
4.3 Air Quality

The following analysis is summarized from an air quality study prepared by Mestre Greve Associates which is contained in its entirety in Appendix D. Please refer to Appendix D for a more detailed description of study methodology and data.

4.3.1 ENVIRONMENTAL SETTING

Meteorology/Climate Setting

The climate in and around the project area, as with all of Southern California, is controlled largely by the strength and position of the subtropical high pressure cell over the Pacific Ocean. It maintains moderate temperatures and comfortable humidities, and limits precipitation to a few storms during the winter "wet" season. Temperatures are normally mild, excepting the summer months, which commonly bring substantially higher temperatures. In all portions of the basin, temperatures well above 100 degrees F. have been recorded in recent years. The annual average temperature in the basin is approximately 62 degrees F.

Winds in the project area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night the wind generally slows and reverses direction traveling towards the sea. Wind direction is altered by local canyons, with wind tending to flow parallel to the canyons. During the transition period from one wind pattern to the other, the dominant wind direction rotates into the south and causes a minor wind direction maximum from the south. The frequency of calm winds (less than 2 miles per hour) is less than 10 percent. Therefore, there is little stagnation in the project vicinity, especially during busy daytime traffic hours.

Southern California frequently has temperature inversions which inhibit the dispersion of pollutants. Inversions may be either ground based or elevated. Ground based inversions, sometimes referred to as radiation inversions, are most severe during clear, cold, early winter mornings. Under conditions of a ground based inversion, very little mixing or turbulence occurs, and high concentrations of primary pollutants may occur local to major roadways. Elevated inversions can be generated by a variety of meteorological phenomena. Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Below the elevated inversion dispersion is not restricted. Mixing heights for elevated inversions are lower in the summer and more persistent. This low summer inversion puts a lid over the South Coast Air Basin and is responsible for the high levels of ozone observed during summer months in the air basin.

Air Quality Management

The proposed project is located in the South Coast Air Basin (SCAB), which is composed of Orange County, and the non-desert portions of Los Angeles, San Bernardino and Riverside Counties. This topographically defined area is considered an airshed for pollution planning and control purposes.

Key Air Quality Mandates: Two key pieces of legislation govern air pollution control efforts within the SCAB:

- The Federal Clean Air Act, as amended in 1990, sets national ambient air quality standards for six pollutants: ozone, carbon monoxide, nitrogen dioxide, microscopic particulates, sulfur dioxide and lead. The Clean Air Act also establishes deadlines for attaining the national standards based on the severity of pollution in each air basin. The United States Environmental Protection Agency (U.S. EPA) administers and enforces the Federal Clean Air Act. The Federal Clean Air Act requires polluted air basins to prepare attainment plans that specify control measures and schedules to expeditiously reduce pollution to meet federal standards and deadlines.
- The California Clean Air Act, adopted in 1988, establishes separate, more stringent state standards for the same six pollutants as well as other compounds. The California Clean Air Act requires steady progress toward state standards, but does not specify deadlines. Instead, the Act requires attainment of the state standards at the earliest practicable date. The Act also requires the state to maintain a Clean Air Plan composed of control measures, emission reduction targets, and implementation strategies capable of meeting state standards expeditiously. The California Clean Air Act considers the cost-effectiveness of control measures.

Lead Agencies on Air Quality. Four key agencies insure the South Coast Air Basin's compliance with air quality legislative mandates:

- The U.S. Environmental Protection Agency oversees state compliance with the Federal Clean Air Act. It also takes the lead in implementing control measures designed to reduce air pollution from locomotives, aircraft, trucks and other vehicles and fuels used in interstate commerce.
- The California Air Resources Board (CARB) is responsible for preparing and implementing California's air quality programs to comply with the Federal Clean Air Act and California Clean Air Act. CARB formulates state pollutant standards, prepares mandated state and federal pollution reduction plans, adopts emission control regulations, and coordinates the pollution control efforts of air basins throughout the state into a cohesive statewide pollution reduction effort. CARB oversees air quality planning for the SCAB, and integrates SCAB plans into statewide air plans. CARB is legislatively authorized to control stationary and

mobile sources of pollution within California, and takes the lead on mobile source controls affecting vehicle engine and fuel usage.

- The South Coast Air Quality Management District (SCAQMD) was formed to manage air quality programs within the SCAB. SCAQMD develops and adopts rules and regulations to meet federal and state emission reduction requirements within the SCAB. SCAQMD powers include permit authority over stationary industrial sources. SCAQMD prepares the Air Quality Management Plan (AQMP) for the SCAB. The AQMP is designed to meet all federal and state Clean Air Act requirements in a coordinated, comprehensive program of control measures and incentives. The AQMP is updated every three years to insure timely compliance with state and federal requirements.
- The Southern California Association of Governments (SCAG) is the federally-designated Metropolitan Planning Organization for the six-county Southern California region. SCAG is mandated to prepare the region's long-range transportation plan (the Regional Transportation Plan), and to insure that it conforms to emission budgets contained in the AQMP. SCAG also prepares the transportation control strategy contained in the AQMP.

The Air Quality Management Plan. The Air Quality Management Plan presents the SCAB's response to federal and state requirements to reduce air pollution below the applicable standards. The AQMP is updated every three years to incorporate new or improved control measures and advances in emission control technology.

The 1997 AQMP, as amended in 1999, is the most recent federally-approved AQMP. As such, the 1997 AQMP is the appropriate basis for comparing the impacts of proposed projects. U.S. EPA approved the 1997 AQMP in April, 2000. The 1997 AQMP builds on and refines the previous 1991 and 1994 AQMPs, by eliminating unproductive control measures and adding new control measures based on the latest technology advances. The AQMP includes control measures aimed at stationary, areawide and mobile sources, that must be implemented by federal, state and local governments as well as the private sector. Short-term measures to be implemented by 2005 are based on available technology, while many long-term measures to be carried out by 2010 depend on technological breakthroughs or commercialization of emerging technologies.

SCAQMD is now preparing the 2001 AQMP update for the SCAQMD Governing Board's consideration and adoption in early 2002. The 2001 AQMP will be consistent with CARB's California Air Plan, a comprehensive long-term pollution control blueprint for the state which is now slated for adoption by CARB's Governing Board in December 2001. Building on the 1997 AQMP, SCAQMD expects to replace control measures for which new technology has not yet become available or cost-effective, and add new stationary source controls. SCAG is preparing updated transportation control measures that reflect the recently adopted 2001 Regional Transportation Plan.

Attainment Status. Currently, the SCAB meets the federal nitrogen dioxide, sulfur dioxide, and lead standards. However, the SCAB is deemed an "extreme" nonattainment area for ozone, with a November 15, 2010, deadline for attaining the federal standard. The 1997 AQMP sets forth the control strategy for meeting emission reduction milestones necessary to meet the 2010 deadline.

The SCAB also fails to meet the standard for very fine particulates less than 10 microns in diameter (PM-10), which must be met by December 31, 2006. The 1997 AQMP includes the SCAB's plan for attaining PM-10 standards.

The SCAB's 1992 Carbon Monoxide Plan provided a federally approved strategy for attaining the federal CO standards by the Clean Air Act deadline of December 31, 2000. The 1992 CO Plan was updated and incorporated into the 1997 AQMP. The 1997 AQMP predicted that the SCAB would achieve the federal CO standard by the December 2000 deadline, but the SCAB exceeded the federal carbon monoxide standard by a narrow margin. To date, the SCAB remains designated as a CO non-attainment area. The Environmental Protection Agency (EPA) has not yet acted on the expired CO attainment. SCAQMD is working to reach the federal standard by the end of 2002 through revised CO control measures to be incorporated in the forthcoming 2001 AQMP.

