State CEQA Guidelines and require a local determination whether a proposed action would meet or exceed the stated standard.
[20]/ *Op. Cit*., State CEQA Guidelines, Appendix G, Section VIII (Hydrology and Water Quality).

The Lead Agency has not identified other standards that can appropriately be extracted from other related policy or other environmental documents and used as the basis for assessing the potential significance of project-related and cumulative hydrologic and water quality impacts.

4.4.3 Impact Analysis

4.4.3.1 Construction Impacts

Hydrology and Water Quality Impact 4-1*. Construction activities may increase sediment discharge and/or result in the introduction of hazardous materials, petroleum products, or other waste discharges that could impact the quality of the area's surface and ground water resources if discharged to those waters.*

Level of Significance before Mitigation*. Less-than-significant impact.*

As illustrated in Figure 2-6 ("Site D" Specific Plan – Conceptual Grading Plans), development of the proposed project would involve approximately 390,000 cubic yards of earth movement to create the project's major building pads and circulation system.

During and following site grading, existing vegetation and any other debris or unsuitable fill materials would be cleared and removed. Extensive bare ground surface area would be exposed to potential erosional forces such as wind and rain. If proper controls are not implemented during the grading phases, siltation from exposed loose soils could be blown or washed off the site and into Brea Canyon Road Storm Drain Channel and Diamond Bar Creek. If substantial amounts of such materials reach this watercourse, significant impacts on water quality could occur, particularly if water is flowing at the time and the materials are transported with those flows.

In accordance with the provisions of the Construction General Permit, prior to the commencement of grading operations, the Applicant is required to prepare a storm water pollution prevention plan (SWPPP). Water quality protection is ensured through preparation and implementation of the SWPPP in terms of the BMPs designed to ensure that grading and construction operations which involve the transport, storage, use, and disposal of a variety of construction materials, including regulated materials (such as diesel and gasoline fuels to power heavy earth-moving equipment, paints, glues, solvents, lubricants, and other liquid and solid materials used in various construction and maintenance processes), comply with certain requirements regarding proper storage, handling and transport of these materials. BMPs within the SWPPP also set out the means by which any accidental releases of hazardous materials would be contained, cleaned up, and reported to regulatory authorities.

In addition, pursuant to the MS4 Permit, the Applicant is further obligated to prepare a SUSMP, including appropriate BMPs and guidelines to reduce pollutants in storm water to the MEP. These sediment-control practices are routinely imposed as conditions of grading permit approval.

The Construction General Permit and compliance with SWPPP and MS4 Permit requirements constitute mandatory project measures. As such, practices and procedures are already in place to minimize erosion and sediment transport to the MEP. Compliance with such actions will ensure that project-induced water-borne erosion does not significantly impact downstream drainage systems. On this basis, the impact of construction on water quality as a result of

erosion and sediment transport from the project is considered less than significant and no project conditions or mitigation measures are recommended or required. Implementation will serve to effectively minimize impacts to water quality from project-related construction activities.

4.4.3.2 Operational Impacts

Hydrology and Water Quality Impact 4-2*. Project implementation will result in the introduction of impervious surfaces onto the project site and, as a result of the impedance of opportunities for absorption and infiltration of those waters, has the potential to increase the quantity, velocity, and duration of storm waters discharged from the project site.*

Level of Significance before Mitigation*. Potentially significant unless mitigation incorporated.*

According to the recorded plans for the Brea Canyon Storm Drain Channel (LACDPW Private Drain No. 395), a 25-year discharge of 2,285 cubic feet per second (cfs) is shown at the downstream side of the Diamond Bar Boulevard culvert. The LACDPW has stipulated that the proposed drainage system accommodate a 50-year storm event, calculated to be 2,602 cfs. As illustrated in Figure 4.4-3 (Existing Hydrology Map), the 50-year storm creates approximately 68.38 cfs of runoff from the western portion of the project site. An existing 33-inch diameter reinforced concrete pipe located to the south of the project site currently carries off-site discharge of 83.94 cfs.

The proposed development includes both residential and commercial use. For engineering purposes, the residential component is assumed to contain 74 percent impervious surface and the commercial component is assumed to contain 91 percent impervious surface. As illustrated in Figure 4.4-4 (Proposed Hydrology Map), when combined with existing off-site discharge, the 50-year storm runoff totals 174.80 cfs at the Brea Canyon Storm Drain Channel. The summation of 50-year flows (2,602 + 174.80 = 2,776.8) from the project site and from the channel total approximately 2,777 cfs at this reach.

The existing Brea Canyon Channel at this reach will be replaced with reinforced concrete box (RCB) and the area created will be used for parking and/or landscaping. An existing tributary open channel east of the project site will be replaced with RCB, as well as the proposed entrance to the site. TO convey the 50-year discharge, the proposed channel section will be double cells 9-foot-wide by 8-foot-high RCB with an average 20 feet of cover. Approximately 50 feet of transition box will be constructed from the proposed RCB section to the existing culvert section under Diamond Bar Boulevard. A transition structure downstream of the proposed RCB will be construed to join the existing trapezoidal channel.

A mitigation measures has been formulated to ensure that drainage improvements are consistent with applicable design and development standards and that post-project drainage flows do not result in any adverse public safety or other impacts (Mitigation Measure 4-1).

4.4.3.3 Cumulative Impacts

Hydrology and Water Quality Impact 4-3*. Continuing urbanization of the general project area will collectively contribute to surface flows within the Diamond Bar Creek watershed will result in the introduction of additional urban pollutants that could affect the beneficial uses of existing surface and ground water resources.*

***Level of Significance before Mitigation**. Less-than-significant impact.*

Conversion of the project site to a mixed-use development will generate additional urban runoff that would be discharged into Diamond Bar Creek. Project-generated runoff would contribute to potentially significant cumulative water quality impacts generated by existing and future land uses within the tributary watershed area, potentially affecting both surface and ground water downstream of the project site.

Similar to the proposed project, other projects that may occur within the general project area and that may produce cumulative water quality impacts will also be required to implement BMPs and fully comply with all applicable State water quality laws and regulations. As such, because all related projects must fully comply with applicable water quality requirements, cumulative impacts would not manifest at a level of significance.

4.4.4 Project Conditions and Mitigation Measures

Conditional of Approval

- **Condition of Approval 4-1**. If the flood control channel right-of-way is to be utilized as part of the project's development plan, prior to the issuance of a grading permit, the Applicant shall obtain all requisite permits and approvals from the Los Angeles County Department of Public Works – Flood Control District allowing for the overbuilding of the Brea Canyon Storm Drain Channel and shall provide the City Engineer with documentation, acceptable to the City Engineer, demonstrating County approval and authorization, including a complete list of all permit requirements that may be associated therewith.

- **Condition of Approval 4-2**. Prior to the issuance of a grading permit, the Applicant shall prepare and, when acceptable, the City Engineer shall approve a standard urban storm water mitigation plan (SUSMP) conforming to the requirements of Section 8.12.1695 (Standard Urban Storm Water Mitigation Plan Requirements for New Development and Redevelopment Projects) of the Municipal Code.

Mitigation Measures

- **Mitigation Measure 4-1**. Prior to the issuance of grading permits, all drainage facilities and improvements shall be subject to final design and engineering review and approval by the City Engineer and, for those storm drain facilities under County jurisdiction, by the Los Angeles County Department of Public Works (LACDPW).

4.4.5 Significant Unavoidable Adverse Effects

As mitigated, the approval, construction, occupancy, use, and habitation of the proposed project will not result in any significant unavoidable adverse project-related or cumulative hydrologic or water quality impacts.

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4.5 BIOLOGICAL RESOURCES

Information germane to this assessment was derived from a variety of sources, including the California Natural Diversity Database (CNDDB), the California Department of Fish and Game's (CDFG) "The Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database,"[1] the California Native Plant Society's (CNPS) "Inventory of Rare and Endangered Vascular Plants of California,"[2] the CDFG's "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities"[3] and "Preliminary Description of the Terrestrial Natural Communities of California,"[4] and "The Jepson Manual – Higher Plants of California."[5]

In addition, the Applicant has submitted and the Lead Agency has independently reviewed a number of site-specific and project-specific studies that provide information concerning the site's existing biological resources.[6] Those studies, as prepared by PCR Services Corporation (PCR), include: (1) "Biological Resources Assessment – Site D, City of Diamond Bar, Los Angeles County, California" (June 24, 2008); (2) "Tree Survey Report – Site D, City of Diamond Bar, Los Angeles County, California" (December 18, 2007); (3) "Results of Sensitive Plant Surveys Conducted for the Site D Project Site, City of Diamond Bar, Los Angeles County, California" (December 18, 2007); and (4) "Investigation of Jurisdictional Wetlands and Waters of the U.S., Site D, City of Diamond Bar, Los Angeles County, California" (June 24, 2008). Each of those studies is included in Appendix F (Biological Resource Assessment) herein.

4.5.1 Environmental Setting

4.5.1.1 Regulatory Setting

Federal Endangered Species Act

The Federal Endangered Species Act of 1973 (FESA) provided for the conservation of ecosystems upon which "threatened" and "endangered" species of fish, wildlife, and plants depend.[7] Among other provisions, the FESA authorizes protective listing of species, prohibits unauthorized taking, possession, sale, and transport of endangered species, and authorizes the assessment of civil and criminal penalties for violations of the FESA. The FESA seeks to preserve endangered and threatened species by protecting individuals of the species and their

[1]/ California Department of Fish and Game, The Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database, September 2003 Edition.

[2]/ Tibor, David (ed.), Inventory of Rare and Endangered Plants of California, Sixth Edition, 2001.

[3]/ California Department of Fish and Game, Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities, December 9, 1984, Revised May 8, 2000.

[4]/ Holland, Robert F., Preliminary Description of the Terrestrial Natural Communities of California, California Department of Fish and Game, 1986.

[5]/ Hickman, James C. (ed.), The Jepson Manual, Higher Plants of California, 1993.

[6]/ The "study area" examined in the derivation of this biological resource assessment is coterminous with the boundaries of the project site. Based on slight deviations created through rounding, the "study area" presented in these reports is described as containing approximately 30.4 acres (which is larger that the actual size of the project site). This difference is not analytically significant.

[7]/ Under the FESA, an "endangered species" is one that is in danger of extinction in all or a significant part of its range; a "threatened species" is one that is likely to become endangered in the near future unless conservation and other actions are undertaken.

habitat and by implementing measures that promote their recovery. Candidate species that are proposed for listing do not receive substantive or procedural protection under the FESA.

Once a species is listed, Section 7 of the FESA requires that federal agencies, in consultation with the United States Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS), ensure that their actions do not jeopardize their continued existence or habitat critical for the species' survival. Federal wildlife agencies are required to provide an opinion as to whether the proposed federal action would jeopardize the species. The biological opinion (BO) must include reasonable and prudent alternatives to the action that would avoid jeopardizing the species' existence. Federal actions subject to Section 7 include issuance of federal permits. The mitigation of a proposed project's impacts is not considered until avoidance of those impacts has first been analyzed.

Federal Clean Water Act

Section 404 of the CWA establishes a program regulating the discharge of dredged and fill material into waters of the United States (WoUS), including wetlands. The basic premise of the program is that no discharge of dredged or fill material shall be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. Applicants must first show that they have taken steps to avoid, where practicable, wetland impacts, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through activities to restore or create wetlands.

Regulated activities are controlled by a permit review process administered by the United States Department of the Army Corps of Engineers (ACOE). For those projects that have the potential to produce significant impacts, an individual ACOE permit may be required. For most projects, however, the ACOE administers a nationwide permit (NWP) program for particular categories of activities (e.g., minor road crossings, utility line backfill, and bedding) as a means to expedite the permitting process. Generally, an individual permit is required if over 0.5 acres of WoUS will be impacted or if over 300 linear feet of jurisdictional non-ephemeral waters are impacted. In the absence of wetlands, the limits of ACOE jurisdiction in non-tidal waters (e.g., rivers, lakes, and intermittent streams) extends to the ordinary high water mark (OHWM). The OHWM is defined as "that line on the shore established by the fluctuation of water indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

Unless otherwise exempt under a NWP, applicants for federal permits that involve dredge or fill activities in surface waters, including wetlands, are required to obtain certification from the State verifying that the proposed activity will comply with applicable State water quality standards. Applicants must concurrently apply for a Section 401 water quality certification or waiver stating that the proposed project will not violate the State's water pollution control laws. In California, Section 401 certification actions are the responsibility of the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs).

Federal Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act of 1918 (MBTA) establishes a federal prohibition, unless otherwise permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture

or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention. . .for the protection of migratory birds. . .or any part, nest, or egg of any such bird" (16 U.S.C. 703). The MBTA decreed that all migratory birds and their parts (e.g., eggs, nests, and feathers) are fully protected.

California Endangered Species Act

The California Endangered Species Act (CESA) is similar to the FESA. Listing decisions are, however, made by the California Fish and Game Commission rather than by the USFWS or NMFS. The CESA directs the CDFG to coordinate with the USFWS and NMFS in the consultation process so that consistent and compatible opinions or findings can be adopted by federal and State agencies.

As defined, a native species is "endangered" when "its prospects of survival and reproduction are in immediate jeopardy from one or more causes." A native species is "threatened" when "although not presently threatened with extinction, it is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts." A native plant is "rare" when "although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens." The CESA also creates a "candidate" category, defined as a taxon that has been officially noticed by the California Fish and Game Commission as being under review by the CDFG for addition to the threatened or endangered species lists.

Pursuant to the CESA, a CDFG permit is required for projects that result in the take of a State-listed threatened or endangered species. Under the CESA, a "take" of a species is defined as an activity that would, directly or indirectly, kill an individual of a species but does not include harm or harassment, as is included in the FESA. For projects causing incidental take, CDFG is required to specify reasonable and prudent measures to minimize impacts on listed species.

California Fish and Game Code

Sections 1600-1616 of the California Fish and Game Code (CFGC) requires any person, State, local agency, or public utility to notify the CDFG before beginning an activity that will do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. CDFG jurisdiction includes ephemeral, intermittent, and perennial watercourses and is extended to the limit of riparian habitat that is located contiguous to the water resource and functions as part of the watercourse system. If the CDFG determines that the activity could substantially and adversely affect an existing fish and wildlife resource, a lake or streambed alteration agreement is required from the CDFG.

Under Section 3503 of the CFGC, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the CFGC or any regulation made pursuant thereto. Section 3513 states that it is "unlawful to take or possess any migratory nongame bird as designed in the Migratory Bird Treaty Act or any part of such migratory

nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act."