Major Pollutants

Basic knowledge of air pollutants will aid the reader in understanding the technical nature of this section. This section provides general information concerning each of the major air pollutants: what they are, how they are generated and how they affect human health and activities.

Many pollutants are released directly into the atmosphere by motor vehicles and aircraft, among numerous other sources. This means that the pollutant is created and emitted immediately. Pollutants which are directly emitted by a source into the atmosphere are called primary pollutants. An example of a primary pollutant is carbon monoxide (CO). Other pollutants require additional chemical reactions subsequent to their release into the atmosphere. Pollutants which are formed via chemical reactions in the atmosphere are referred to as secondary pollutants. The most important secondary pollutant is ozone. This section discusses the major pollutants of concern in the study area and provides information regarding the health and well-being impacts of each pollutant.

Ozone

Ozone is not directly emitted by any pollutant source, and therefore, is considered a secondary pollutant. It is the product of a reaction in the atmosphere between hydrocarbons (HC) and nitrogen oxide (NOx). This reaction takes place only in the presence of ultraviolet light. Sunlight contains a lot of ultraviolet light. This is why ozone levels are the highest on bright, sunny days. As it takes several hours for the ozone levels to build, the pollutant is diffused over a wide area and concentrations are fairly constant over a regional area.

Ozone is a strong irritant to the respiratory system. It primarily affects children, people with respiratory ailments and the elderly, but has the potential to affect others as well. Exposure of humans to high concentrations of ozone may result in eye irritation, nausea, dizziness, headaches, coughs or a burning sensation in the chest, even in healthy people. Ozone aggravates heart disease, asthma, bronchitis and emphysema, and also acts to reduce lung capacity over long exposure periods. Research into the effects of this pollutant shows that ozone damages the alveoli, which are the small sacs in the lung where the exchange of gases between air and blood takes place.

Carbon Monoxide (CO)

The primary source of CO is the internal combustion engine in motor vehicles. CO is a primary pollutant. Generally, CO is a localized pollutant and high concentrations of CO generally occur only adjacent to very busy and congested roads. The highest concentrations occur when the atmosphere is very stable and there is very little or no wind. These conditions occur most commonly during early morning winter hours.

In the lung, particular gases are exchanged between the air and blood. The blood releases carbon dioxide (CO₂), which is a waste product of the body, into the alveoli, from which the CO₂ is then exhaled. Also in the alveoli, inhaled oxygen is absorbed by the blood and then carried to the parts of the body where it is needed. Because of the chemical nature of the substances, hemoglobin (the protein in the blood that carries oxygen) bonds more easily to CO than to oxygen. This means that the blood is more likely to absorb any CO that is present in the air that is inhaled than it is to absorb oxygen in the air. As a result, CO reduces the amount of oxygen that is absorbed by the blood and, in turn, reduces the amount of oxygen which reaches the heart, brain and other body tissues. The effects of this phenomenon, even at low doses, include headaches, fatigue and slow reflexes from lack of oxygen. Exposure to CO particularly endangers people with coronary artery disease, whose hearts already receive limited supplies of blood and oxygen. A consistent association between increasing ambient CO levels and excess admissions for heart diseases, such as congestive heart failure, is observed in many cities across the United States.

Respirable Particulate Matters (PM₁₀)

In rural areas, wind and agricultural operations are primarily responsible for the particulate level. In urban areas, transportation sources can be a major source of particulate matter, especially PM₁₀. Industrial activity and the burning of wood are other sources. Particulates can also be formed in the atmosphere via chemical reactions. Suspended water droplets (e.g., fog) can be a microscopic location where chemicals collect and chemically react. Then, as the water vaporizes, the remaining chemicals can form a particulate. PM₁₀ is emitted directly from combustion sources, can form in the atmosphere, and is naturally occurring. Therefore, it is considered both a primary and secondary pollutant. The human body has the ability to prevent most large particles that might be inhaled from reaching the lungs. Larger particles are trapped in the nose, throat and upper respiratory system. Smaller particles (particles smaller than 10 microns in diameter, referred to as PM₁₀), however, are able to bypass the body's protection mechanisms and can reach areas deep inside the lung. Such

small particles can contain substances that can irritate the lung, constrict airways and aggravate chronic heart disease.

Nitrogen Oxides (NO_x)

Most combustion processes, including motor vehicles, emit a combination of NO and NO₂. Much of the NO further reacts with oxygen in the atmosphere to form NO₂. The SCAB has not exceeded the federal standard for NO₂ since 1991. Although the health criteria for NO₂ have been met for almost a decade, NO_x emissions are still of major concern because higher emissions of NO_x result in higher concentrations of ozone.

Nitrogen oxides (NO_x) consists primarily of nitrogen oxide (NO) and nitrogen dioxide (NO₂). The most significant impact of NO_x emissions is its contribution to the formation of ozone, as discussed earlier. NO₂, by itself, however, damages the cells lining the respiratory tract and increases susceptibility to respiratory infection. It also constricts the airways of asthmatics.

Sulfur Dioxide (SO₂)

Since sulfur was removed from gasoline, motor vehicles have contributed very little to the sulfur dioxide (SO₂) emissions. SO₂ is a regional pollutant and concentrations in the SCAB are well below the ambient air quality standards (AAQS). The more stringent state 1-hour standard was last exceeded in 1990, due to a breakdown at a local refinery. This was the first exceedance since 1984. The presence of SO₂ in the atmosphere has been associated with a variety of respiratory diseases and constricts airway passages, thereby increasing airway resistance. Industrial sources, such as paper mills, power plants and smelters, are the major sources of this pollutant.

Lead (Pb)

Lead is introduced into the atmosphere in automobile emissions (although in far smaller concentrations than in the 1970's), in emissions from industries that smelt or process the metal, and other industrial and combustion processes. Lead is a regional pollutant. The last exceedance of the federal AAQS was in 1994. Exposure of lead to children one to five years old is extremely dangerous. Exposure can impair the formation of the nervous system and can damage kidneys and blood-forming systems. Lead exposure in other age groups is also considered hazardous.

Hydrocarbons (HC)

While there are no health effects linked directly with HC, it is important as a pollutant because it reacts with NO_x in the presence of sunlight to form ozone. There are no state or federal standards for HC emissions. Hydrocarbons are also referred to as total organic gases (TOG). The methane portion of hydrocarbon gases does not contribute substantially to the formation of ozone and, therefore, references to non-methane hydrocarbons (NMHC), volatile organic compounds (VOC), reactive hydrocarbons (RHC) and reactive organic gases (ROG) are also found in this section.

Sensitive Receptors

The SCAQMD "CEQA Air Quality Handbook" identifies the following as sensitive receptors; long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. These locations represent areas that are most sensitive to air pollution. However, receptors sensitive to air pollution occur in all areas with a human presence. The U.S. Environmental Protection Agency suggests that any areas with human occupancy should be considered as sensitive to air pollution. Therefore, people sensitive to air pollution also are located in office developments, industrial areas and all through developed areas.

Residential and other developed areas are spread throughout the study area. The western edge of the project is bounded by residential development. The southern edge of the project lies along the San Diego (I-5) Freeway. The eastern side of the project is adjacent to the former El Toro military base. To the north of the project lies the Lomas de Santiago Hills.

The project, once constructed, would contain sensitive receptors including residential areas, schools, parks, commercial and office areas.

Monitored Air Quality

Overview of Region

Air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates for the SCAB have been made for existing emissions ("1997 Air Quality Management Plan," April 2000). The data indicate that mobile sources are the major source of regional emissions. Motor vehicles (i.e., on-road mobile sources) account for approximately 51 percent of volatile organic compounds (VOC), 63 percent of nitrogen oxide (NO_x) emissions, and approximately 78 percent of carbon monoxide (CO) emissions.

District Monitoring Stations

The SCAQMD has divided the air basin into Source Receptor Areas. The project site is in the District's Source Receptor Area 19 which is represented by the El Toro air monitoring station. The data collected at this station is considered to be representative of the air quality experienced in the vicinity of the project area. The air quality data at the El Toro station is available for ozone, CO, and PM₁₀. Air quality data for NO_x and sulfur oxides (SO_x) is available at the next nearest station, which is Costa Mesa. The monitored air quality data are shown in Table 4-2 for the latest three years. The air monitoring data was obtained from the "California Air Quality Data" prepared by the California Air Resources Board.

Table 4-2
Air Quality Levels Measured at El Toro/Costa Mesa
Ambient Air Monitoring Stations

Air Pollutant	State Standard	Federal Standard	Year	Maximum Level	Days State Std. Exceeded
Ozone	0.09 ppm for 1 hr.	0.12 ppm for 1 hr.	2000 1999 1998	0.13 0.10 0.16	3+ 2 14
Carbon Monoxide (CO)	20 ppm for 1 hr.	35 ppm for 1 hr.	2000 1999 1998	4.7 4.1 5.8	0 0 0
Carbon Monoxide (CO)	9.0 ppm for 8 hr.	9 ppm for 8 hr.	2000 1999 1998	2.2 2.7 3.2	0 0 0
Particulates (PM ₁₀)**	50 ug/m ³ for 24 hr.	150 ug/m ³ for 24 hr.	2000 1999 1998	60 111 70*	6(2%)+ 36(10%)+ 36(10%)*
Nitrogen Dioxide (NO ₂)	0.25 PPM for 1 hr.	0.053 PPM AAM	2000 1999 1998	.11 .12 .12	0 0 0
Sulfur Dioxide (SO ₂) ⁺	0.04 ppm for 24 hr.	0.14 ppm for 24 hr.	2000 1999 1998	.01 .01 .01	0 0 0
<p>⁺ The number of days at least one measurement was greater than the level of the state hourly standard. The number of days above the standard is not necessarily the number of violations of the standard of the year.</p> <p>^{**} PM10 samples were collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard has measurements been collected every day.</p> <p>[*] Data presented are valid, but incomplete in that an insufficient number of valid data point were collected to meet EPA and/or ARB criteria for representativeness.</p>					

The air quality data in Table 4-2 indicate that ozone and PM10 are the air pollutants of primary concern in the project area. In the last three years, the state ozone standard was exceeded 3 days in 2000, 2 days in 1999, and 14 days in 1998. Ozone is a secondary pollutant; it is not directly emitted. Ozone is the result of the chemical reactions of other pollutants, most importantly hydrocarbons and nitrogen dioxide, in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the project area. Many areas of the SCAB contribute to the ozone levels experienced at the monitoring station, with the more significant areas being those directly upwind.

PM10 is another air pollutant of primary concern in the project area. The state standard for particulate matter (PM10) has been occasionally exceeded at the El Toro monitoring station. The state standard was exceeded for 2 percent of the days measured in 2000, 10 percent of the days measured in 1999 and 1998. The Federal PM10 standard, however, is not being exceeded. The data indicate that the trend for PM10 levels has slightly decreased. Particulate levels in the area are probably due to natural sources, grading operations, agricultural uses, and motor vehicles.

Carbon monoxide is another important pollutant that is due mainly to motor vehicles. As can be seen in Table 4-2, carbon monoxide levels in the area are currently within the State and Federal standards.

According to the monitoring data shown in Table 4-2, other than ozone and PM10 as mentioned above, no state or federal standards were exceeded for the remaining criteria pollutants.

Existing Emissions

At the present time, there is a minimum amount of emissions generated in the project area. The site is currently agricultural and open space. There is only a nominal amount of traffic and corresponding air emissions associated with the current land uses. Agricultural operations currently generate emissions from the operation of farm equipment, and particulate emissions are generated by cultivation and driving on unpaved roads. No statistics on these activities are kept, and therefore, the level of emissions generated by current agricultural operation can not be estimated. However, the current emissions are likely to be very small in comparison to the future emissions generated by the proposed project.

Local Air Quality

Background and Criteria

Local air quality is a major concern along roadways. Carbon monoxide is a primary pollutant. Unlike ozone, carbon monoxide is directly emitted from a variety of sources. The most notable source of carbon monoxide is motor vehicles. For this reason carbon monoxide concentrations are usually indicative of the local air quality generated by a roadway network, and are used as an indicator of its impacts on the local air quality. Comparisons of levels with state and federal carbon

monoxide standards indicate the severity of the existing concentrations for receptors in the project area. The Federal and State standards for carbon monoxide are presented in Table 4-3.

Table 4-3 Federal and State Carbon Monoxide Standards		
	Averaging Time	Standard
Federal	1 hour	35 ppm
	8 hours	9 ppm
State	1 hour	20 ppm
	8 hours	9 ppm

Caltrans Modeling “Protocol”

A CO hot-spot analysis for the proposed project was conducted according to the “Transportation Project-level Carbon Monoxide Protocol” (referred to as CO Protocol). The CO Protocol was developed by the Institute of Transportation Studies at University of California, Davis (December 1997) for Caltrans. The CO Protocol has been approved by EPA to replace the procedures for determining localized CO concentrations (hot-spot analysis) that are given in 40 CFR 93.101 in California. The CO Protocol is organized into three sections. The first section provides a framework and roadmap for conducting a federal conformity determination at the project level as well as National Environmental Policy Act of 1969 (NEPA) and CEQA. The second section is intended to provide a procedure for conducting a “screening analysis” of local impacts of intersections. The third section provides guidance for conducting a more “detailed analysis” required when a project does not pass the screening analysis, and is for use in conjunction with programs such as CT-EMFAC or CALINE4. Since a “detailed analysis” approach was used for this analysis, the third section of the CO Protocol was in general followed for the CO hot spot analysis.

“CALINE4” Carbon Monoxide Modeling

Carbon monoxide levels in the project vicinity due to nearby roadways were assessed with the CALINE4 computer model. CALINE4 is a fourth generation line source air quality model developed by the California Department of Transportation (Caltrans) (“CALINE4,” Report No. FHWA/CA/TL-84/15, November 1984). The purpose of the model is to assess air quality impacts near transportation facilities in what is known as the microscale region. The microscale region encompasses the region of a few miles around the pollutant source. Given source strength, meteorology, site geometry, and site characteristics, the model can reliably predict pollutant concentrations. Additional details on the methodology used in the modeling is discussed in Local

Air Quality Impacts. The remainder of this section discusses the resulting existing carbon monoxide levels in comparison to the State and Federal carbon monoxide standards.

The existing traffic data were provided by Austin-Foust Associates, Inc. (November 2001). Peak p.m. traffic data were utilized in the CALINE4 CO modeling. The composite emission factors were derived from EMFAC2000 prepared by CARB.