City of Diamond Bar General Plan

The City General Plan includes a number of policies that address, either directly or indirectly, biological resources. In accordance therewith, it is the policy of the City to:

- Preserve significant environmental resources within proposed developments, allow clustering or transferring of all or part of the development potential of the entire site to a portion of the site, thus preserving the resources as open space, and mandating the dedication of those resources to the City or a conservancy (Strategy 1.5.6, Land Use Element).
- Encourage clustering within the most developable portions of project sites to preserve open space and/or other natural resources. Such development should be located to coordinate with long-term plans for active parks, passive (open space) parks, and preserve natural open space areas (Strategy 1.6.4, Land Use Element).
- Ensure that time-specific issues are evaluated as part of the review of new development and intensification of existing development. For example, when deemed appropriate by the City, require prior to approval that biological assessments be prepared through the seasonal cycle of plants and migration of wildlife for a period of not less than one year (Strategy 2.1.3, Land Use Element).
- To the greatest extent possible, require that dwelling units, structures and landscaping be sited in a manner which: protects views for existing development, retains opportunities for views from dwellings, preserves or enhances vistas, particularly those seen from public places, preserves mature trees, natural hydrology, native plant materials, and areas of visual interest, permit removal of vegetation as part of a City or Fire District approved fuel modification plan (Strategy 1.1.7, Resource Management Element).
- New development should include the preservation of significant trees of cultural or historic value (Strategy 1.1.12, Resource Management Element).
- Maintain, protect, and preserve biologically significant areas, including SEA [Significant Ecological Area] 15, riparian areas, oak and walnut woodlands, and other areas of natural significance, providing only such recreational and cultural opportunities as can be developed in a manner sensitive to the environment (Objective 1.2, Resource Management Element).
- Recognizing the significance of SEA 15 ecological resources, support further definition of the extent and intensity of such resources to provide needed additional information for the purpose and intent of preservation of this area (Strategy 1.2.1, Resource Management Element).
- Ensure that all development, including roads, proposed adjacent to riparian and other biologically sensitive habitats avoid significant impacts to such areas. Require that new development proposed in such locations be designed to minimize or eliminate impacts on environmentally sensitive areas, protect the visual seclusion of forage areas from road intrusion by providing vegetative buffering, provide wildlife movement linkages to water, food, shelter and nesting, provide vegetation that can be used by wildlife for cover along roadsides, avoid intrusion of night lighting into identified areas through properly designed lighting systems, allow wildlife and migration access by use of tunnels or other practical means, replace fresh drinking water for wildlife when natural water areas are removed or blocked, to the greatest extent possible, prevent street water runoff from flowing into natural or blue-line streams (Strategy 1.2.2, Resource Management Element).

- Take an active role in pursuing the preservation of environmentally sensitive canyon areas in their natural state (Strategy 1.2.4, Resource Management Element).
- To the greatest extent possible, provide for preservation of flora and fauna (Strategy 1.2.5, Resource Management Element).

City of Diamond Bar Municipal Code

The City's Municipal Code contains a number of regulations that, either directly or indirectly, related to biological resources. Those ordinances that appear most applicable to the proposed project are outlined below:

- Natural Vegetation. Pursuant to Section 8.12.1430 (Removal or Destruction of Natural Vegetation Prohibited, Exception) in Title 8 (Health and Safety) of the Municipal Code, no person shall remove or destroy or cause the removal or destruction of natural vegetation on sloping terrain within the City without first obtaining written approval from the City building official to do so. As stipulated in Section 8.12.1440 (Approval to Perform Work), prior to the removal or destruction of vegetation regulated by this division, the owner in control of the land or owner's agency shall submit a written request to the City building official for approval to perform the work. Such request shall include a description of the property and be accompanied by a map showing the topography of the land and the location of any drainage courses, the location and extent of the proposed work, and details of the precautionary measures or devices to be used to prevent erosion and flood hazards, including if necessary, a drainage plan by a civil engineer showing routing of runoff, estimate of quantity and frequency of runoff, character of soils, and channel sections and gradients.

- Landscape Plans. As required under Section 22.24.030 (Landscape Plan Requirements) in Chapter 22.24 (Landscape Standards) in Title 22 (Development Code) of the Municipal Code: "A preliminary landscape plan shall be submitted as part of an application for a land use entitlement, for new development, and the significant expansion or redevelopment of an existing use as determined by the director." As required in Section 22.24.040 (Landscape Area Requirements), landscaping shall be provided as follows: (1) all setback and open space areas required under the Development Code shall be landscaped, except where a required setback is occupied by a sidewalk or driveway or where a required setback is screened from public view and it is determined by the director that landscaping is not necessary to fulfill the purposes of this chapter; (2) all areas of a project site not intended for a specific use shall be landscaped unless it is determined by the director that landscaping is not necessary to fulfill the purposes of this chapter; and (3) new single-family developments shall provide landscaping with an automatic irrigation system for the area of the site between the street curb and the front of the structure from side property lines.

  As further required under Section 15.00.320 (Code Amendments) in Title 15 (Building and Construction Safety) of the Municipal Code, Section J110.4b of the 2007 California Building Code is amended to state: "Planting and Irrigation Plans and Specifications. For grading which includes cut slopes more than 5 feet in height; or fill slopes supporting structures of more than 3 feet in height; or natural slopes disturbed more than 10 feet in superficial extent by the grading operations planting and irrigation plans and specifications shall be submitted for approval of the city engineer and/or the community development director. For all manufactured slopes more than 20 feet in height or natural

slopes disturbed more than 20 feet in superficial extent by grading operations plans shall be prepared and signed by a civil engineer or landscape architect."

- Protected Trees. As indicated in Section 22.38.010 (Purpose) in Chapter 22.38 (Tree Preservation and Protection) of the Municipal Code, the General Plan, "as the overall policy document for the City, requires the preservation and maintenance of native trees including oak, walnut, sycamore, willow, significant trees of cultural or historical value and pepper trees where appropriate. The purpose of this chapter is to protect and preserve these trees and when removal is allowed as a result of new development to require their replacement." The provisions of the City's tree preservation and protection ordinance are applicable in all zoning districts to the removal, relocation or pruning of "protected trees," as provided in Section 22.38.030 (Protected Trees). As indicated in Section 22.38.040 (Damaging Protected Trees Prohibited), except as provided in Section 22.38.060 (Exemptions), no person shall cut, prune, remove, relocate, or otherwise destroy a "protected tree." The topping of "protected trees" is prohibited.

  As defined in Section 22.38.030 (Protected Trees), a "protected tree" is any: (1) native oak, walnut, sycamore and willow trees with a DBH of eight inches or greater; pepper trees with a DBH of eight inches or greater where appropriate; (2) trees of significant historical or value as designated by the City Council; (3) trees required to be preserved or relocated as a condition of approval for a discretionary permit; (4) any tree required to be planted as a condition of approval for a discretionary permit; and (5) stand of trees, the nature of which makes each tree dependent upon the others for survival.

4.5.1.2 Regional Setting

The CNDDB is a valuable repository of rare plant and animal information maintained by the CDFG's Habitat Conservation Division. The primary function of the CNDDB is to gather and disseminate data on the status and locations of rare and endangered plants, animals, and vegetation types. The CNPS is a substantial contributor to the database. The CNDDB only records actual sightings of rare species and natural communities.[8]

In order to identify the range of sensitive species and plant communities that may exist on the project site, a CNDDB records search of the 7.5-Minute USGS Yorba Linda topographic quadrangle was conducted. The findings of the CNDDB search are presented in Table 4.5-1 (California Natural Diversity Database Records Search – Yorba Linda Quadrangle).[9]

4.5.1.3 Local Setting

Biological Resources Assessment

As indicated in the CDFG's "The Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database": "The primary purpose of the CNDDB classification is to assist in the location and

[8]/ Bittman, Roxanne, The California Natural Diversity Database: A Natural Heritage Program for Rare Species and Vegetation, Fremontia, Vol. 29:3-4, Department of Fish and Game, July/October 2001, pp. 57-62.

[9]/ The area comprising the USGS 7.5-minute quadrangle is approximately 64 square miles. As such, the information contained in the CNDDB is not necessarily indicative of those resources found on the project site.

determinations of significance and rarity of various vegetation types. Thus, ranking of natural communities by their rarity and threat is an important facet of the classification."[10]

As described in Table 4.5-2 (Plant Communities on the Project Site) and as shown in Figure 4.5-1 (Existing Plant Communities), existing vegetation on the project site can be categorized by the plant community. As described below, a total of eight CNDDB-recognized and non-recognized plant communities have been identified as occurring on the property.

- Developed. Developed areas consist of urban and suburban developments, roads, parks and golf courses, and graded or otherwise cleared areas, including the Brea Creek Flood Control Channel that traverses the western portion of the project site.

- Disturbed/Ruderal. Disturbed areas either do not support any plant species or contain sparse, predominantly non-native weedy species. Ruderal areas typically consist of more dense non-native weedy species that readily colonize disturbed ground. Disturbed areas had been recently disked, supporting sparse vegetation. Ruderal areas were dominated by black mustard (*Brassica nigra*) and brome grasses (*Bromus* sp.). Additional species include wild oat (*Avena* sp.), red-stemmed filaree (*Erodium cicutarium*), horehound (*Marrubium vulgare*), doveweed (*Eremocarpus setigerus*), jimson weed (*Datura* sp.), and pigweed (*Amaranthus* sp.).

- Eucalyptus Stand/Disturbed. Within the study area, eucalyptus stand/disturbed is dominated by eucalyptus (*Eucalyptus* sp.). Areas surrounding the eucalyptus are disturbed (having been recently disked) and support sparse vegetation composed of non-native weedy species.

- Mule Fat Scrub. Mule fat scrub occurs along the on-site stream channels and is characterized by tall, herbaceous riparian scrub dominated by mule fat (*Baccharis salicifolia*). Additional species include cattail (*Typha* sp.), curly dock (*Rumex crispus*), toyon (*Heteromeles arbutifolia*), poison oak (*Toxicodendron diversilobum*), and sweet fennel (*Foeniculum vulgare*).

- Ruderal/Goldenbush Scrub. Ruderal/goldenbush scrub was mapped as being predominantly ruderal, dominated by brome grasses, with a local concentration of coastal goldenbush (*Isocoma menziesii*). Additional species include pigweed, milk thistle (*Silybum marianum*), morning glory (*Calystegia macrostegia*), and coyote brush (*Baccharis pilularis*).

- Southern Willow Scrub. Southern willow scrub is a riparian community that requires repeated flooding. This community is dominated by arroyo willow (*Salix lasiolepis*) and black willow (*Salix nigra*). Additional species include mule fat.

- California Walnut Woodland. California walnut woodland typically occurs on north-facing slopes and along riparian corridors. This community is dominated by southern California black walnut (*Juglans californica* var. *californica*). Additional species include poison oak and coyote brush.

[10]/ *Op. Cit*., The Vegetation Classification and Mapping Program List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database, p. 2.

Table 4.5-1
CALIFORNIA NATURAL DIVERSITY DATABASE RECORDS SEARCH - YORBA LINDA QUADRANGLE

Common Name	Scientific Name	Federal Status	California Status	CDFG	CNPS List
Animals					
Long-eared owl	*Asio otus*	None	None	SC[3]	-
Coastal cactus wren	*Campylorhynchus brunneicapillus sandiegenis*	None	None	SC	-
Coastal California gnatcatcher	*Polioptrila californica californica*	Threatened[1]	None	SC	-
Least Bell's vireo	*Vireo bellii pusillus*	Endangered[2]	Endangered	-	-
Tricolored blackbird	*Agelaius tricolor*	None	None	SC	-
Western mastiff bat	*Eumops perotis californicus*	None	None	SC	-
Southwestern pond turtle	*Emys (=Clemmys) marmorata pallida*	None	None	SC	-
Coast (San Diego) horned lizard	*Phrynosoma coronatum (blainvillei)*	None	None	SC	-
Coast patch-nosed snake	*Salvadora hexalepis virgultea*	None	None	SC	-
Northern red-diamond rattlesnake	*Crotalus ruber ruber*	None	None	SC	-
Plants					
Southern tarplant	*Centromadia parryi* ssp. *australis*	None	None	-	1B.1[4]
Many-stemmed dudleya	*Dudleya multicaulis*	None	None	-	1B.2
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	None	None	-	1B.1
Santa Ana River woolly-star	*Eriastrum densifolium* ssp. *sanctorum*	Endangered	Endangered	-	1B.1
Intermediate mariposa lily	*Calochortus weedii* var. *intermedius*	None	None	-	1B.2
Plant Communities					
Southern coast live oak riparian forest	Southern coast live oak riparian forest	None	None	-	-
Southern willow scrub	Southern willow scrub	None	CHIP[5]	-	-
California walnut woodland	California walnut woodland	None	None	-	S2.1[6]