The CALINE4 modeling was conducted for seven intersections in the vicinity of the project. The worst case intersections were selected based on traffic volume, congestion level and land use. Intersections projected to have high traffic volumes and high demand to capacity ratios in the year 2025 were selected for analysis. These intersections are Jamboree Road/Barranca Parkway, Culver Drive/Walnut Avenue, Jeffrey Road/Irvine Boulevard, Jeffrey Road/Irvine Center Drive, Trabuco Road/Sand Canyon Avenue, and Bake Parkway/Millemnium. A seventh intersection, Oak Canyon/Sand Canyon Avenue, was selected for a sensitivity analysis to determine local air quality impacts if the Oak Canyon Crossing (described in detail in the Special Future Case Scenarios section below) were implemented. Seven receptor locations were chosen for analysis. Receptor locations at each intersection were also identified. These receptors are situated approximately 25 feet from the intersections and represent the nearest sensitive land uses. The locations of these receptors are shown in Exhibit 4-14.

The existing (2001) background CO concentrations were estimated using the highest of the CO monitoring data for the last three years. The nearest available CO background data for the project area is the El Toro monitoring station. The highest CO background data at the El Toro monitoring station in the last three years are 5.8 ppm for 1-hour and 3.2 ppm for 8-hour. Therefore, 5.8 ppm is added to the worst case meteorological 1-hour projections, and 3.2 ppm to the 8-hour projections, to account for the existing background carbon monoxide levels. The 8-hour CO concentration is estimated utilizing a persistence/non-dispersion factor of 0.7. The modeling results of the existing CO levels are presented in Table 4-4.

Table 4-4 presents the existing CO modeling results at the receptor locations. The existing CO concentration levels range between 6.8 and 10.6 ppm for 1-hour and between 3.9 and 6.6 ppm for 8-hour. The results indicate that the existing CO concentrations at these receptor locations are currently in compliance with both State and Federal CO standards.

PM10 Hot-Spot Analysis

As CO levels have consistently improved over the years, PM10 has shown little change. Therefore, PM10 is becoming more of a concern along busy roadways. Areas of most concern are where high levels of traffic operate under heavily congested conditions, or where unusually large numbers of diesel-powered vehicles can be expected to occur. Currently, the project is located in a serious nonattainment area for PM10.

Exhibit 4-14 CALINE4 Modeling Receptor Locations

Table 4-4
Existing Carbon Monoxide Concentrations (2001)

	Receptor	Carbon Monoxide Concentrations (ppm)	
		1 Hour	8 Hours
1	Jamboree Rd./Barranca Pkwy. – Residential/Ind.	10.6	6.6
2	Culver Dr./Walnut Av. – Residential	10.5	6.5
3	Jeffrey Rd./Irvine Blvd. – Residential	7.7	4.5
4	Jeffrey Rd/ Irvine Center Dr. – Residential	8.5	5.1
5	Trabuco Rd./Sand Canyon Av. – Commercial	6.8	3.9
6	Bake Pkwy./Millennium – Commercial	--	--
7	Oak Canyon/Sand Canyon Av. – Animal shelter	8.7	5.2
Summary of Carbon Monoxide State Standards Exceedance:		No. of Sites exceeding 20 ppm	No. of Sites exceeding 9 ppm
		0	0
Note: Concentrations include existing background CO concentrations of 5.8 ppm for 1-hour and 3.2 ppm for 8-hour.			
-- Future in intersection; does not currently exist.			

There are no guidelines at this time for modeling PM₁₀. The CALINE4 computer modeling was used to determine the potential for PM₁₀ hot spots for the proposed project. The precise methodology utilized with the CALINE4 modeling is further discussed in this section.

“CALINE4” PM₁₀ Modeling

The CALINE4 computer modeling was conducted for PM₁₀ at the same seven intersections and receptor locations as in the CO modeling. These receptor locations were shown previously in Exhibit 4-14.

The existing (2001) background PM₁₀ concentrations were estimated using the highest of the PM₁₀ monitoring data for the last three years. The nearest available PM₁₀ background data for the project area is the El Toro monitoring station. The highest existing background concentration for 24-hour PM₁₀ is 111 micrograms per cubic meter (ug/m³), and this was added to the CALINE4 PM₁₀ projections to determine PM₁₀ levels. The CALINE4 model can only project 1-hour concentrations. Therefore, the 1-hour PM₁₀ concentrations due to local roadways were multiplied by a persistence factor of 0.6 to get a 24-hour concentration. The persistence factor of 0.6 is recommended in the EPA’s “Workbook of Atmospheric Dispersion Estimates.” The modeling results of the existing PM₁₀ concentration levels are presented in Table 4-5.

Table 4-5 presents the existing PM₁₀ modeling results at the seven receptor locations. The existing PM₁₀ concentrations range between 113 and 123 ug/m³ for 24-hour. The results indicate that the

existing PM10 concentrations currently comply with the Federal standard of 150 ug/m³. However, the PM10 concentration levels exceed the State PM10 standard of 50 ug/m³ at all receptor locations. Note that the bulk of the PM10 concentrations are due to the background concentration. The local roadways added 2 to 12 ug/m³ to the ambient level of 111 ug/m³ (1.8% to 10.8%).

**Table 4-5
Existing PM10 Concentrations (2001)**

Receptor		PM10 Concentrations (ppm)
		24 Hours
1	Jamboree Rd./Barranca Pkwy. – Residential	123
2	Culver Dr./Walnut Av. – Residential	121
3	Jeffrey Rd./Irvine Blvd. – Residential	116
4	Jeffrey Rd/ Irvine Center Dr. – Residential	117
5	Trabuco Rd./Sand Canyon Av. – Commercial	113
6	Bake Pkwy./Millennium – Commercial	--
7	Oak Canyon/Sand Canyon Av. – Animal shelter	115
Number of Sites Exceeding State Standard of 50 ug/m³:		6
Number of Sites Exceeding Federal Standard of 150 ug/m³:		0
Note: Concentrations include existing background PM10 concentrations of 111 ug/m³ for 24 hours.		
--	Future in tersection ; does not currently ex ist.	

4.3.2 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on air quality if it will:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Conflict with or obstruct implementation of the applicable air quality plan.

-
- Create objectionable odors affecting a substantial number of people.

The SCAQMD (CEQA Air Quality Handbook, November 1993) has established two types of air pollutant thresholds, short-term construction and long-term daily operation, to assist lead agencies in determining whether or not each phase of a project is significant. The significant thresholds established by the SCAQMD for short-term construction operation are:

- 75 pounds a day for ROC
- 100 pounds a day for NOx
- 550 pounds a day for CO
- 150 pounds a day for PM10
- 150 pounds a day for SOx.

For long-term daily operation, both direct and indirect emissions should be included when determining whether the project exceeds these thresholds. The significant thresholds for long-term daily operation are:

- 55 pounds per day for ROC
- 55 pound per day for NOx
- 550 pounds per day for CO
- 150 pounds per day for PM10
- 150 pounds per day for SOx.

These thresholds are taken from the “1993 CEQA Air Quality Handbook,” which states that the criteria “are consistent with the federal Clean Air Act definition of a significant source in an area classified as extreme for ozone.” While it is correct that the thresholds are consistent as such, the Handbook does not acknowledge that these criteria were developed initially by the U.S. EPA to be applied to point source emissions, such as an industrial smokestack, and its effect on adjacent land uses. Emissions from the proposed project will be primarily from non-point sources, such as motor vehicles traveling in the area or grading activities over a large area, which are clearly different from point sources, such as an industrial smokestack. Application of these stringent point source thresholds to activities such as grading and vehicular emissions results in a more conservative approach to measuring air emissions because the thresholds originally developed for a concentrated source are applied to emissions that are diffused in the atmosphere and generated over a larger area as compared to the single point source.

Localized criteria pollutant concentration standards for carbon monoxide have been established by the State as follows:

- 1 hour CO standard: 20.0 ppm
- 8 hour CO standard: 9.0 ppm

Project Impacts on Air Quality Standards

Air quality impacts are usually divided into short-term and long-term. Short-term impacts are usually the result of construction of grading operations. Long-term impacts are associated with the built out condition. Long term impacts are further divided into local and regional impacts.

Impacts are measured by the extent of emissions from both short-term construction activities, and long-term operational activities. For purposes of analyzing the project's long term air quality impacts based upon vehicle emissions, the traffic volumes and capacity levels used for the CALINE4 modeling as well as the calculation of long term vehicle emissions, assumed no mitigation (in the form of intersection or street improvements) for potentially impacted intersections, and therefore represent a "worst case" scenario.

Short Term Construction Impacts

The development portion of the Northern Sphere Area comprises a total of approximately 3,145 acres. As a worst case scenario, it is assumed that all 3,145 acres will be graded. At this time, specific construction information in terms of phasing, duration of grading, and amount of construction equipment for the proposed project is not known. According to the developer, it is anticipated that approximately two thirds of the project site or 2,097 acres may be graded in the first five years of construction, and the last third or 1,048 acres may be graded in the second five years of construction. This corresponds roughly to the Phase 1 and Phase 2 development in the project description. That is, grading for two-thirds of the project area is assumed to be initiated in year 2002 and then, five years later in the year 2007, the remaining third of the project area is assumed to be graded. The construction of the proposed project is expected to be completed in a 15 year duration. Due to the size of the project, the grading cycles of the project are assumed to be six months.

Temporary impacts will result from the project's construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated during grading and site preparation. Construction emission rates for large development projects have been estimated by the U.S. Environmental Protection Agency. According to the SCAQMD's 1993 CEQA Air Quality Handbook, the emission factor for disturbed soil is 0.40 tons of PM10 per month per acre. If water or other soil stabilizers are used to control dust as required by SCAQMD Rule 403, the emissions can be reduced by 50 percent.

For the first phase, applying the above factors to 2,097 acres of gradable area and six month grading cycles result in an estimate of 498 tons per year and an average 2,730 pounds of PM10 per day. This estimate represents a worst case estimate of the PM10 emissions generated.

Heavy-duty equipment emissions are difficult to quantify because of day to day variability in construction activities and equipment used. Typical emission rates for construction equipment were obtained from the SCAQMD Air Quality Handbook. For the grading of a site of this size (2,097 acres), it is anticipated that approximately 140 pieces of heavy equipment may be expected to

operate at one time. The number of pieces of equipment assumed included 20 scrapers, 20 loaders, 20 graders, 40 dozers, 20 water trucks and 20 miscellaneous trucks. If all of the equipment operated for 8 hours per day the emissions would result in approximately 712 pounds per day of carbon monoxide, 119 pounds per day of ROG, 1,866 pounds per day of nitrogen oxides, 235 pounds per day of PM10, and 283 pounds per day of sulfur oxides.

For the second phase, applying the above factors to 1,048 acres of gradable area and 6 month grading cycles result in an estimate of 249 tons per year and an average 1,365 pounds of PM10 per day. Again this estimate represents a worst case estimate of the PM10 emissions generated.

For the grading of a site of this size (1,048 acres), it is anticipated that approximately 70 pieces of heavy equipment may be expected to operate at one time. The number of pieces of equipment assumed included 10 scrapers, 10 loaders, 10 graders, 20 dozers, 10 water trucks and 10 miscellaneous trucks. If all of the equipment operated for 8 hours per day the emissions would result in approximately 356 pounds per day of carbon monoxide, 60 pounds per day of ROG, 933 pounds per day of nitrogen oxides, 118 pounds per day of PM10, and 142 pounds per day of sulfur oxides.

There will also be some emissions generated by commuter vehicles as workers travel to and from the job site. However, specific information for the project is not available to project these emissions. Assumptions were made to determine the air emissions and they are usually small in comparison to the other construction emissions. The data used in the assumptions to determine emissions generated from construction-related commuter vehicles are provided in the appendix.

The construction emission data is summarized in Table 4-6. Note that all of the pollutant emissions are greater than the significance thresholds established by the SCAQMD in the CEQA Air Quality Handbook for the first phase. Only NOx and PM10 are greater than the thresholds for the second phase. Since the project's construction emissions are greater than the significance thresholds, the short term construction impacts are considered to be significant. Mitigation measures are recommended for the construction activities of the project to minimize emissions. The mitigation measures are provided in Section 4.3.3. The data used to calculate the construction emissions are shown in the appendix.

PM10 emissions exceed the threshold more often than any of the other pollutants. For the proposed project, the average emissions of 2,966 pounds per day of PM10 generated in the first phase, and 1,483 pounds per day of PM10 generated in the second phase are minor when compared with the total average annual of 416 tons per day (832,000 pounds per day) of particulate matter currently released in the whole South Coast Air Basin (SCAB). However, according to the SCAQMD's CEQA Handbook, PM10 emissions greater than 150 pounds per day for a proposed project should be considered significant. The PM10 emissions generated by the proposed project for both phases are projected to exceed this threshold, and therefore, are considered to be significant.

**Table 4-6
Worst Case Construction Emissions**

Peak Emissions (Pounds/Day)					
Pollutant	Employee Travel	Grading Activities (PM10* only)	Equipment Emissions	Total Emissions	SCAQMD Thresholds
First Phase					
Carbon Monoxide	69.51	--	712	<u>781</u>	<u>550</u>
ROG	5.93	--	119	<u>125</u>	<u>75</u>
Nitrogen Oxides	18.15	--	1,866	<u>1,884</u>	<u>100</u>
PM10*	0.62	2,730	135	<u>2,966</u>	<u>150</u>
Sulfur Oxides	0.74	--	283	<u>284</u>	<u>150</u>
Second Phase					
Carbon Monoxide	34.75	--	356	391	550
ROG	2.96	--	60	62	75
Nitrogen Oxides	9.07	--	933	<u>942</u>	<u>100</u>
PM10*	0.31	1,365	118	<u>1,483</u>	<u>150</u>
Sulfur Oxides	0.37	--	142	142	150
<i>Note: The underlined data indicate exceedance of the significant thresholds.</i>					
<i>* Includes a 50%reduction from watering.</i>					

Long-Term Operational Impacts

The long-term daily emissions were assessed for the proposed project. The long-term daily emissions at the project build out will be primarily due to vehicular emissions, and emissions due to on-site combustion of natural gas for space heating and water heating. Also, the generation of electrical energy by the combustion of fossil fuels results in additional emissions off-site.

The proposed project is analyzed in two time frames: (interim) 2007 and (buildout) 2025. For 2007, the proposed land uses consist of a total of 1,343 single-family detached homes, 882 multi-family (condominium) units, 1,275 multi-family (apartment) units, 135,500 square feet of commercial, 13,500 square feet of restaurant, a gas station, and a 900-student elementary/middle school. For project buildout year (2025), the proposed land uses consist of a development of a maximum of 12,350 dwelling units, 575,000 sq. ft. of Multi-Use development, 175,000 sq. ft. of Community Commercial uses, 51 acres of Commercial Recreation, 6,566,000 sq. ft. of Medical and Science uses, and 13 acres of Institutional uses, community and neighborhood parks, and a minimum of four elementary/middle schools within the Northern Sphere Area in the City of Irvine.