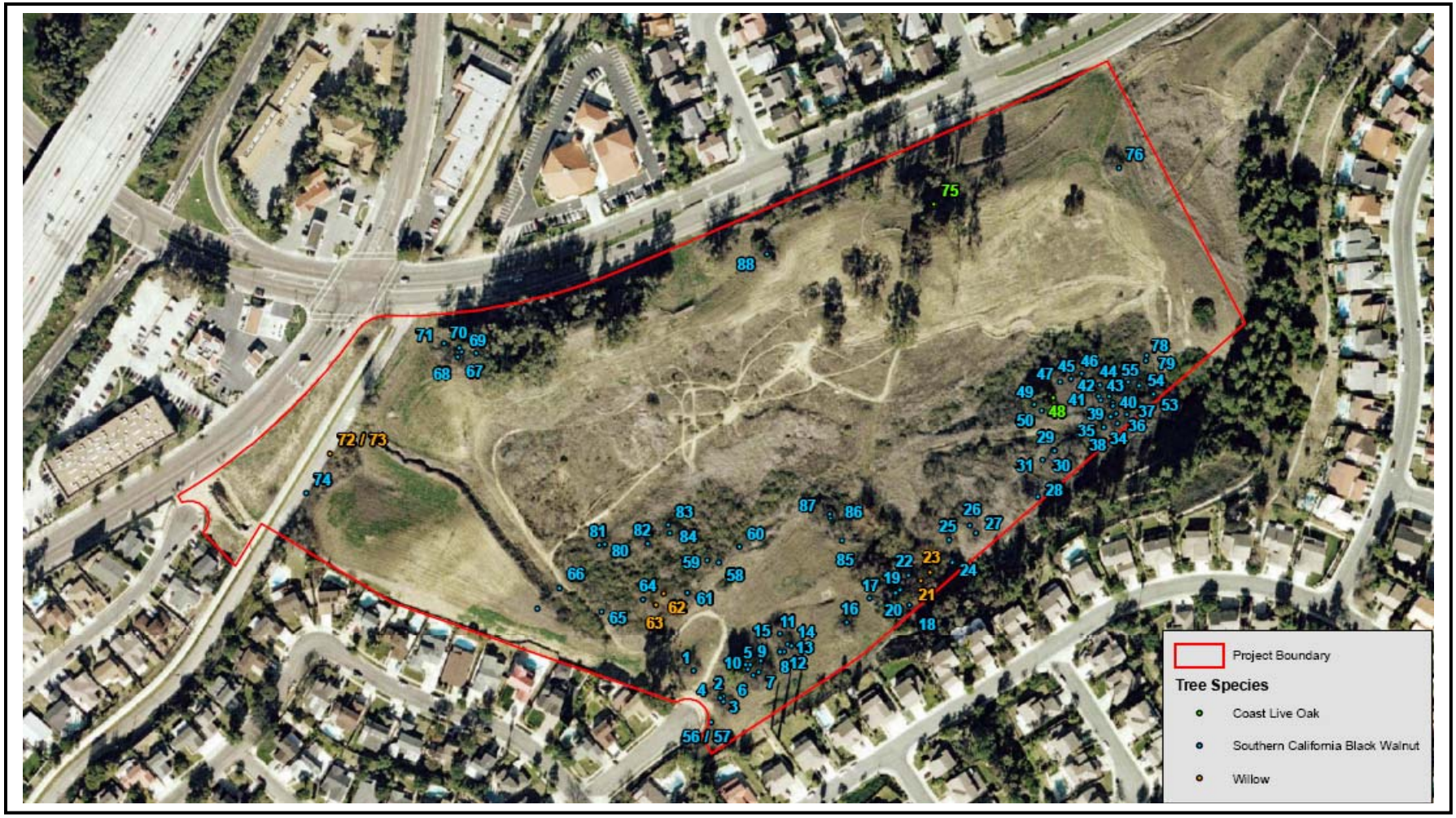
Notes:
1. Animal species listed as "threatened" do not automatically have protection under the FESA. The USFWS, under Section 4(d) of the FESA, has applied most of the same protection provided for "endangered" species to "threatened" species.
2. Listing as "endangered" gives species protection under Section 9 of the FESA, which prohibits the take of a federally-listed endangered species.
3. Identified as a California "Species of Special Concern," defined as species whose declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
4. California Native Plant Society (CNPS) List 1B (Rare, threatened, or endangered in California and elsewhere).
5. Community of Highest Inventory Priority (CHIP).
6. S2.# - Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining. The number to the right of the decimal point refers to the degree of threat posed to that natural community regardless of the ranking (e.g., S1.1 – very threatened; S2.2 – threatened; S3.3 – no current threat known).

Source: CNDDB, May 2008 (http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp)

N
175 0 175 Feet
Source: Google Earth, 2006; PCR Services Corporation, 2007.

N
NOT TO SCALE

Figure 4.5-1
EXISTING PLANT COMMUNITIES
Source: PCR Services Corporation



175 0 175 Feet

NOT TO SCALE

Figure 4.5-2
SENSITIVE TREE LOCATIONS MAP
Source: PCR Services Corporation

Table 4.5-2
PLANT COMMUNITIES ON THE PROJECT SITE

Plant Community	CNDDB[1] Code	Approximate Acres
Developed	N/A	0.3
Disturbed/Ruderal	N/A	20.4
Eucalyptus Stand/Distrubed	N/A	3.6
Mule Fat Scrub	63.510.00	2.8
Ruderal/Goldenbrush Scrub	N/A	0.9
Southern Willow Scrub[2]	61.208.00	0.3
California Walnut Woodland[2]	72.100.01	1.5
California Walnut Woodland/Disturbed	72.100.01/N/	0.6
Total		30.4[3]

Notes:
1. CNDDB Classification System
2. Considered high-priority for inventory under the CNDDB.
3. Although the project site is actually less than 30-acres in size, due to numeric rounding, a slightly larger area is depicted herein. This difference is not representative of internal variations or inconsistencies with regards to the manner in which the project is described but only the consequence of rounding numbers upward.

Source: PCR Services Corporation

- California Walnut Woodland/Disturbed. Within this community, areas surrounding the walnut trees are disturbed and support sparse vegetation composed of non-native weedy species.

Field surveys of the project site were conducted between April 2004 and October 2007. Sensitive plant surveys were conducted within the study area on June 29 and August 29, 2007. Plant communities were mapped directly in the field. All plant species observed during the surveys were either identified in the field or collected and later identified using taxonomic keys.

Sensitive plants include those listed or candidates for listing by the USFWS and CDFG and species considered sensitive by the CNPS (particularly Lists 1A, 1B, and 2). Several sensitive plant species were reported in the CNDDB from the general project vicinity with the potential to occur within the study area due to suitable habitat. A discussion of each sensitive species observed, as well as those potentially present on the property, is presented in Table 4.5-3 (Sensitive Plant Species).

Sensitive wildlife species include those species listed as endangered or threatened under the FESA or the CESA, candidates for listing by USFWS or CDFG, and species of special concern to CDFG. A number of sensitive wildlife species were reported in the CNDDB and are known to occur within the region, some of which have potential to occur within the study area. One sensitive wildlife species, the Cooper's hawk (*Accipiter cooperii*), was observed within the study area. Several additional species have the potential to occur. A discussion of the Cooper's hawk and each sensitive wildlife species potentially present within the study area is presented in Table 4.5-4 (Sensitive Wildlife Species).

The project area is unlikely to function as an integral part of regional wildlife movement due to its fragmentation from other open space areas; however, the site may be utilized as stepping-stone habitat for regional movement of birds and more ubiquitous species of mammals.

Table 4.5-3
SENSITIVE PLANT SPECIES

Scientific Name	Common Name	Flowering Period	Federal	State	CNPS List	Other	Preferred Habitat	Occurrence within the Study Area
GYMNOSPERMS								
Cupressaeceae	**Cypress Family**							
Cupressus forbesii	Tecate cypress[1]	N/A	None	None	1B.1	None	Chaparral, closed cone coniferous forest.	NE
ANGIOSPERMS (DICOTYLEDONS)								
Asteraceae	**Sunflower Family**							
Baccharis malibuensis	Malibu baccharis[2]	Aug.	None	None	1B.1	None	Chaparral, cismontane woodland, coastal scrub, riparian woodland.	NE
Centromadia parryi ssp. *australis*	Southern tarplant[3]	May-Nov.	None	None	1B.1	None	Marshes and swamps (margins), valley and foothill grassland (vernally mesic), vernal pools.	NE
Centromadia pungens ssp. *laevis*	Smooth tarplant[4]	Apr.-Sep.	None	None	1B.1	None	Chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland; alkaline.	NE
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields[5]	Feb.-Jun.	None	None	1B.1	None	Marshes and swamps, playas, vernal pools.	NE
Microseris douglasii ssp. *platycarpha*	small-flowered microseris[6]	Mar.-May	None	None	4.2	None	Cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools; clay.	NE
Pseudognaphalium leucocephalum	White rabbit-tobacco[7]	Aug.-Nov.	None	None	2.2	None	Chaparral, cismontane woodland, coastal scrub, riparian woodland; sandy, gravelly.	NE
Senecio aphanactis	Rayless ragwort[8]	Jan.-Apr.	None	None	2.2	None	Chaparral, cismontane woodland, coastal scrub; sometimes alkaline.	NE
Symphyotrichum defoliatum	San Bernardino aster[9]	Jul.-Nov.	None	None	1B.2	None	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic)/near ditches, streams, springs.	NE
Berberidaceae	**Barberry Family**							
Berberis nevinii	Nevin's barberry[10]	Mar.-Jun.	FE	SE	1B.1	None	Chaparral, cismontane woodland, coastal scrub, and riparian scrub; sandy or gravelly.	NE

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Scientific Name	Common Name	Flowering Period	Federal	State	CNPS List	Other	Preferred Habitat	Occurrence within the Study Area
Boraginaceae	**Borage Family**							
Harpagonella palmeri	Palmer's grapplinghook[11]	Mar.-May	None	None	4.2	None	Chaparral, coastal scrub, valley and foothill grassland; clay.	NE
Brassicaceae	**Mustard Family**							
Caulanthus simulans	Payson's jewel-flower[12]	Mar.-May	None	None	4.2	None	Chaparral, coastal scrub; sandy, granitic.	NE
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass[13]	Jan.-Jul.	None	None	1B.2	None	Chaparral and coastal scrub.	NE
Chenopodiaceae	**Goosefoot Family**							
Atriplex coulteri	Coulter's saltbush[14]	Mar.-Oct.	None	None	1B.2	None	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland; alkaline or clay.	NE
Atriplex parishii	Parish's brittlescale[15]	Jun.-Oct.	None	None	1B.1	None	Chenopod scrub, playas, and vernal pools.	NE
Atriplex serenana var. *davidsonii*	Davidson's saltscale[16]	Apr.-Oct.	None	None	1B.2	None	Coastal bluff scrub, coastal scrub; alkaline.	NE
Convovulaceae	**Morning-Glory Family**							
Calystegia peirsonii	Peirson's morning-glory[17]	Apr.-Jun.	None	None	4.2	None	Chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland.	NE
Convovulus simulans	small-flowered morning-glory[18]	Mar.-Jul.	None	None	4.2	None	Chaparral (openings), coastal scrub, valley and foothill grassland; clay, serpentinite seeps.	NE
Crassulaceae	**Stonecrop Family**							
Dudleya multicaulis	many-stemmed dudleya[19]	Apr.-Jul.	None	None	1B.2	None	Chaparral, coastal scrub, valley and foothill grassland; often clay.	NE
Fabaceae	**Pea Family**							
Astragalus brauntonii	Braunton's milk-vetch[20]	Feb.-Jul.	FE	None	1B.1	None	Sage scrub, chaparral, valley and foothill grassland, closed cone coniferous forest; carbonate soils, recent burns, and disturbed areas.	NE

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Scientific Name	Common Name	Flowering Period	Federal	State	CNPS List	Other	Preferred Habitat	Occurrence within the Study Area
Fagaceae	**Oak Family**							
Quercus engelmannii	Engelmann oak[21]	Mar.-Jun.	None	None	4.2	None	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland.	NE
Geraniaceae	**Geranium Family**							
Erodium macrophyllum	round-leaved filaree[22]	Mar.-May	None	None	1B.1	None	Cismontane woodland, valley and foothill grassland; clay.	NE
Grossulariaceae	**Gooseberry Family**							
Ribes divaricatum var. *parishii*	Parish's gooseberry[23]	Feb.-Apr.	None	None	1A	None	Riparian woodland.	NE
Hydrophyllaceae	**Waterleaf Family**							
Phacelia stellaris	Brand's phacelia[24]	Mar.-Jun.	FC	None	1B.1	None	Coastal dunes, coastal scrub.	NE
Juglandaceae	**Walnut Family**							
Juglans californica var. *californica*	southern California black walnut[25]	Mar.-May	None	None	4.2	None	Chaparral, cismontane woodland, coastal scrub; alluvial.	OB
Lamiaceae	**Mint Family**							
Lepechinia cardiophylla	heart-leaved pitcher sage[26]	Apr.-Jul.	None	None	1B.2	None	Closed-cone coniferous forest, chaparral, cismontane woodland.	NE
Monardella hypoleuca ssp. *lanata*	felt-leaved monardella[27]	Jun.-Aug.	None	None	1B.2	None	Chaparral and cismontane woodland.	NE
Scutellaria bolanderi ssp. *austromontana*	southern skullcap[28]	Jun.-Aug.	None	None	1B.2	None	Chaparral, cismontane woodland, lower montane coniferous forest/mesic.	NE
Malvaceae	**Mallow Family**							
Sidalcea neomexicana	salt spring checkerbloom[29]	Mar.-Jun.	None	None	2.2	None	Alkali playas, brackish marshes, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub; alkali springs and marshes.	NE
Nyctaginaceae	**Four O'Clock Family**							
Abronia villosa var. *aurita*	chaparral sand-verbena[30]	Jan.-Aug.	None	None	1B.1	None	Coastal scrub and chaparral habitats.	NE

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Scientific Name	Common Name	Flowering Period	Federal	State	CNPS List	Other	Preferred Habitat	Occurrence within the Study Area
Papaveraceae	**Poppy Family**							
Romneya coulteri	Coulter's matilija poppy[31]	Mar.-Jul.	None	None	4.2	None	Chaparral, coastal scrub/often in burns.	NE
Polemoniaceae	**Phlox Family**							
Eriastrum densifolium ssp. *sanctorum*	Santa Ana River woollystar[32]	Jun.-Sep.	FE	SE	1B.1	None	Chaparral, coastal scrub (alluvial fan); sandy or gravelly.	NE
Navarretia prostrata	Prostrate navarretia[33]	Apr.-Jul.	None	None	1B.1	None	Coastal scrub, meadows and seeps, valley and foothill grassland (alkaline), vernal pools; mesic.	NE
Polygalaceae	**Milkwort Family**							
Polygala cornuta var. *fishiae*	Fish's milkwort[34]	May-Aug.	None	None	4.3	None	Chaparral, cismontane woodland, riparian woodland.	NE
Polygonaceae	**Buckwheat Family**							
Chorizanthe parryi var.*fernandina*	San Fernando Valley spineflower[35]	Apr.-Jul.	FC	SE	1B.1	None	Coastal scrub; sandy.	NE
Chorizanthe parryi var. *parryi*	Parry's spineflower[36]	Apr.-Jun.	None	None	3.2	None	Openings/clearings in coastal or desert sage scrub, chaparral or interface; dry slopes or flat ground; sandy soils.	NE
Chorizanthe polygonoides var. *longispina*	long-spined spineflower[37]	Apr.-Jun.	None	None	1B.2	None	Primarily associated with clay soils but also found on sandy or gravelly soils within open areas of chaparral, sage scrub, or needlegrass grassland.	NE
Dodecahema leptoceras	slender-horned spineflower[38]	Apr.-Jun.	FE	SE	1B.1	None	Associated with chaparral, cismontane woodland and coastal scrub in alluvial fan areas.	NE
Mucronea californica	California spineflower[39]	Mar.-Jul.	None	None	4.2	None	Chaparral, cismontane woodland, coastal dunes, coastal scrub, valley and foothill grassland; sandy.	NE

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Scientific Name	Common Name	Flowering Period	Federal	State	CNPS List	Other	Preferred Habitat	Occurrence within the Study Area
Rosaceae	**Rose Family**							
Horkelia cuneata ssp. *puberula*	mesa horkelia[40]	Feb.-Jul.	None	None	1B.1	None	Chaparral, cismontane woodland, and coastal scrub; sandy or gravelly.	NE
Sterculiaceae	**Cacao Family**							
Fremontodendron mexicanum	Mexican flannelbush[41]	Mar.-Jun.	FE	SR	1B.1	None	Closed-cone coniferous forest, chaparral, cismontane woodland; gabbroic, metavolcanic, or serpentinite.	NE
ANGIOSPERMS (MONOCOTYLEDONS)								
Cyperaceae	**Sedge Family**							
Cladium californicum	California sawgrass[42]	Jun.-Sep.	None	None	2.2	None	Meadows and seeps, marshes and swamps; alkaline or freshwater.	NE
Liliaceae	**Lily Family**							
Brodiaea filifolia	thread-leaved brodiaea[43]	Mar.-Jun.	FT	SE	1B.1	None	Sage scrub, valley and foothill grassland, cismontane woodland; vernal pools (clay soils).	NE
Calochortus catalinae	Catalina mariposa lily[44]	Mar.-Jun.	None	None	4.2	None	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland.	NE
Calochortus plummerae	Plummer's Mariposa lily[45]	May-Jul.	None	None	1B.2	None	Chaparral (openings), cismontane woodland, coastal scrub, valley and foothill grassland, granitic/rocky.	NE
Calochortus weedii var. *intermedius*	Intermediate mariposa lily[46]	May-Jul.	None	None	1B.2	None	Chaparral, coastal scrub, valley and foothill grassland; rocky.	NE
Nolina cismontana	chaparral nolina[47]	May-Jul.	None	None	1B.2	None	Chaparral, coastal scrub; sandstone or gabbro.	NE
Poaceae	**Grass Family**							
Hordeum intercedens	vernal barley[48]	Feb.-Jul.	None	None	1B.1	None	Coastal dunes, coastal scrub, valley and foothill grassland (saline flats and depressions), and vernal pools.	NE
Muhlenbergia californica	California muhly[49]	Jun.-Sep.	None	None	4.3	None	Chaparral, coastal scrub, lower montane coniferous forest, meadows and seeps/mesic, seeps and streambanks.	NE

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Notes:
1. Tecate cypress is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
2. Malibu baccharis is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
3. Southern tarplant is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
4.. Smooth tarplant is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
5. Coulter's goldfields is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
6. Small-flowered microseris is not expected to occur within the study area due to the lack of suitable habitat.
7. White rabbit-tobacco is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
8. Rayless ragwort is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
9. San Bernardino aster is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
10. Nevin's barberry was not observed during focused surveys; therefore, is not expected to occur within the study area.
11. Palmer's grapplinghook was not observed during focused surveys; therefore, is not expected to occur within the study area.
12. Payson's jewel-flower is not expected to occur within the study area due to the lack of suitable habitat.
13. Robinson's pepper-grass is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
14. Coulter's saltbush is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
15. Parish's brittlescale is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
16. Davidson's saltscale is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
17. Peirson's morning-glory is not expected to occur within the study area due to the lack of suitable habitat.
18. Small-flowered morning-glory was not observed during focused surveys; therefore, is not expected to occur within the study area.
19. Many-stemmed dudleya is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
20. Braunton's milk-vetch is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
21. Engelmann oak is not expected to occur within the study area due to the lack of suitable habitat. In addition, this species was not observed during the tree survey conducted within the study area.
22. Round-leaved filaree is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
23. Parish's gooseberry was not observed during focused surveys; therefore, is not expected to occur within the study area.

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Notes (Continued):

24. Brand's phacelia is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
25. A total of 75 individual southern California black walnut trees meeting the size requirements of the tree ordinance were mapped during the tree survey. However, additional individuals that did not meet the tree ordinance size criteria also occur within the study area. The locations of the southern California black walnut trees meeting the size requirements of the tree ordinance are included in Figure 4.5-2 ("Site D" Sensitive Tree Location Map).
26. Heart-leaved pitcher sage is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
27. Felt-leaved monardella is not expected to occur within the study area due to the lack of suitable habitat.
28. Southern skullcap is not expected to occur within the study area due to the lack of suitable habitat.
29. Salt spring checkerbloom is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat
30. Chaparral sand-verbena is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
31. Coulter's matilija poppy is not expected to occur within the study area due to the lack of suitable habitat.
32. Santa Ana River woollystar is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
33. Prostrate navarretia is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
34. Fish's milkwort was not observed during focused surveys; therefore, is not expected to occur within the study area.
35. San Fernando Valley spineflower is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
36. Parry's spineflower is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
37. Long-spined spineflower is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed during focused surveys; therefore, is not expected to occur within the study area.
38. Slender-horned spineflower is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
39. California spineflower is not expected to occur within the study area due to the lack of suitable habitat.
40. Mesa horkelia is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
41. Mexican flannelbush is not expected to occur within the study area due to the lack of suitable habitat.
42. California sawgrass is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
43. Thread-leaved brodiaea is is not expected to occur within the study area due to the lack of suitable habitat.
44. Catalina mariposa lily is not expected to occur within the study area due to the lack of suitable habitat.
45. Plummer's mariposa lily is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. Plummer's mariposa lily is not expected to occur within the study area due to the lack of suitable habitat
46. Intermediate mariposa lily is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.

Table 4.5-3 (Continued)
SENSITIVE PLANT SPECIES

Notes (Continued):
47. Chaparral nolina is reported in the CNDDB and CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
48. Vernal barley is reported in the CNPS Online Inventory as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
49. California muhly was not observed during focused surveys; therefore, is not expected to occur within the study area.

Legend:
OB = Observed; P = Species has the potential to occur on-site; NE = Species not expected to occur on-site due to the lack of suitable habitat or the negative results of focused surveys; F = For raptor species: if present, would utilize the site for foraging only; N = For raptor species: if present, would utilize the site for nesting only; B = For raptor species: if present, would utilize the site for both foraging and nesting.

Key to Species Listing Status Codes

FE	Federally Listed as Endangered	FC	Federal Candidate Species	SCT	State Candidate for Threatened
FT	Federally Listed as Threatened	SE	State Listed as Endangered	SFP	State Fully Protected
FPE	Federally Proposed as Endangered	ST	State Listed as Threatened	SR	State Rare
FPT	Federally Proposed as Threatened	SCE	State Candidate for Endangered	CSC	California Special Concern Species
FPD	Federally Proposed for Delisting				
California Native Plant Society (CNPS)					
List 1A	Presumed extinct in California.				
List 1B	Rare, threatened, or endangered throughout their range.				
List 2	Rare, threatened, or endangered in California, but more common in other states.				
List 3	Plant species for which additional information is needed before rarity can be determined.				
List 4	Species of limited distribution in California (i.e., naturally rare in the wild), but whose existence does not appear to be susceptible to threat.				
CNPS Threat Codes					
.1	Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)				
.2	Fairly endangered in California (20-80% occurrences threatened)				
.3	Not very endangered in California (<20% of occurrences threatened or no current threats known)				

Source: PCR Services Corporation

Table 4.5-4
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
CRUSTACEA – CRUSTACEANS						
Anostraca	**Fairy Shrimp**					
Branchinecta sandiegonensis	San Diego fairy shrimp[1]	FE	None	None	Vernal pools/swales.	NE
FISH						
Catostomidae	**Suckers**					
Catostomus santaanae	Santa Ana sucker[2]	FT	CSC	None	Small, shallow streams that are subject to periodic, severe flooding.	NE
AMPHIBIANS						
Salamandridae	**Newts**					
Taricha torosa torosa	coast range newt[3]	None	CSC	None	Lives in terrestrial habitats and migrates to breed in ponds, reservoirs, and slow-moving streams.	NE
Pelobatidae	**Spadefoot Toads**					
Spea hammondii	western spadefoot[4]	None	CSC	None	Prefers burrow sites within relatively open areas in lowland grasslands, chaparral, and pine-oak woodlands, areas of sandy or gravelly soil in alluvial fans, washes, and floodplains. Requires temporary pools for reproduction.	NE
REPTILES						
Emydidae	**Box and Water Turtles**					
Clemmys marmorata pallida	Southwestern pond turtle[5]	None	CSC	None	Ponds, marshes, rivers, streams, irrigation ditches.	NE
Phrynosomatidae	**Iguanid Lizards**					
Phrynosoma coronatum	coast horned lizard[6]	None	CSC	None	Valley-foothill hardwood, conifer, and riparian habitats, pine-cypress, juniper and annual grassland habitats below 6,000 feet, open country, especially sandy areas, washes, flood plains, and windblown deposits.	NE

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
Teiidae	**Whiptails**					
Cnemidophorus hyperythrus	orange-throated whiptail[7]	None	CSC	None	Valley-foothill hardwood forests, valley-foothill/hardwood conifer, mixed conifer, and desert scrub habitats.	NE
Colubridae	**Colubrid Snakes**					
Salvadora hexalepis virgultea	coast patch-nosed snake[8]	None	CSC	None	Desert and rocky areas in chaparral covered hillsides and canyons.	NE
Thamnophis hammondii	two-striped garter snake[9]	None	CSC	None	Riparian and freshwater marshes with perennial water.	NE
Viperidae	**Vipers**					
Crotalus ruber ruber	northern red rattlesnake[10]	None	CSC	None	Chaparral, woodland, and arid desert habitats in rocky areas with dense vegetation.	NE
BIRDS						
Accipitridae	**Hawks, Kites, Harriers and Eagles**					
Elanus leucurus	white-tailed kite[11]	None	SFP	None	Low-elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands.	P, F
Circus cyaneus	northern harrier[12]	None	CSC	None	Coastal salt marshes, freshwater marshes, grasslands, and agricultural fields; occasionally forages over open desert and brushlands.	NE
Accipiter striatus	sharp-shinned hawk[13]	None	CSC	None	Woodlands; forages over chaparral and other scrublands; prefers riparian habitats and north-facing slopes with plucking perch sites.	P, F
Accipiter cooperi	Cooper's hawk[14]	None	CSC	None	Open woodlands especially riparian woodland.	OB
Buteo regalis	ferruginous hawk[15]	None	CSC	None	Open treeless areas including grasslands, desert scrub, and sagebrush flats. Rivers, lakes, and coasts; grasslands and agricultural areas during winter.	NE

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
Aquila chrysaetos	golden eagle[16]	None	CSC	None	Mountains, deserts, and open country; prefer to forage over grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. Nests in secluded cliffs with overhanging ledges or in large trees.	NE
Falconidae	**Falcons**					
Falco columbarius	merlin[17]	None	CSC	None	Coastlines, wetlands, woodlands, agricultural fields, and grasslands	NE
Falco mexicanus	prairie falcon[18]	None	CSC	None	Grasslands, savannahs, rangeland, agricultural fields, and desert scrub; often uses sheltered cliff ledges for cover.	NE
Falco peregrinus anatum	American peregrine falcon[19]	Delisted	SE, SFP	None	Open country, cliffs (mountains to coasts).	NE
Cuculidae	**Cuckoos and Roadrunners**					
Coccyzus americanus occidentalis	Western yellow-billed cuckoo[20]	FE	CSC	None	Deciduous riparian thickets or forests with dense, low-level or understory foliage; abut on slow-moving watercourses, backwaters, or seeps; willows a dominant component of the vegetation.	NE
Strigidae	**True Owls**					
Athene cunicularia	burrowing owl[21]	None	CSC	None	Dry grasslands, desert habitats, open-pinyon-juniper and ponderosa pine woodlands below 5,300 feet elevation. Prefers berms, ditches, and grasslands adjacent to rivers, agricultural, and scrub areas.	NE
Asio otus	long-eared owl[22]	None	CSC	None	Dense riparian areas, thickets, woodlands, and forest.	NE
Tyrannidae	**Tyrant Flycatchers**					
Empidonax traillii extimus	southwestern willow flycatcher[23]	FE	SE	None	Wet meadows, riparian woodlands that contain water and low growing willow thickets.	NE

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
Alaudidae	**Lark Family**					
Eremophila alpestris actia	California horned lark[24]	None	CSC	None	Open habitats, grasslands along the coast, deserts near sea level to alpine dwarf shrub habitat, uncommonly in coniferous and chaparral habitats.	NE
Troglodytidae	**Wrens**					
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren[25]	None	CSC	None	Coastal sage scrub, vegetation with thickets of prickly pear or cholla cactus.	NE
Sylviidae	**Old World Warblers, Gnatcatchers**					
Polioptila californica californica	coastal California gnatcatcher[26]	FT	CSC	None	Coastal sage scrub vegetation below 2,500 feet elevation in Riverside County and generally below 1,000 feet elevation along the coastal slope; generally avoids steep slopes and dense vegetation for nesting.	NE
Laniidae	**Shrikes**					
Lanius ludovicianus	loggerhead shrike[27]	None	CSC	None	Open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	P
Vireonidae	**Vireos**					
Vireo bellii pusillus	least Bell's vireo[28]	FE	SE	None	Perennial and intermittent streams with low, dense riparian scrub and riparian woodland habitats below 2,000 feet elevation; nests primarily in willows and forages in the riparian and occasionally in adjoining upland habitats. Associated with willow, cottonwood, and mule fat.	NE
Parulidae	**Wood Warblers**					
Icteria virens	yellow-breasted chat[29]	None	CSC	None	Riparian woodlands with a thick understory.	NE

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
Emberizidae	**Emberizids**					
Aimophila ruficeps canescens	southern California rufous-crowned sparrow[30]	None	CSC	None	Generally, steep, rocky areas within coastal sage scrub and chaparral, often with scattered bunches of grass; prefers relatively recently burned areas.	NE
Amphispiza belli belli	Bell's sage sparrow[31]	None	CSC	None	Dense, dry chamise chaparral and coastal slopes of coastal sage scrub.	NE
Icteridae	**Blackbirds**					
Agelaius tricolor	tricolored blackbird[32]	None	CSC	None	Freshwater marshes and riparian scrub.	NE
MAMMALS						
Phyllostomidae	**Leaf-nosed Bats**					
Choeronycteris Mexicana	Mexican long-tongued bat[33]	None	CSC	None	Desert and montane riparian, desert succulent scrub, desert scrub, pinyon juniper, and urban habitats. Roosts in caves, mines, and possibly buildings. Occurs in San Diego County.	NE
Vespertilionidae	**Evening Bats**					
Antrozous pallidus	pallid bat[34]	None	CSC	None	Nests in dry, rocky habitats/caves, crevices in rocks, arid habitats including deserts, chaparral, and scrublands.	P
Lasiurus cinereus	hoary bat[35]	None	CSC	None	Found primarily in forested habitats but also occurs in riparian zones and park/garden settings in urban areas.	NE
Molossidae	**Free-tailed Bats**					
Nyctinomops femorosaccus	pocketed free-tailed bat[36]	None	CSC	None	Arid lowland areas and desert canyons; mixed conifer forest.	NE
Nyctinomops macrotis	big free-tailed bat[37]	None	CSC	None	Rocky areas; typically low elevation arroyo, scrub, and woodland habitats.	NE
Eumops perotis californicus	western mastiff bat[38]	None	CSC	None	Primarily arid lowlands, especially deserts. Open, semiarid to arid habitats including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban.	NE

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Scientific Name	Common Name	Federal	State	Other	Preferred Habitat	Occurrence within the Study Area
Leporidae	**Hares and Rabbits**					
Lepus californicus bennettii	San Diego black-tailed jackrabbit[39]	None	CSC	None	Open brushlands and scrub habitats between sea level and 4,000 feet elevation.	NE
Heteromyidae	**Pocket Mice and Kangaroo Rats**					
Chaetodipus fallax fallax	northwestern San Diego pocket mouse[40]	None	CSC	None	Sandy herbaceous areas, usually in association with rocks or coarse gravel, sagebrush scrub, annual grassland, chaparral, and desert scrubs	P
Muridae	**Mice, Rats, and Voles**					
Neotoma lepida intermedia	San Diego desert woodrat[41]	None	CSC	None	Chaparral, coastal sage scrub, and pinyon-juniper woodland.	P
Mustelidae	**Weasels, Skunks, and Otters**					
Taxidea taxus	American badger[42]	None	CSC	None	Grasslands, desert areas, especially scrub with friable soils.	NE

Legend:
OB = Observed; P = Species has the potential to occur on-site; NE = Species not expected to occur on-site due to the lack of suitable habitat or the negative results of focused surveys; F = For raptor species: if present, would utilize the site for foraging only; N = For raptor species: if present, would utilize the site for nesting only; B = For raptor species: if present, would utilize the site for both foraging and nesting.