The future traffic data for the proposed project were provided by Austin-Foust Associates, Inc. (November 2001). The traffic study analyzed four future scenarios: *2007, 2025 Constrained Toll, 2025 Buildout Toll*, and *post 2040 Buildout Toll-Free*. As long term air quality impact is a factor

of vehicle trips and vehicle emissions, the air quality analysis used the same four future scenarios as the project's traffic study. The *2040 Buildout Toll-Free* analysis is the cumulative impact analysis as it assumed the air quality impacts of the proposed project considered together with build-out of the City's General Plan.

Vehicular emissions will be the main sources of the project's daily emissions. Estimates were made of the vehicular emissions that would be generated by the proposed project. The project's average daily trip generation (ADT), as well as vehicle miles traveled (VMT) for all future scenarios were provided by the traffic engineer. The proposed project is expected to generate approximately 46,051 ADT by year 2007, and a total of 254,873 ADT by buildout year 2025. The project's VMT are estimated to be 46,127 for year 2007, 628,989 for *2025 Constrained Toll*, 622,245 for *2025 Buildout Toll* and 567,379 for *post 2040 Buildout Toll-Free*. The project's VMT contribution was determined by taking the regional VMT forecast with the project and subtracting the regional VMT forecast without the project.

The emission factors were derived from EMFAC2000 prepared by the California Air Resources Board (CARB). The EMFAC2000 emission factors, at an average speed of 25 miles per hour, were utilized in the estimates.

Other emission sources that will be generated by the proposed project are on-site combustion of natural gas for space heating and water heating, and off-site electrical usage. The data used to estimate the on-site combustion of natural gas, and off-site electrical usage were based on the project's land uses in terms of dwelling units and square footages, and emission factors taken from EMFAC2000. These data are provided as technical data in the appendix. The total daily emissions for all future scenarios are presented in Table 4-7.

The data in Table 4-7 show that the greatest emissions will be generated by the project around the year 2025. By this year the project will be completely built out. In years after 2025, emission rates for motor vehicles will continue to decline. Therefore, the highest emissions for the project will occur around the year of buildout. Two cases were considered for the year 2025: *Constrained Toll* and *Buildout Toll*. The emissions projected for these two cases are nearly identical indicating that the traffic conditions for these two scenarios only have minor differences from an air quality perspective.

The year 2040 emissions are lower than year 2025 emissions for two reasons. First, the motor vehicle emission rates will continue to decline as cleaner vehicle engines and fuels are integrated into the fleet. Second, the VMT for the project is also lower in comparison to the project 2025 VMT. The VMT reduction is due to a combination of factors, including a more developed roadway network which results in shorter trip lengths.

In conclusion, the project's long term operational air quality impacts are considered to be significant. For the year 2007, CO, ROG, and NO_x emissions exceeded SCAQMD thresholds. For the years 2025 (both *Constrained* and *Buildout Toll*) and 2040, project emissions calculated for CO,

ROG, NOx and SOx exceeded SCAQMD thresholds. (See Table 4-7) Mitigation measures are recommended for long-term impacts. Mitigation measures are discussed in Section 4.3.3.

Table 4-7 Total Daily Emissions Due to Project (Pounds per day)				
Pollutant	Source			
	Vehicular Emissions	On-Site Emis. from Natural Gas Combustion	Off-Site Emis. from Electrical Generation	Total Daily Emission
<u>Year 2007</u>				
CO	1,089	11.85	13.01	1,114
TOG/ROG	53	3.14	0.65	57
NOx	197	48.06	74.82	320
PM10	67	0.12	2.60	10
SOx	37	0.00	7.81	44
<u>2025 Constrained Toll</u>				
CO	3,474	57.46	78.49	3,610
TOG/ROG	128	15.23	3.92	147
NOx	592	258.13	451.31	1,302
PM10	50	0.57	15.70	66
SOx	441	0.00	47.09	489
<u>2025 Buildout Toll</u>				
CO	3,447	57.46	78.49	3,583
TOG/ROG	127	15.23	3.92	146
NOx	587	258.13	451.31	1,296
PM10	50	0.57	15.70	66
SOx	437	0.00	47.09	484
<u>2040 Buildout Toll-Free</u>				
CO	1,974	57.46	78.49	2,110
TOG/ROG	49	15.23	3.92	68
NOx	494	258.13	451.31	1,203
PM10	42	0.57	15.70	58
SOx	402	0.00	47.09	449

Project Contribution to Criteria Pollutants for which the Region is in Non-Attainment

Project Emissions Compared to Thresholds and Regional Levels

The main source of emissions generated by the proposed project will be motor vehicles. Other sources of emissions will be natural gas combustion for space heating and electrical generation. Emissions for the proposed project were calculated using methods recommended by the SCAQMD's CEQA Air Quality Handbook.

As with the AQMP consistency analysis, the SCAB regional emissions data taken from the 1997 AQMP are for year 2010, and therefore, do not provide a direct year-to-year comparison of the project to the SCAB regional emissions. The project's future air quality emissions were calculated on two time horizons on either side of 2010: 2007 and 2025. The SCAB regional emissions projected for the year 2010, however, are used to compare with the project's total emissions. The total daily emissions generated by the four future scenarios are presented in the first through fourth lines of Table 4-8, and the SCAB emissions are presented on line 6.

As can be seen in Table 4-8, on the regional basis (when compared with the SCAB emissions), the future scenarios will contribute less than 0.04 percent for 2007, and less than 0.4 percent for 2025 *Constrained Toll*, 2025 *Buildout Toll*, and post 2040 *Buildout Toll-Free*. The primary source of the proposed project emissions will be from motor vehicles.

Nevertheless, the project's emissions for all four future scenarios are projected to exceed the SCAQMD thresholds of significance, specifically for CO, ROG (except 2007), NO_x and SO_x (except 2007).

Therefore, even though the project's emissions as a percentage of regional emissions is less than ½ percent, because the project's emissions exceed SCAQMD thresholds, and the SCAB is non-attainment for ozone, PM₁₀, and CO, the project's net increase in these criteria pollutants to the region is considered significant. Mitigation measures are discussed in Section 4.3.3.

**Table 4-8
Comparison of Project Impact Emissions**

Contaminant	CO	ROG	NO _x	PM ₁₀	SO _x
Total Project Emissions Per Day					
2007 Emission s (Pounds/Day)	<u>1,114</u>	<u>57</u>	<u>320</u>	10	44
2025 Constrained Toll Emissions (Pounds/Day)	<u>3,610</u>	<u>147</u>	<u>1,302</u>	66	<u>498</u>
2025 Buildout Toll Emissions (Pounds/Day)	<u>3,583</u>	<u>146</u>	<u>1,296</u>	66	<u>484</u>
Post 2040 Buildout Toll-Free Emissions (Pounds/Day)	<u>2,110</u>	<u>68</u>	<u>1,203</u>	58	<u>449</u>
SCAQMD Thresholds of Significance (Pounds/Day)	550	55	55	150	150
SCAB (Tons/Day)	3,341	769	697	457	70
Project Emissions as a Percent of Regional (SCAB) Emissions					
2007	.017%	.004%	.023%	.001%	.032%
2025 Constrained Toll	.054%	.010%	.093%	.007%	.349%
2025 Buildout Toll	.054%	.010%	.093%	.007%	.346%
Post 2040 Buildout Toll-Free	.032%	.004%	.086%	.006%	.321%
<i>Note: Underlined data indicate exceedance of the significance thresholds.</i>					

Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Because the project will introduce an increase in traffic upon the roadways serving the project, a detailed analysis of carbon monoxide concentrations at sensitive areas in the project vicinity is warranted to analyze project impacts on localized ambient air quality. In addition to analysis of carbon monoxide concentrations, the analysis also examines PM₁₀ concentrations at seven selected intersections.