Key to Species Listing Status Codes

FE	Federally Listed as Endangered	FC	Federal Candidate Species	SCT	State Candidate for Threatened
FT	Federally Listed as Threatened	SE	State Listed as Endangered	SFP	State Fully Protected
FPE	Federally Proposed as Endangered	ST	State Listed as Threatened	SR	State Rare
FPT	Federally Proposed as Threatened	SCE	State Candidate for Endangered	CSC	California Special Concern Species
FPD	Federally Proposed for Delisting				

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Notes:
1. The San Diego fairy shrimp is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
2. The Santa Ana sucker is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
3. The coast range newt is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
4. The western spadefoot is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
5. The southwestern pond turtle is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
6. The coast horned lizard is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
7. The orange-throated whiptail is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
8. The coast patch-nosed snake is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
9. The two-striped garter snake is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
10. The northern red rattlesnake is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
11. The white-tailed kite was not observed within the study area; however, there is a low potential for it to forage over the study area.
12. The northern harrier was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
13. The sharp-shinned hawk was not observed within the study area; however, may occur for foraging.
14. The Cooper's hawk is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was observed within the study area and may utilize the study area for breeding and/or foraging.
15. The ferruginous hawk is not expected to occur within the study area due to the lack of suitable habitat.
16. The golden eagle is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
17. The merlin was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
18. The prairie falcon was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
19. The American peregrine falcon was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
20. The western yellow-billed cuckoo is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed and is not expected to occur within the study area due to the lack of suitable habitat.
21. The burrowing owl is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
22. The long-eared owl is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.

Table 4.5-4 (Continued)
SENSITIVE WILDLIFE SPECIES

Notes (Continued):

23. The southwestern willow flycatcher is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat. Although the study area supports 0.3 acre of southern willow scrub, it is not extensive enough to support this species.
24. The California horned lark was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
25. The coastal cactus wren is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
26. The coastal California gnatcatcher is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
27. The loggerhead shrike was not observed within the study area but may occur due to the presence of suitable habitat.
28. The least Bell's vireo is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat. Although the study area supports 0.3 acre of southern willow scrub, the study area is fragmented (i.e., surrounded by development in all directions) and the habitat it is not extensive enough to support this species.
29. The yellow-breasted chat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
30. The southern California rufous-crowned sparrow is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
31. The Bell's sage sparrow was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
32. The tricolored blackbird is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
33. The Mexican long-tongued bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. However this species is not expected to occur due to the study area's location outside of the species range.
34. The pallid bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species has the potential to forage within the study area.
35. The hoary bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
36. The pocketed free-tailed bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
37. The big free-tailed bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
38. The western mastiff bat is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species is not expected to occur within the study area due to the lack of suitable habitat.
39. The San Diego black-tailed jackrabbit is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.
40. The northwestern San Diego pocket mouse was not observed within the study area but has the potential to occur due to the presence of suitable habitat.
41. The San Diego desert woodrat was not observed; however, may occur within the study area.
42. The American badger is reported in the CNDDB as occurring within the nine-quadrangle area surrounding (and including) the Yorba Linda quadrangle. This species was not observed within the study area and is not expected to occur due to the lack of suitable habitat.

Source: PCR Services Corporation

Tree Survey Report

A tree survey was conducted on March 16, 2005 and a subsequent tree survey, conducted to to verify and update the 2005 survey, was performed on October 4, 2007. The tree surveys were conducted to comply with the City's tree preservation and protection ordinance, as codified in Chapter 22.38 (Tree Preservation and Protection) in Title 22 (Development Code) of the Municipal Code.

According to the City's tree preservation and protection ordinance, no person shall remove or relocate a protected tree or develop within the protection zone of a protected tree without first obtaining a tree removal permit from the Community Development Director (Director). Protected trees include native oak (*Quercus* sp.), walnut (*Juglans* sp.), western sycamore (*Platanus racemosa*), and willow (*Salix* sp.), as measuring eight inches or more in DBH.

One sensitive plant species, southern California black walnut, was observed within the study area. A total of 75 individual southern California black walnut trees, meeting the size requirements of the tree ordinance, were mapped during the tree survey. Additional individuals that did not meet the tree ordinance size criteria also occur within the study area. The locations of those southern California black walnut trees meeting the size requirements of the tree ordinance are included in Figure 4.5-2 (Sensitive Tree Location Map). No other sensitive plant species were observed within the study area or are expected to occur based on the lack of suitable habitat and negative results of focused surveys.

Jurisdictional Delineation

As illustrated in Figure 4.5-3 (Portion of USGS Yorba Linda 7.5-Minute Topographic Quadrangle),[11] the project site contains a number of "blue-line" streams (USGS-defined intermittent streams), illustrating the potential presence of streams that flows only when it receives water from rainfall runoff or springs, or from some surface source. The USGS topographic quadrangle was last revised in 1981 and may not accurately reflect on-site and near-site conditions.

The study area contains three jurisdictional drainages that total approximately 2,125 linear feet and support approximately 0.20 acres of ACOE/RWQCB jurisdictional "waters of the United States/waters of the State" (WoUS/WoS), of which approximately 0.01 acres are wetlands, and approximately 4.10 acres of CDFG jurisdictional streambed and associated riparian habitat. The various jurisdictional acreages overlap (i.e., ACOE/RWQCB acreage is typically included in CDFG acreages and are not additive). A summary of the drainage feature is presented in Table 4.5-5 (Jurisdictional Features) and a map of the locations of these features is presented in Figure 4.5-4 (Jurisdictional Features).[12] A detailed description of each of the drainage located within the project site is provided below.

- Drainage A. Drainage A is an intermittent, earthen wash located in the southern portion of the study area and appears to originate immediately off the project site. Its upper terminus is a very well-defined, steeply-sloped ridgeline. An approximately 2-10 foot wide OHWM was identified along the length of the drainage.

[11]/ United States Geological Survey, Yorba Linda, California 7.5-Minute Topographic Quadrangle, 1964, Photorevised 1981.

[12]/ PCR Services Corporation, Investigation of Jurisdictional Wetlands and Waters of the U.S., Site D, City of Diamond Bar, Los Angeles County, California, December 18, 2007.

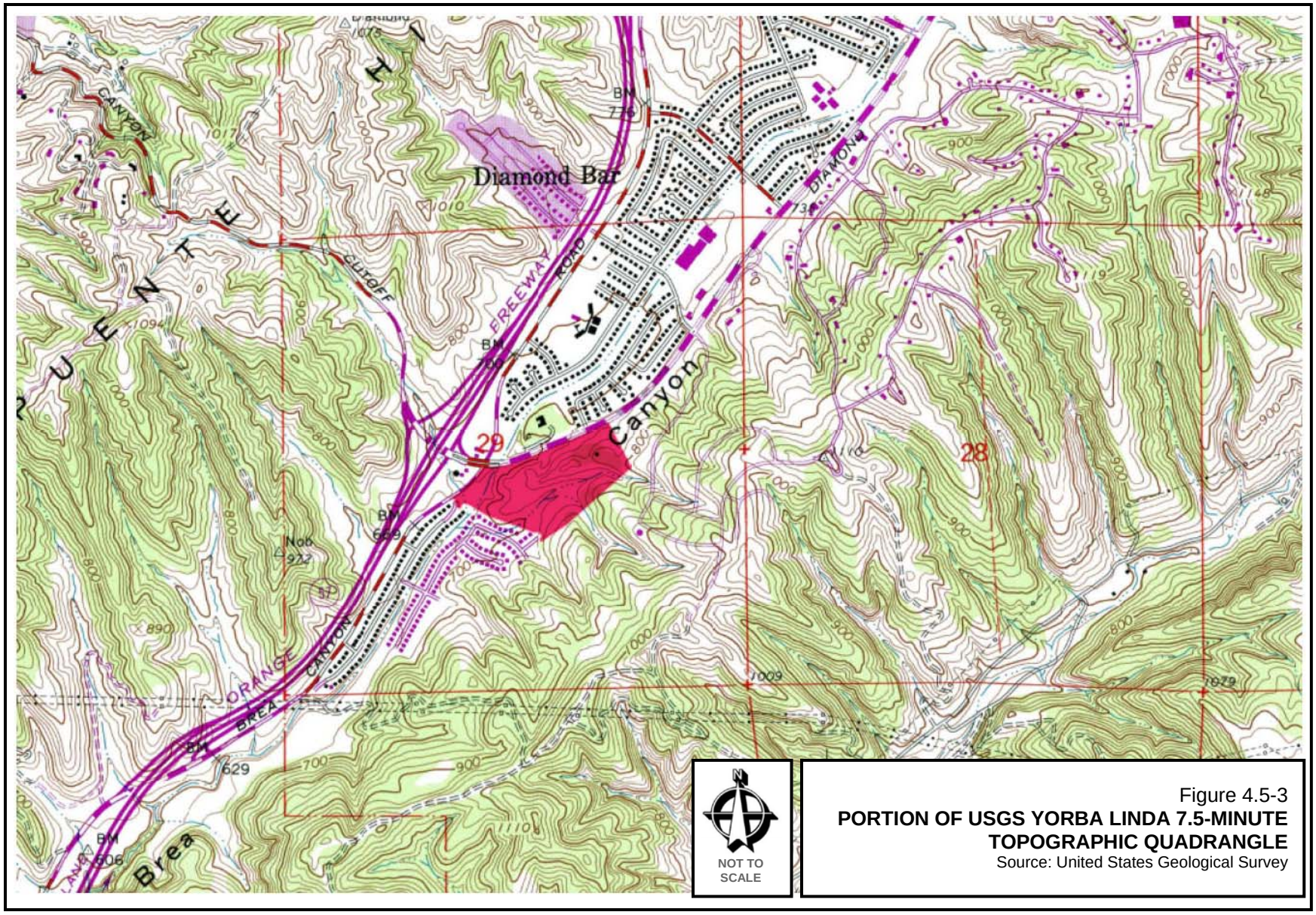


Figure 4.5-3
PORTION OF USGS YORBA LINDA 7.5-MINUTE TOPOGRAPHIC QUADRANGLE
Source: United States Geological Survey

Figure 4.5-4
JURISDICTIONAL FEATURES
Source: PCR Services Corporation

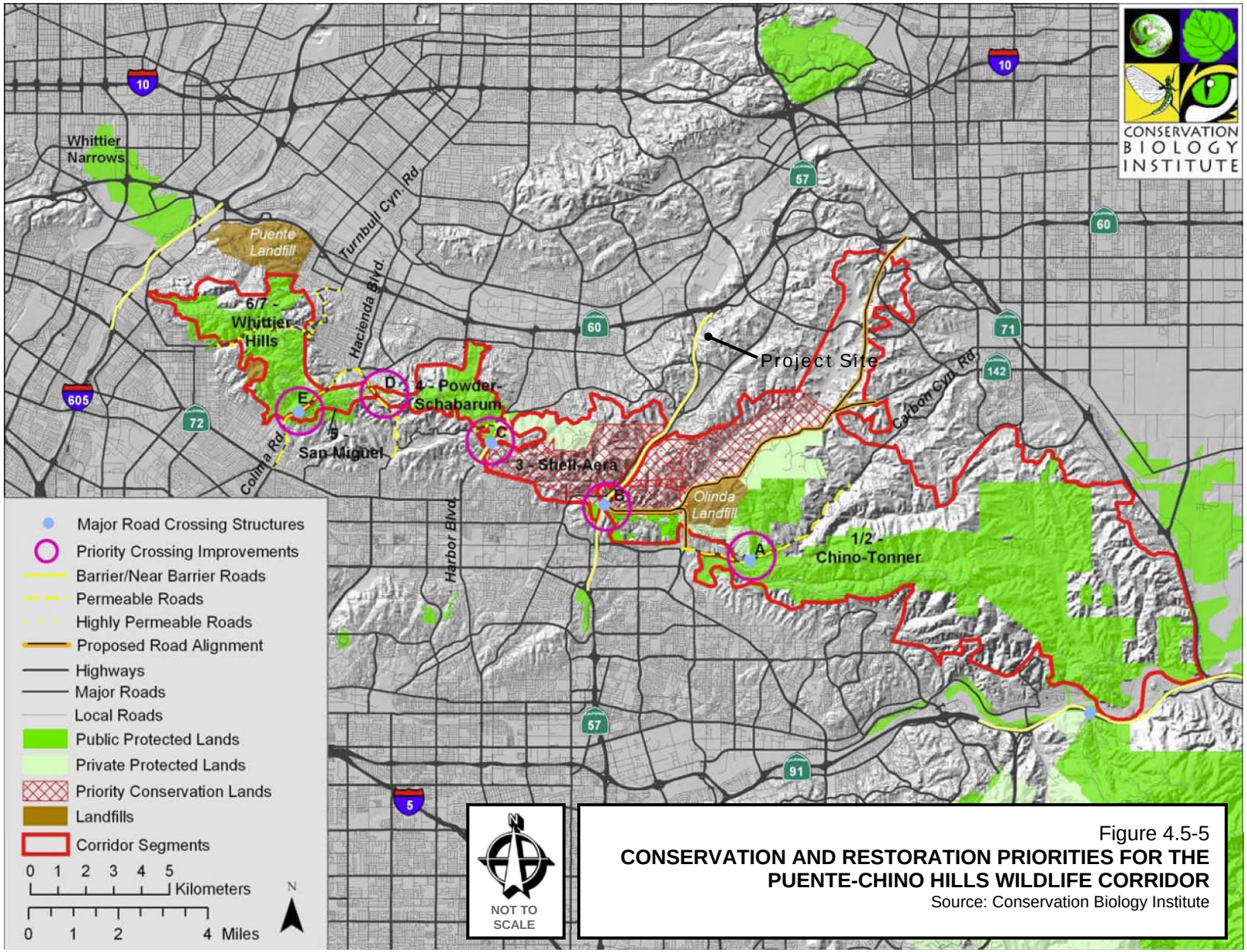


Figure 4.5-5
CONSERVATION AND RESTORATION PRIORITIES FOR THE PUENTE-CHINO HILLS WILDLIFE CORRIDOR
Source: Conservation Biology Institute