Methodology

Carbon monoxide (CO) is the pollutant of major concern along roadways since the most notable source of carbon monoxide is motor vehicles. For this reason carbon monoxide concentrations are usually indicative of the local air quality generated by a roadway network, and are used as an indicator of its impacts on local air quality.

PM₁₀ is also a pollutant of concern. At this time, there is no formal protocol guidance established by EPA or Caltrans for PM₁₀ analysis. The CALINE4 model was used for the PM₁₀ hot spot analysis.

Local air quality impacts can be assessed by comparing future CO and PM10 levels with state and federal standards, and also by comparing future concentrations with and without the project. The federal and state standards for PM10 and CO were presented previously in Tables 4-2 and 4-3, respectively.

Future CO and PM10 concentrations were forecasted with the CALINE4 computer model. CALINE4 is a fourth generation line source air quality model developed by the California Department of Transportation ("CALINE4," Report No. FHWA/CA/TL-84/15, June 1989). The purpose of the model is to forecast air quality impacts near transportation facilities in what is known as the microscale region. The microscale region encompasses the region of a few thousand feet around the pollutant source. Given source strength, meteorology, site geometry, and site characteristics, the model can reliably predict pollutant concentrations.

Worst case meteorology was assessed. Specifically, a late afternoon winter period with a ground based inversion was considered. For worst case meteorological conditions, a wind speed of 0.5 meter per second (1 mph) and stability class G was utilized for a 1-hour averaging time. Stability class G is the worst case scenario in terms of the most turbulent atmospheric conditions. A worst case wind direction for each site was determined by the CALINE4 Model. The temperature used for worst case was 45 degrees Fahrenheit (7.2 degrees Celsius). The temperature affects the dispersion pattern and emission rates of the motor vehicles. The temperature represents the January mean minimum temperature as reported by Caltrans. The wind speed, stability class, sigma theta, and temperature data used for the modeling are those recommended in the "Development of Worst Case Meteorology Criteria," (California Department of Transportation, June 1989). A mixing height of 1,000 meters was used as recommended in the CALINE4 Manual. A surface roughness of the ground in the area, 100 centimeters, was utilized and is based on the CALINE4 Manual. It should be noted that the results are also determined based on the level-of-service of the roadways. These worst case meteorology assumptions are also consistent with the Caltrans Carbon Monoxide Protocol.

Composite emission factors utilized with the CALINE4 computer model were obtained from EMFAC2000 prepared by CARB. The traffic data used in the CALINE4 CO and PM10 computer modeling were provided by Austin-Foust Associates, Inc. (November 2001). The traffic volumes and capacity levels are unmitigated and therefore, the intersections modeled represent congested intersections prior to any mitigation that might be required by the traffic study. Therefore, the traffic scenario modeled for these intersections represent a worst case.

The CALINE4 computer modeling was based on the peak hour traffic data. For this analysis, peak p.m. hour traffic data were used as the worst case scenario. The levels-of-service at the intersections were also used in the CALINE4 computer modeling. The levels-of-service determine the congestion levels at the intersections, and therefore, are important in the CALINE4 modeling. The levels-of-service determine the average speeds used at these intersections. In general, the slower the speeds, the higher the vehicular emissions factors. As a result, higher pollutant levels will occur.

Eight hour carbon monoxide levels were projected using Caltrans methodology described in the “Transportation Project-Level Carbon Monoxide Protocol.” The method essentially uses a persistence factor which is multiplied times the 1-hour emission projections. The projected 8-hour ambient concentration is then added to the product. The persistence factor can be estimated using the highest ratio of 8-hour to 1-hour second annual maximum carbon monoxide concentrations from the most recent three years that data is available. For the project, a persistence factor of 0.7 was utilized to determine 8-hour CO concentration. For PM10 analysis, a persistent factor of 0.6 was utilized to estimate 24-hour PM10 concentration levels. The data and results of the CALINE4 modeling for CO and PM10 are provided in the appendix. (The CALINE4 modeling results shown in the appendix do not include the ambient background levels.)

The CALINE4 computer modeling was conducted for the worst case future scenarios. The worst case future scenarios are considered to be those with the highest traffic volumes and heavy congestion levels. Six scenarios were selected for the CO and PM10 computer modeling to assess localized air quality impacts. These scenarios include two of the four future project scenarios: *2007 with and without project*, and *2025 Buildout Toll with and without project*. These two future project scenarios were selected among the four addressed in the traffic study because the post-2040 buildout emissions are projected to be lower than the year 2025 emissions. First, the motor vehicle emission rates will continue to decline as cleaner vehicle engines and fuels are integrated into the fleet, and second, the VMT for the project is also lower in comparison to the project 2025 VMT due to a combination of factors, including a more developed roadway network which results in shorter trip lengths. The *2025 Buildout Toll* scenario was selected over the *2025 Constrained Toll* scenario because the former was assumed to present the “worst case” as the continued presence of tolls on the corridors would result in greater arterial highway volumes, and this scenario does not assume the deletion of Culver.

The CALINE4 modeling was performed for six intersections in the vicinity of the project. These worst case intersections were selected based on traffic volume, congestion level and land use. In general, intersections with high traffic volumes and high demand to capacity ratios in the year 2025 were selected for analysis. These intersections are Jamboree Road/Barranca Parkway, Culver Drive/Walnut Avenue, Jeffrey Road/Irvine Boulevard, Jeffrey Road/Irvine Center Drive, Trabuco Road/Sand Canyon Avenue, and Bake Parkway/Millemium. A seventh intersection, Oak Canyon/Sand Canyon Avenue, was selected for a sensitivity analysis to determine local air quality impacts if the Oak Canyon Crossing (described in detail in the Special Future Case Scenarios section below) were implemented. It should be noted that the Oak Canyon/Sand Canyon Avenue currently experiences a level-of-service (LOS) “D” (see Section 4.14 for a description of intersection levels-of-service), but this congestion level will be improved to “C” for year 2025. Therefore, although seven receptor locations were chosen for analysis, because Receptor 7 (Oak Canyon/Sand Canyon) was not experiencing significant levels of congestion, the tables do not reflect CO and PM10 measurements for this Receptor. These receptors are set back approximately 25 feet from the intersections, and represent the nearest sensitive land uses in the vicinity of the project. The locations of the receptor locations are shown in previous Exhibit 4-14. The receptor locations

utilized for the future CO and PM10 modeling are essentially the same receptor locations as the existing CALINE4 modeling in Exhibit 4-14.

The future ambient (background) concentration levels for CO and PM10 are not available. For the purpose of the analysis, it is assumed that the background levels for the future years are the same as existing year 2001. This can be considered as the worst case situation since the background levels are anticipated to decrease in future years due to cleaner vehicles and fuels.

CO Analysis Results

The results of the CO analysis are summarized in Table 4-9 for 1 hour concentrations, and Table 4-10 for 8 hour concentrations. The pollutant levels, expressed in parts per million (ppm) for each receptor are reported. The carbon monoxide levels reported in Tables 4-9 and 4-10 are composites of the background levels of carbon monoxide coming into the area plus those generated by the local roadways.