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Table 4.5-5
JURISDICTIONAL FEATURES

Feature	Length (feet)	Width (feet)		Acres (acres)		Nature
		ACOE/RWQCB	CDFG	ACOE/RWQCB[1]	CDFG	
Drainage A	1,397	2-10	15-60	0.13 (0,01)	2.84	Intermittent
Drainage A1	579	5	40	0.07	1.26	Intermittent
Tributary A2	149	1	15	<0.01	-[3]	Ephemeral
Total[2]	2,125			0.20 (0.01)	4.10	

Notes:
1. Acreages presented in parenthesis represent the portion of ACOE/RWQCB jurisdiction that meets the three-parameter definition of wetlands.
2. Jurisdictional acreage often overlaps and are, therefore, not additive (e.g., ACOE acreages are often included in the total RWQCB and CDFG jurisdictional acreages).
3. CDFG jurisdictional acreage for Tributary A2 is included in the acreage for Drainage A.

Source: PCR Services Corporation

The variation in width was dependent on slope, material comprising the streambed, and the extent of introduced modifications to the channel. The channel flows generally from east to west, taking two nearly 90-degree turns along its length. For discussion purposes, these two bends delineate three reaches within the drainage. The upper two reaches are densely vegetated with a canopy of black walnut, oak, and willow species and an understory including cattail, poison oak, mule fat, and other non-native grass and forb species.

A small wetland occurs just upstream from the first bend near the confluence with tributary Drainage A1. This wetland is contained entirely within the OHWM and is dominated by a monotypic cattail stand. Throughout the length of the drainage, banks were generally very well defined, often nearly vertical. The downstream reach is a graded channel and is dominated with a mix of non-native grassland species.

Drainage A contains approximately 0.13 acre of ACOE/RWQCB jurisdictional WoUS/WoS, of which approximately 0.01 acres are wetland, and approximately 2.84 acres of CDFG jurisdictional streambed and associated riparian habitat.

- Drainage A1. Drainage A1, the primary tributary to Drainage A, is an intermittent, earthen stream located in the southeastern and central portions of the study area that appears to originate immediately off the project site along the southeastern study area boundary. Similar to Drainage A, its upper terminus is a very-well defined, steeply-sloped ridgeline. The drainage supports California walnut woodland and mule fat scrub. The OHWM averages five-feet wide and the streambed throughout the length of the drainage is comprised of unconsolidated sands.

  The lowest segment of Drainage A1, just above the confluence with Drainage A, is a very disturbed area with extensive past earthwork. This area is not jurisdictional due to a lack of an OHWM or any evidence of flowing water. While no defined flow channel occurs within this area, it is considered a hydrologic connection between Drainage A1 and Drainage A. The lack of a distinct flow channel allows incoming waters to spread over a broad area prior to flowing into Drainage A, via poorly defined sheet flow.

Drainage A1 contains approximately 0.07 acres of ACOE/RWQCB jurisdictional non-wetland WoUS/WoS and approximately 1.26 acres of CDFG jurisdictional streambed and associated riparian habitat.

- Drainage A2. Drainage A2 is a small, ephemeral drainage that appears to be an excavated farm ditch, tributary to Drainage A, that transports surface water from a small subwatershed to Drainage A. Vegetation within the ditch is typically non-native grasses and forb species. The earthen channel is approximately one-foot wide and approximately 1-2 feet deep. Drainage A2 contains less then 0.01 acres of ACOE/RWQCB jurisdictional non-wetland WoUS/WoS, and 2.84 acres of CDFG jurisdictional streambed.

As noted, when Figure 4.5-3 (Portion of USGS Yorba Linda 7.5-Minute Topographic Quadrangle) and Figure 4.5-4 (Jurisdictional Features) are compared, the USGS-delineated "blue-line" streams associated with the Brea Canyon Wash (represented on the project site as the Brea Canyon Storm Drain Channel) and the drainage feature emanating from the terminus of Castle Rock Road have not been identified as jurisdictional WoUS/WoS.

4.5.2 Threshold of Significance Criteria

Presented herein is the threshold of significance criteria identified by the Lead Agency relative to this topical issue. In accordance therewith, the proposed project would normally be deemed to produce a significant biological resource impact if the project or if project-related activities were to:

- Have a substantial adverse effect,[13] 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 CDFG or USFWS.
- Have a substantial adverse effect on a riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially[14] 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.
- Conflict[15] with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted HCP, natural community conservation plan (NCCP), or other approved local, regional, or State HCP.[16]

[13]/ As defined herein, "substantial effect" shall mean a significant loss or harm of a magnitude that, based on current scientific data and knowledge: (1) would cause a species or a native plant or animal community to drop below self-perpetuating levels on a Statewide or regional basis; (2) would cause a species to become threatened or endangered; (3) substantially reduce population numbers of a listed, candidate, sensitive, rare, or other special status species; or (4) eliminate or substantially impair the functions and values of a biological resource in a geographic area defined by interrelated biological components and systems.

[14]/ Certain terms, such as "substantially," are neither defined in CEQA nor in the State CEQA Guidelines and require a local determination whether a proposed action would meet or exceed the stated standard.

[15]/ As defined herein, "conflict" means contradiction of a magnitude which, based on foreseeable circumstances, would preclude or prevent substantial compliance.

[16]/ *Op. Cit*., State CEQA Guidelines, Appendix G, Section IV (Biological Resources).

The FESA provide legal protection for threatened and endangered species nationwide. California has similar mandates, including the CESA, the California Species Preservation Act of 1980, and the California Native Plant Protection Act of 1977. Certain species listed as threatened or endangered by the USFWS and/or by the California Fish and Game Commission are also protected by the California Native Plant Protection Act. Certain plant and animal taxa are considered sensitive as a result of their declining populations, vulnerability to habitat change, and restricted distributions. Some habitats are considered sensitive biological resources. The CNPS compiles and maintains an inventory of sensitive plant species, including State and federally recognized rare plant species and those plants determined to be rare by that organization and other experts. In accordance therewith, the proposed project would normally be deemed to produce a significant biological resource impact if the project or if project-related activities were to:

- Result in a violation of any applicable regulations promulgated by a State or federal resource agency for the protection of rare, threatened, endangered, or otherwise protected species and their habitats, including wetlands.
- Result in a violation of any applicable State or federal laws prohibiting the elimination or net reduction in a site's or an area's biological value through either direct removal of sensitive or protected on-site or near-site biological resources or through the indirect disruption or interference with those resources whose impact is not substantially offset through the avoidance of such impacts or through the provision of substitute resources or environs or other measures providing reasonable and relatively equivalent compensation for such impacts.

Section 5650 of the CFGC stipulates that "[i]t is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of this State any of the following: (a) Any petroleum, acid, coal or oil tar, lampblack, aniline, asphalt, bitumen, or residuary product of petroleum, or carbonaceous material or substance. (b) Any refuse, liquid or solid, from any refinery, gas house, tannery, distillery, chemical works, mill or factory of any kind. (c) Any sawdust, shavings, slabs, edgings. (d) Any factory refuse, lime, or slag. (e) Any *Cocculus indicus*. (f) Any substance or material deleterious to fish, plant life, or bird life." In accordance therewith, the proposed project would normally be deemed to create a significant biological resource impact if the project of if project-related activities were to:

- Discharge into waters of the State any substance or material deemed to be deleterious to fish, plant life, or bird life.

As further indicated in Section 1603 of the CFGC, "[i]t is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designed by the department [CDFG], or use any material from the streambeds, without first notifying the department of such activities, except when the department has been notified pursuant to Section 1601." In accordance therewith, the proposed project would normally be deemed to create a significant biological resource impact if the project or if project-related activities were to:

- Substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake subject to the jurisdiction of the CDFG except through prior notification and authorization of that agency.

As indicated in Section 735.5(d) in Title 14 of the CCR, a presumption of adverse effect exists if and when the environmental checklist form or the initial study indicates that the project may or

will result in chances to the following resources: (A) riparian land, rivers, streams, watercourses, and wetlands under State and federal jurisdiction; (B) native and non-native plant life and the soil required to sustain habitat for fish and wildlife; (C) rare and unique plant life and ecological communities dependent on plant life; (D) listed threatened and endangered plant and animals and the habitat in which they are believed to reside; (E) all species of plant or animals as listed as protected or identified for special management in the CFGC, the PRC, the California Water Code, or regulations adopted thereunder; (F) all marine and terrestrial species subject to the jurisdiction of the CDFG and the ecological communities in which they reside; and (G) all air and water resources the degradation of which will individually or cumulatively result in a loss of biological diversity among the plants and animals residing in that air and water. The presence of the resources cited in Section 735.5(d) of the CCR constitute a basis for the presumption that a project has the potential to produce an adverse effect on fish and wildlife resources or the habitat upon which the wildlife depends but does not presume that such effect is, merely by the presence of those resources, significant.

The Lead Agency has not identified other applicable or potentially applicable standards that can appropriately be extracted from other related policy or environmental documents and used as the basis for assessing the potential significance of project-related and cumulative biological resource impacts.

4.5.3 Impact Analysis

4.5.3.1 Construction Impacts

Biological Resource Impact 5-1*. Construction activities and fuel-modification requirements will result in direct impacts from vegetation removal of about 30.4 acres located within the tract map area. Fuel modification requirements imposed by the Los Angeles County Fire Department could directly impact additional vegetation.*

Level of Significance before Mitigation*. Less-than-significant impact.*

For the purpose of this analysis, it is assumed that the entire project site will be disturbed through those grading activities required to optimize the development potential of the project site. Project implementation will, therefore, result in the conversion of the entire project site from that of an open space area to an urban use comprising of both commercial and residential development. Based on the acreage totals outlined in Table 4.5-2 (Plant Communities on the Project Site), during grading operations, impacts will occur to approximately 2.8 acres of mule fat scrub, 3.6 acre of eucalyptus stand/disturbed, 20.4 acre of disturbed/ruderal, and 0.9 acre of ruderal/goldenbush scrub. None of these communities represent sensitive plant communities and are not considered rare or of high priority for inventory by the CNDDB. Impacts to these plant communities would, therefore, constitute a less-than-significant impact.

Project implementation would result in the direct removal of numerous common plant species within the project area. Common plant species present within the study area occur in large numbers throughout the region. Since loss, removal, and destruction to those common plant species occurring on the project site do not meet the identified threshold of significance criteria, construction-term impacts on those species is not considered to be significant.

A total of approximately 0.3 acres of southern willow scrub will be impacted by the project's implementation. Unlike other more common plant communities, southern willow scrub is

considered high-priority for inventory under the CNDDB because it is experiencing decline throughout its range. Notwithstanding its categorization by the CNDDB, the loss, removal, and destruction of approximately 0.3 acres of southern willow scrub on the project site would not constitute a significant impact based on the limited presence of this plant community within the project boundaries and its isolation from other off-site areas. The habitat is marginal in its value because it is fragmented (i.e., not contiguous with similar habitats within and beyond the project boundaries). In addition, this community is not expected to support sensitive species. Focused sensitive plant surveys were negative and habitat assessments for sensitive wildlife species (e.g., the least Bell's vireo and southwestern willow flycatcher) determined that the habitat is not suitable to support these species.

Due to the fragmented nature of the southern willow scrub habitat within the project area and frequent occurrence of human disturbances, the least Bell's vireo and southwestern willow flycatcher are not expected to occur on the project site. Further, the absence of a perennial system and lack of a tiered vegetation composition further reduces the potential for these two sensitive bird species to occur. Although this plant community is associated with ACOE/RWQCB and CDFG jurisdictional waters and impacts to the habitat will require permitting, the loss, removal, and destruction of this plant community on the project site would neither eliminate nor substantially diminish the functions and values of the on-site drainages as a regional biological resource.

The primary impacts of the proposed project on wildlife resources are the removal and disruption of habitat and the loss and displacement of wildlife, resulting in a less diverse and less abundant local faunal population. Adverse impacts to wildlife are generally associated with the degree of habitat loss and fragmentation from the standpoint of physical character, quality, diversity, and abundance of vegetation. Implementation of the proposed project would result in the loss of primarily disturbed land. The proposed impacts would cause the direct mortality of some common wildlife species and the displacement of more mobile species to suitable habitat areas nearby. These impacts, by themselves, would not be expected to reduce general wildlife populations below self-sustaining levels within the region and impacts to common wildlife species are considered less than significant.

Several of the sensitive wildlife species, as listed in Table 4.5-4 (Sensitive Wildlife Species) above, may occur within the region but are not expected to occur within the project area due to the lack of suitable habitat. No significant impacts are, therefore, expected to occur to these species. Several additional sensitive wildlife species, as detailed by taxonomic group, have at least a moderate potential to occur within the project area.

- Sensitive reptile species. No sensitive reptiles were observed within the study area and none are expected to occur; therefore, no significant impacts to sensitive reptiles are anticipated.

- Sensitive bird species. One sensitive bird species (Cooper's hawk) was observed within the project area and three additional species (white-tailed kite, sharp-shinned hawk, and loggerhead shrike) have the potential to occur within the study area due to the presence of suitable habitat. Since these species are not protected by federal or State listings as threatened or endangered and since the loss of individuals would not threaten the regional populations, removal of their habitat represents an adverse but less than significant impact to regional populations.

- Sensitive mammal species. No sensitive mammal species were observed within the study area; however, three species (pallid bat, San Diego desert woodrat, and northwestern San Diego pocket mouse) have the potential to occur. None of these species are protected by federal or State listings as threatened or endangered and the loss of individuals would not threaten the regional populations. The removal of their habitat represents an adverse but less-than-significant impact to regional populations.

Project implementation would result in disturbances to local wildlife movement within and across the study area. The project area is located near the open space areas of the "Puente-Chino Hills wildlife corridor," about which several wildlife movement studies have been conducted, and which is discussed in greater detail below. The project site is surrounded by urban development and is not connected to the larger open space areas to the south. Based on the absence of connectivity to other open space areas, during construction, the conversion of the project site to an urban use would not significantly impact regional wildlife movement.

Since none of the threshold of significance criteria would be exceeded, the identified biological resource impact would be less than significant and no project conditions and/or mitigation measures are recommended or required.

Biological Resource Impact 5-2*. The project will permanently impact approximately 2,125 linear feet of streambed, including approximately 0.20 acres of United States Army Corps of Engineers (ACOE) and Regional Water Quality Control Board (RWQCB) jurisdictional waters and approximately 4.10 acres of California Department of Fish and Game (CDFG) jurisdictional streambed and associated riparian habitat.*

Level of Significance before Mitigation*. Potentially significant unless mitigation incorporated.*

Project implementation will result in direct impacts to federal and State-administered jurisdictional waters. Impacts to jurisdictional waters will affect those presented in Figure 4.5-4 (Jurisdictional Features) and described in Table 4.5-5 (Jurisdictional Features). Project implementation will result in direct impacts to approximately 2,125 linear feet of streambed. A total of approximately 0.20 acre of ACOE/RWQCB jurisdictional WoUS and approximately 4.10 acres of CDFG jurisdictional streambed and associated riparian habitat would be impacted by the proposed development. No direct impacts to jurisdictional waters are anticipated beyond the project boundaries. The project will likely require a nationwide Section 404 (CWA) permit from the ACOE, a Section 401 (CWA) water quality certification from the RWQCB, and a Section 1602 (CFGC) streambed alteration agreement from the CDFG. Resource agencies could stipulate that compensatory resources for identified impacts be provided at a ratio greater than the identified area of disturbance. For example, permit conditions could require the provision of compensatory resources at a ratio of 2:1 or more.

Impacts to jurisdictional features will be subject to the regulations set forth by the ACOE, RWQCB, and CDFG, which will require mitigation or result in the imposition of other conditions for the identified impacts to jurisdictional waters. Generally, mitigation can typically occur on the project site and/or at an off-site location, such as an ACOE-approved mitigation bank, through the preservation, restoration, enhancement, or creation of compensating jurisdictional waters.

Direct impacts upon ACOE/RWQCB and CDFG jurisdictional waters can be effectively mitigated through either the enhancement of remaining on-site or through the provision of compensatory

resources. Although not required based on existing regulatory requirements, a project condition (Condition of Approval 5-1) has been recommended in order to ensure compliance with the provisions of Sections 401-404 of CWA and Sections 1600-1616 of the CFGC.

Although fragmented and surrounded by extensive human disturbances, the regulatory agencies have a "no-net-loss" policy for wetlands. Without replacement of the loss of wetland functions and values, impacts to jurisdictional features are considered potentially significant.

The ACOE and the CDFG will require the Applicant to explore alternatives to reduce impacts and will require mitigation for all unavoidable impacts. The ACOE's "no-net-loss" policy requires that any unavoidable impacts to wetland functions and values be replaced. In addition, the RWQCB will add restrictions to control runoff from the study area, require on-site treatment of runoff to improve water quality, and impose BMPs on construction operations. In recognition of the presence of jurisdictional waters, a mitigation measure (Mitigation Measure 5-1) has been formulated. That measure requires, unless a greater ratio is required by permitting agencies: (1) the on-site and/or off-site replacement of ACOE/RWQCB jurisdictional waters and wetlands at a 2:1 ratio; (2) the on-site and/or off-site replacement of CDFG jurisdictional streambed and associated riparian habitat at a 2:1 ratio; and (3) the incorporation of design features into the proposed project's design and development. When implemented, the recommended measure would reduce impacts to ACOE/RWQCB and CDFG jurisdictional areas to a less-than-significant level.

Biological Resource Impact 5-3*. Proposed grading and grubbing activities will result in the removal of 83 protected ordinance-size trees, including 75 California black walnut, six willow, and two coast live oak trees, which now exist on the project site.*

Level of Significance before Mitigation*. Less-than-significant impact.*

Project implementation would result in the loss of approximately 1.5 acres of California walnut woodland and 0.6 acre of California walnut woodland/disturbed. Because it is experiencing a decline throughout its range, California walnut woodland is considered high priority for inventory under the CNDDB. Due to the limited distribution of California walnut woodland in southern California, the loss of approximately 2.1 acres of habitat supporting California walnut woodland would be considered potentially significant.

As shown in Figure 4.5-2 (Sensitive Tree Location Map), a total of 75 California black walnut, six willow, and two coast live oak trees will be impacted by the proposed project. Each of these species are protected trees under the City's tree preservation ordinance, codified in Chapter 22.38 (Tree Preservation and Protection) of the Municipal Code. In accordance with the ordinance, impacts to protected trees shall be mitigated and replaced at a minimum ratio of 3:1 for residential parcels, commercial, and industrial properties greater than 20,000 square feet. The Director or the Planning Commission may, however, authorize an alternative replacement ratio. Replacement trees shall be a minimum box size of 24 inches for six or fewer replacement trees. For greater than six replacement trees, the sizes shall be determined by the Director (Section 22.38.130[b]-[c]], Municipal Code).

In addition, no person shall remove or relocate a protected tree or undertake develop within the protection zone of a protected tree without first obtaining a tree removal permit (Section 22.38.050, Municipal Code) from the Director. However, when the removal or relocation of a protected tree is proposed in connection with an application for another discretionary permit, the

Director may waive the requirement of a separate tree removal permit and require necessary information to be submitted as part of the discretionary permit application (Section 22.38.070, Municipal Code).[17]

As indicated in the ordinance, the Applicant may be required, as a condition of permit approval, to enter into a tree maintenance agreement prior to removal of any protected tree or commencement of construction activities that may adversely affect the health and survival of trees to be preserved. The maintenance agreement may include provisions for the submittal of arborist reports during and after construction activities, installation of replacement trees and irrigation systems by or under the supervision of a certified arborist, replacement of trees that die during or after construction phases, periodic fertilizing and pruning, and submittal of a security deposit as may be necessary to ensure the health and survival of the affected trees during the effective date of the tree maintenance agreement. The performance security may be required for three years from the date of the approval or as determined by the Director. The amount of the performance security deposit shall be equal to 125 percent of the cost of a nursery grown tree and installation by a qualified professional (Section 22.38.130[f], Municipal Code).

Although not specifically required based on the existence of ordinance-based obligations, a number of conditions (Condition of Approval 5-2 and Condition of Approval 5-3) have been recommended in order to specify the number type of replacement trees to be provided. Those conditions require the preparation of an arborist-prepared tree study and specified replacement requirements for qualifying trees and serve to mitigate impacts on California walnut woodlands, respectively. With regards to nesting birds and raptors, although not specifically required based on existing federal requirements established under the MBTA, another project condition (Condition of Approval 5-4), promoting vegetation removal activities outside the nesting season, has been formulated to further describe the Applicant's obligations under that act.

Biological Resource Impact 5-4*. Construction activities initiated during the nesting season, typically extending from February 15 to August 15 of each year, could impact nesting birds and raptors in violation of the federal Migratory Bird Treaty Act.*

Level of Significance before Mitigation*. Less-than-significant impact.*

Table 4.5-4 (Sensitive Wildlife Species) discusses the birds that have been identified as having the potential to occur on the project site. As noted therein, one sensitive wildlife species (Cooper's hawk) was observed within the project area and several additional species have the potential to occur. As a result, the project area has the potential to support both nesting raptor and songbird due to the presence of trees, shrubs, and ground cover.

Based on the presence of suitable vegetation, the removal of vegetation during the breeding season (typically extending between February 15 and August 15) would constitute a potentially significant impact. Disturbing or destroying active nests is, however, a violation of the MBTA. In addition, nests and eggs are protected under Section 3503 and 3513 of the CDFC. Existing

[17]/ To the extent feasible, tree relocation or replacement shall be on the same site from which the trees are removed. A written report by an arborist is required concerning the methodology and feasibility of transplanting trees. Where site conditions preclude the long-term success of replacement trees, the Director or Planning Commission may require either or both of the following alternatives: (1) planting replacement trees on public property (e.g., designated open space areas or public parks); and/or (2) monetary donation to a tree replacement fund in the amount equal to the value of required replacement trees and the cost of installation, as established by an arborist's report.

federal and State regulations are in place, such that no additional mitigation measures are recommended or required to protect migratory birds and raptors. A condition of approval (Condition of Approval 5-4) has, however, been formulated to describe the Applicant's obligations under the MBTA.

4.5.3.2 Operational Impacts

Biological Resource Impact 5-5*. Project implementation has the potential to impede existing wildlife movement patterns across the project site.*

Level of Significance before Mitigation*. Less-than-significant impact.*

It has been reported that in "environments fragmented by human development disruption of movement patterns can alter essential ecosystem functions, such as top-down regulation by large predators, gene flow, natural patterns and mechanisms of pollination and seed-dispersal, natural competitive or mutualistic relationships among species, resistance to invasion by alien species, and prehistoric patterns of energy flow and nutrient cycling. Without the ability to move among and within natural habitats, species become more susceptible to fire, flood, disease and other environmental disturbances and show greater rates of local extinction. The principles of island biogeography, models of demographic stochasticity, inbreeding depression, and metapopulation theory all predict that isolated populations are more susceptible to extinction than connected populations. Establishing connections among natural lands has long been recognized as important for sustaining natural ecological processes and biological diversity."[18]

Researchers have indicated that wildlife corridors are required by animals for three primary reasons: (1) to allow for the movement of animals between remaining natural areas, thus replenishing populations and maintaining genetic diversity; (2) provide escape routes from fire, predators, and human disturbance; and (3) provide a travel route for animals to disperse, forage, and breed. A wildlife movement corridor is defined as a piece of habitat, usually linear in nature that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Corridors generally contain suitable cover, food, and water to support species and facilitate movement between habitat areas.

In November 2000, a wildlife conference was conducted in San Diego involving, among others, the California Department of Parks and Recreation, the USGS, The Nature Conservancy, and the California Wilderness Coalition. The conference resulted in the publication of "Missing Linkages: Restoring Connectivity to the California Landscape," which identified 232 "critical habitat linkages" throughout California, and spurred the subsequent establishment of the South Coast Wildlands Project (SCWP). Of those, "Linkage No. 43 (Coal Canyon)" is located near but is not inclusive of the project site. The identified linkage connects the Puente Hills to the Santa Ana Mountains and is identified as a "choke-point," defined as a narrow, impacted, or otherwise tenuous habitat linkage connecting two or more habitat blocks. As indicated in the conference report: "This linkage was identified as providing habitat connectivity for mountain lion, bobcat, coyote, and mule deer. Habitat types identified in the linkage included chaparral, coastal sage scrub, Tecate cypress, and annual grassland. . .Urbanization was the only listed threat."[19]

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[18]/ Penrod, Kristeen, *et al*., South Coast Missing Linkages Project: A Linkage Design for the San Gabriel-Castaic Connection, South Coast Wildlands, March 2004, p. 1; Penrod, Kristeen, *et al.*, South Coast Missing Linkages Project: A Linkage Design for the San Gabriel-San Bernardino Connection, South Coast Wildlands, May 2004, p. 1.

[19]/ Penrod, K., Hunter, R, and Merrifield, M., Missing Linkages: Restoring Connectivity to the California Landscape, Conference Proceedings, Cosponsored by California Wilderness Coalition, The Nature Conservancy,

The study area is located in the Puente Hills in proximity to the open space areas comprising what has been referred to by the Conservation Biology Institute (CSI) as the "Puente-Chino Hills wildlife corridor."[20] The Puente-Chino Hills wildlife corridor is described as a generally undeveloped area extending approximately 26 miles from the Santa Ana Mountains within the Cleveland National Forest (Trabuco Ranger District) northwesterly through Chino Hills State Park to the San Gabriel River. The area is comprised of both public and private properties and is traversed by a number of major roadways (including the SR-57, SR-91, and the I-605 Freeways) which create substantial barriers to wildlife movement. Portions of Carbon and Tonner Canyons (located to the east of the SR-57 Freeway) and much of the area from the SR-57 Freeway westward toward Harbor Boulevard are privately owned and may be subject to subsequent development.

As indicated in the "Resource Management Plan – Puente Hills Native Habitat Preservation Authority," the Puente-Chino Hills wildlife corridor "[c]overs more than 30,000 acres of land" and "supports a wide variety of inhabitants. The distribution of vegetation types and subtypes within the Puente-Chino Hills is influenced by a variety of abiotic factors, including soils, slope steepness and aspect, elevation, and microclimate. These, in turn, are influenced significantly by the combination of the geology of the region and local climate influences. The Puente-Chino Hills are in a region that represents a transition between two coastal sage scrub types, Venturan and Riversidean, as classified Statewide by Holland. When combined with other habitat types in the area, such as chaparral and oak/sycamore woodland, the vegetation provides habitat for a unique assemblage of plants and animals. Biologically, this area preserves a microcosm of the California Floristic Province, an identified biodiversity hot spot in North America and a genetic reserve for the continent."[21]

As illustrated in Figure 4.5-5 (Conservation and Restoration Priorities for the Puente-Chino Hills Wildlife Corridor), the project site is located to the north of the area identified by the CSI as part of the Puente-Chino Hills wildlife corridor. The project site is surrounded by urban development and is not directly linked to the larger open space areas to the south. Although wildlife movement corridors exist in the general project area, the project site does not serve any connectivity or linkage role with regards to regional wildlife movement.

Since none of the threshold criteria would be exceeded, the identified impact would be less than significant and no project conditions and/or mitigation measures are recommended or required.

Biological Resource Impact 5-6*. If improperly designed and maintained, the proposed on-site flood control facilities and structural and treatment control Best Management Practices (BMPs) could potentially provide a habitat for the propagation of mosquitoes and other vectors.*

Level of Significance before Mitigation*. Less-than-significant impact.*

A vector refers to any organism that can transmit an infectious disease pathogen to another organism. Vectors include any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rats, but not including any domestic animal.

United States Geological Survey, Center for Reproduction of Endangered Species, and California State Parks, 2001, pp. 51-52

[20]/ Conservation Biology Institute, Maintaining Ecological Connectivity across the "Missing Middle" of the Puente-Chino Hills Wildlife Corridor, Final Report, July 2005.

[21]/ Puente Hills Landfill Native Habitat Preservation Authority (LSA Associates), Resource Management Plan – Puente Hills Landfill Native Habitat Preservation Authority, adopted July 26, 2007.

Infections acquired from vectors are referred to as vector-borne diseases. Approximately 3,000 mosquito species have been identified worldwide of which approximately 200 species are in the United States. Since one unifying feature of this group is that they all have obligate aquatic larvae and pupae, they must have water to complete their life cycle.

Before the discovery of modern pesticides, mosquito abatement was effectively carried out by applying petroleum-based liquids (diesel oil and kerosene) to the water surface. After World War II, pesticides, including the use of DDT (dichlorodiphenyltrichloroethane), were widely used. Mosquitoes developed a resistance to DDT and other related insecticides, thus decreasing there effectiveness. In the decades that followed, many new classes of insecticides were developed for mosquito control, each with decreasing environmental toxicity. Modern mosquito control practices integrate a diversity of management practices, including the use of environmentally sound larvicides, biological control agents, and habitat management.

Urban stormwater runoff regulations now mandate the construction and maintenance of structural BMPs for both volume reduction and pollution management. Those BMPs can create additional sources of standing water and sources for mosquito propagation.

In 1998, the California Department of Health Services' (DHS) Vector-Borne Disease Section (VBDS) entered into an agreement with Caltrans to provide technical expertise regarding vector issues within its stormwater BMP retrofit pilot study. As part of that study, VBDS conducted a two-year study of vector production associated with the 37 operational stormwater BMP structures in southern California. The study concluded that a variety of vector species, particularly mosquitoes, utilize the habitats created by stormwater BMP structures.

As reported by the LACDPW: "Certain BMP designs have the potential to create more mosquito habitat than others. Those designs that hold permanent water, like retention ponds, wet basins, or underground chambers, have a much greater potential to breed mosquitoes than those designed to drain or infiltrate rapidly. Mosquitoes can even utilize underground sources of standing water to breed. According to the California Department of Health Services, mosquitoes can "smell" standing water and can navigate in darkness with no problem. Adults may pass through spaces as narrow as 1/8 of an inch to access breeding sources. Consequently, those actions and designs that eliminate standing water, seal all access cracks, and cover openings with netting have been shown to be effective in above- and below-ground BMPs installed by Caltrans in its retrofit pilot program in Los Angeles and San Diego Counties. The long-term effectiveness, though, of those preventative measures requires further study. While it is nearly impossible to completely eliminate mosquitoes from BMPs because of the large number of factors (e.g., sediment build-up, rain fall, non-stormwater discharges, etc.) that influence these devices, properly designed, managed, and maintained, this BMP type should produce negligible numbers of mosquitoes. For example, it is important that underground BMPs that hold standing water be built with tightly fitting covers. Similarly, inlet and outlet pipes from the BMP sump should be submerged (or sealed during no-flow periods) to minimize mosquito access to water."[22]

Design and maintenance of BMP structures can contribute to the production of vectors. In general, any design that includes standing water or requires more than 72 hours to drain serves as a source of mosquitoes and other vectors. Aquatic habitats that last only three to five days

[22]/ Los Angeles County Department of Public Works, Frequently Asked Questions, FAQ Question No. 31 (http://ladpw.org/general/faq/index.cfm?Action=getAnswers&FaqID=IyMtLzMK&Theme=default&ShowTemplate=).

generally do not generally allow for the complete development of mosquito larvae. In California, the general recommendation has been for structures to drain completely in 72 hours or less.

Dry weather flows associated with urban runoff can contribute to vector production by prolonging the occurrence of water within those structures. In addition, without proper maintenance, stormwater BMP structures can degrade and experience a degradation of their pollutant-removal efficiency. Stagnant water with a high concentration of organic material can attractive mosquitoes. In addition, structural damage can reduce BMP performance and create conditions allowing for standing water. The accumulation of vegetation, silt, and debris within structures necessitates the need for routine maintenance to prevent the occurrence of standing water.[23]

All vector-control districts in California derive their formation, enabling, organization, and authoritative powers from the California Health and Safety Code. In the general project area, vector control is performed by the Greater Los Angeles County Vector Control District (GLACVCD), a County special district funded by ad valorum property and benefit assessment taxes. Service programs conducted by the GLACVCD include preventing and controlling mosquitoes, aquatic midges, and simulium black flies. GLACVCD was a participant in the Caltrans study and conducted weekly vector monitoring and control services for 16 operational stormwater BMP structures, representing eight different technologies, were built within district boundaries. Data collected between May 1999 and April 2001 was used to make a preliminary assessment of vector production potential, design, and maintenance recommendations to order to minimize vector breeding, and formulate estimates of vector-control costs.[24]

With regards to new development, the GLACVCD routinely expresses concern about the potential for vector production associated with BMPs. Although the impact does not itself elevate to a level of significance, a project condition (Condition of Approval 5-5) has been formulated to ensure that structural BMPs do not contribute to the production of vectors.

4.5.3.3 Cumulative Impacts

Biological Resource Impact 5-6*. Implementation of the proposed project, in combination with other reasonably foreseeable future projects, will contribute incrementally to the continuing reduction in open space areas in the general project area and contribute to the general decline in species diversity throughout the region.*

Level of Significance before Mitigation*. Less-than-significant impact.*

Implementation of the proposed project and those reasonably foreseeable future projects listed in Table 3-4 (Related Projects Summary) will contribute incrementally to the continuing urbanization of the region. Each project is, however, subject to independent environmental review and, to the extent those related projects were determined by the corresponding permit entity to produce adverse impacts on existing biological resources, there exists a reasonable expectation that mitigation measures, appropriate permit conditions, and/or other actions would

[23]/ Metzer, Marco E., *et al*., The Dark Side of Stormwater Runoff Management: Disease Vectors Associated with Structural BMPs, Stormwater – The Journal for Surface Water Quality Professionals, Volume 3, No. 2, March/April 2002.

[24]/ Kluh, Susan, *et al.*, Stormwater, BMPs, and Vectors: The Impact of New BMP Construction on Local Public Health Agencies, Stormwater – The Journal for Surface Water Quality Professionals, Volume 3, No. 2, March/April 2002.

be imposed by each permitting entity to reduce those biological resource effects to the maximum extent feasible.

Long-term development trends throughout the region suggest the further areawide diminution of habitat areas. As indicated in SCAG's "Regional Comprehensive Plan and Guide," "[m]uch of Southern California's biological diversity has been lost during the past several decades. Future development necessitated by the predicted growth in the region will place demands on the remaining resources."[25]

SCAG further notes: "Southern California ecosystems, mostly those on the lower elevations and gentle slopes of urbanizing areas, are shrinking, becoming fragmented, and not being managed to the point that many are in danger of serious dysfunction and hundreds of plant and animal species have become candidates for listing under the Endangered Species Acts. The potential for more species to be listed will continue to increase as more lands get converted to urban development. Non-native plants and animals are invading many sensitive habitats and are displacing native species."[26]

The County has established a number of significant ecological areas (SEAs).[27] The nearest SEA to the project site is the Puente Hills Significant Ecological Area, a 13,421-acre area beginning in the west within and adjacent to Whittier Narrows Dam Country Recreation Area and Flood Control Basin at the confluence of the San Gabriel and Rio Hondo Rivers, moving east along Workman Mill Road at the mouth of Sycamore Canyon, and ending along the Los Angeles/San Bernardino County lines.

In addition, the project area is located within a region that contains several large open space areas, including Chino Hills State Park, Carbon Canyon Regional Park, and, potentially, the Puente Hills Landfill Native Habitat Preservation Authority's lands and the Puente-Chino Hills wildlife corridor. These open space areas currently provide extensive foraging areas for regional populations of those sensitive wildlife species potentially occurring within the general project area. Since none of the sensitive wildlife species observed or expected to occur on the project site are either federally or State listed, the project's contribution to cumulative impacts on sensitive wildlife species would not be significant.

The proposed project will impact approximately 2.1 acres of California walnut woodland and 0.3 acres of southern willow scrub habitat. As a result, the project will add incrementally to the regional loss of plant communities considered high-priority for inventory under the CNDDB. The City's tree preservation ordinance stipulates that protected trees, including California black

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[25]/ Southern California Association of Governments, Regional Comprehensive Plan and Guide, March 1996, p. 9-9.

[26]/ *Ibid*., p. 9-31.

[27]/ In the County, an area qualifies for recognition as an SEA if it possesses one or more of the following features or classes: (1) Is the habitat of rare, endangered, or threatened plant or animal species; (2) Represents biotic communities, vegetative associations, or habitat of plant or animal species that are either one-of-a-kind or are restricted in distribution on a regional basis; (3) Represents biotic communities, vegetative associations, or habitat of plant or animal species that are either one-of-a-kind or are restricted in distribution in the County; (4) Is habitat that at some point in the life cycle of a species or group of species serves as a concentrated breeding, feeding, resting, or migrating grounds, and is limited in availability; (5) Represents biotic resources that are of scientific interest because they are either an extreme in physical/geographical limitations or they represent an unusual variation in a population or community; (6) Is an area important as game species habitat or as fisheries; (7) Is an area that would provide for the preservation of relatively undisturbed examples of the natural biotic communities in the County; and (8) Is a special area, worthy of inclusion, but one which does not fit any of the other seven criteria.

walnut, shall be replaced at a ratio of at least 3:1. While cumulative impacts are considered adverse, the project's contribution to those cumulative impacts would be less than significant.

Southern willow scrub habitat is considered sensitive because of its potential to support sensitive wildlife species. This habitat type within the study area is limited in distribution and is not connected to contiguous like habitats. As a result this on-site plant community is not expected to support sensitive species. The loss of approximately 0.3 acre of southern willow scrub will add incrementally to regional impacts but is not considered cumulatively significant.

4.5.4 Project Conditions and Mitigation Measures

Project Conditions

- **Condition of Approval 5-1**. In order to demonstrate compliance with applicable State and federal resource protection policies designed to protect or compensate for the loss of biological resources, prior to the approval of a grading permit, were applicable, the Applicant shall provide the Director with documentation of receipt of the following permits: (1) Section 401 (Federal Clean Water Act) water quality certification or waiver of waste discharge requirements from the Regional Water Quality Control Board, Los Angeles Region; (2) nationwide Section 404 (Federal Clean Water Act) permit from the United States Army Corps of Engineers; and (3) Section 1602 (California Fish and Game Code) streambed alteration agreement from the California Department of Fish and Game. The Applicant shall comply with all associated permit requirements.

- **Condition of Approval 5-2**. Prior to the issuance of a grading permit, the Applicant shall submit to the Community Development Director and, when acceptable, the Director shall accept for subsequent processing an arborist-prepared tree survey, specifying: (1) the precise number and type of protected trees that will be directly or indirectly impacted by the proposed project; (2) the number (ratio), type, size, and source of trees that will be planted in compensation thereof; (3) the location of all replacement trees; (4) planting notes and irrigation requirements; (4) performance standards for the survivability of replacement trees; (5) a maintenance agreement stipulating the Applicant's obligations for a minimum 3-year period, including the annual reporting; and (6) the amount and derivation of the security deposit required under the City's tree preservation ordinance.

- **Condition of Approval 5-3**. <u>California Walnut Woodland</u>. Measures to mitigate impacts to California walnut woodland will be orchestrated in concert with the replanting of trees protected by the City's tree preservation and protection ordinance. To the extent possible, southern California black walnut trees will be planted on manufactured slopes within the development. Prior to the issuance of a grading permit, a plan shall be submitted to the Community Development Director and, when acceptable, the Director shall approve a plan describing the number, size, and location of walnut trees to be planted and outline success criteria and adaptive management procedures to ensure that the mitigation plan is successful.

- **Condition of Approval 5-4**. As determined feasible by the Community Development Director, initial vegetation removal activities shall be conducted outside the nesting season (February 15-August 15) to avoid impacts upon nesting birds. If initial vegetation removal activities occur during the nesting season, prior to the commencement of any grading or grubbing activities, all suitable habitat shall first be thoroughly surveyed by a

qualified biologist for the presence of nesting birds. If any active nests are detected, a buffer of at least 300 feet (500 feet for raptors) shall be delineated, flagged, and vegetation removal activities avoided therein until the nesting cycle is complete, as determined by the surveying biologist or a qualified biological monitor.

- **Condition of Approval 5-5**. BMP devices shall be designed in consultation with the Greater Los Angeles County Vector Control District and shall be of a type which minimizes the potential for vector (public nuisance) problems and maintained throughout the project life so as not to contribute to those problems. Unless accepted by the County and/or by the City, the responsibilities for and the funding of the maintenance of Best Management Practices (BMPs) shall constitute obligations of the homeowners' association as to those BMPs associated with the project's residential component and the property owners' association as to those BMPs associated with the project's commercial component. BMPs not directly attributable to a single project component or use shall, by agreement between owners, become the shared obligation of both associations.

Mitigation Measures

- **Mitigation Measure 5-1**. Jurisdictional Features. In order to reduce impacts to United States Army Corps of Engineers and Regional Water Quality Control Board (ACOE/RWQCB) and California Department of Fish and Game (CDFG) jurisdictional waters, prior to the issuance of a grading permit, the Applicant shall demonstrate, to the satisfaction of the Community Development Director, receipt of any discretionary permits and approval as may be required from the ACOE, RWQCB, and CDFG and commit to the provision of compensatory jurisdictional resources meeting or exceeding the following minimal standards: (1) the on-site and/or off-site replacement of ACOE/ RWQCB jurisdictional waters and wetlands at a 2:1 ratio; (2) the on-site and/or off-site replacement of CDFG jurisdictional streambed and associated riparian habitat at a 2:1 ratio; and (3) the incorporation of design features into the proposed project's design and development.

4.5.5 Significant Unavoidable Adverse Effects

The proposed project, inclusive of project conditions and mitigation measures, will either not result in the generation of significant biological resource impacts or, as mitigated, will reduce all significant adverse impacts to nesting birds, jurisdictional features, protected trees, and sensitive plant communities to a less-than-significant level. In addition, the proposed project will not contribute significantly to cumulative impacts on areawide biological resources.