In summary, the CO modeling results in Tables 4-9 and 4-10 show that the future CO concentration levels for all future scenarios will comply with the State and Federal CO standards for both 1-hour and 8-hour, at all receptor locations. As the CO modeling results do not exceed either the 1 or 8 hour CO State standard of 20 ppm and 9 ppm, respectively, the project does not create a significant sensitive local air quality impact for CO concentrations. The 2025 Buildout Toll scenario includes Millennium Plan II (MP II) trips.

The future CO concentration levels for the year *2007 with and without project* scenarios range between 7.2 and 8.5 ppm for 1 hour, and 4.3 and 5.1 ppm for 8 hour at the six receptor locations. (For the year 2007, the CO levels with and without project are the same except for a 0.1 increase with project at Receptor 5.) The future CO concentration levels for the *2025 Buildout Toll no project* scenario will range between 6.3 and 6.7 ppm for 1 hour, and 3.6 and 3.9 ppm for 8 hour. For the *2025 Buildout Toll with project* scenario, the future CO levels will be in the range of 6.4 and 7.0 ppm for 1 hour, and 3.6 and 4.0 ppm for 8 hour.

Although the with project CO concentrations shows a slight increase over the without project CO concentrations, neither concentration exceed the State 1 hour or 8 hour standards, and the increase as a result of the project is not measurable.

Table 4-9 Future Projections of 1-Hour Carbon Monoxide Concentration								
Receptor	<u>Year 2007</u>		<u>2025 Build-out Toll W/MP II</u>		<u>2025</u>	<u>2025</u>	<u>2025</u>	
	<u>No Proj. 1 Hour</u>	<u>W/ Proj. 1 Hour</u>	<u>No Proj. 1 Hour</u>	<u>W/ Proj. 1 Hour</u>	<u>W/ El Toro Aviation Plan 1 Hour</u>	<u>Probable Future 1 Hour</u>	<u>No Oak Canyon Crossing 1 Hour</u>	<u>W/ Oak Canyon Crossing 1 Hour</u>
1	7.8	7.8	6.4	6.7	6.4	6.4	--	--
2	8.5	8.5	6.7	6.9	6.7	6.7	--	--
3	7.2	7.2	6.3	6.4	6.5	6.5	--	--
4	8.0	8.0	6.6	6.7	6.7	6.7	--	--
5	7.2	7.3	6.4	6.5	6.5	6.4	--	--
6	8.5	8.5	6.7	7.0	*	*	--	-
7	--	--	--	--	--	--	6.4	6.4
Number of Sites exceeding 1-Hour CO State standard of 20 ppm								
Exceedances	0	0	0	0	0	0	0	0
<i>Note: Concentrations include background CO concentrations of 5.8 ppm for 1-hour.</i> <i>* This roadway section is eliminated under these future scenarios.</i> <i>-- Not applicable</i>								

Table 4-10 Future Projections of 8-Hour Carbon Monoxide Concentration								
Receptor	<u>Year 2007</u>		<u>2025 Build-out Toll W/MP II</u>		<u>2025</u>	<u>2025</u>	<u>2025</u>	
	<u>No Proj. 8 Hour</u>	<u>W/ Proj. 8 Hour</u>	<u>No Proj. 8 Hour</u>	<u>W/ Proj. 8 Hour</u>	<u>W/ El Toro Aviation Plan 8 Hour</u>	<u>Probable Future 8 Hour</u>	<u>No Oak Canyon Crossing 8 Hour</u>	<u>W/ Oak Canyon Crossing 8 Hour</u>
1	4.6	4.6	3.6	3.8	3.6	3.6	--	--
2	5.1	5.1	3.8	4.0	3.8	3.8	--	--
3	4.2	4.2	3.6	3.6	3.7	3.7	--	--
4	4.7	4.7	3.8	3.8	3.8	3.8	--	--
5	4.2	4.3	3.6	3.7	3.7	3.6	--	--
6	5.1	5.1	3.9	4.0	*	*	--	--
7	--	--	--	--	--	--	3.6	3.6
Number of Sites exceeding 8-Hour CO State standard of 9 ppm								
Exceedances	0	0	0	0	0	0	0	0
<i>Note: Concentrations include background CO concentrations of 5.8 ppm for 1-hour.</i> <i>* This roadway section is eliminated under these future scenarios.</i> <i>-- Not applicable</i>								

The future CO concentration levels in Tables 4-9 and 4-10 can also be compared with the existing CO levels shown in Table 4-4. The future CO concentration levels will essentially be lower than the existing CO levels for all future scenarios, with the exception of 2007 at Receptor 5. In fact, the future CO concentration levels will be reduced on average 0.9 ppm for 1-hour and 0.5 ppm for 8-hour CO. This is mainly due to the anticipated decrease in the future emission factors (EMFAC2000) due to cleaner vehicles and fuels. In general, the background CO concentration and the vehicular emission factors are projected to decrease steadily in the future years. The future contribution of the local traffic actually increase due to increases in traffic, but this is more than offset by declining vehicular emission rates.

The project also proposed an amendment to the City's Circulation Element to establish LOS "E" as the acceptable level of service for specific intersections within the existing Irvine Spectrum and Medical/Science zoned areas within the Project Area. The current Circulation Element identifies LOS "D" as the target level of service. As discussed in greater detail in Section 4.15, Transportation/Circulation, the average travel speed along an urban street is the determinant of the operating level of service. An intersection with the LOS "E" is characterized by greater congestion and slower travel speeds than an intersection operating at LOS "D." Consequently, if amended, there is a possibility that certain of the intersections within the existing Irvine Spectrum and Medical/Science zoned areas within the Project Area would experience more congestion than if the target level of service remained LOS "D," and could result in increased CO concentrations. Based upon the CO "hot spot" analysis summarized above, none of the intersections exceed the 1-hour and 8-hour CO standards, and are well below the 20 ppm and 9 ppm standards. In fact, for both the 1-hour and 8-hour CO concentrations, the projections are less than half of both applicable standards for the year 2025. (For the year 2007, two receptors show concentrations that are a little more than half of the acceptable standard: 5.1 ppm as compared to the State standard of 9 ppm.) Because the CO concentrations are so low as compared to the State standards, even if the intersections were more congested as a result of proposed amendment, the CO concentrations would not exceed the State standards and would not result in a significant sensitive local air quality impact for CO concentrations.

LOS "E" CO Hot Spot Analysis

The project also proposes to consider an amendment to the City's Circulation Element to establish LOS "E" as the acceptable level of service for specific intersections within the existing Irvine Spectrum and Medical and Science zoned areas within the Project Area. The current Circulation Element identifies LOS "D" as the target level of service. As discussed in greater detail in Section 4.14, "Transportation/Circulation," the average travel speed along an urban street is the determinant of the operating level of service. An intersection with a LOS "E" is characterized by greater congestion and slower travel speeds than an intersection operating at LOS "D," and could result in increased CO concentrations. Based upon the CO "hot spot" analysis summarized above, none of the intersections exceed the 1-hour or 8-hour CO standards, and are well below the 20 ppm and 9 ppm standards. In fact, for both the 1-hour and 8-hour CO concentrations, the projections are less than half of both of the applicable standards for the year 2025. (For the year 2007, two receptors

show concentrations that are a little more than half of the acceptable standard: 5.1 ppm as compared to the State standard of 9ppm.) Because the CO concentrations are so low as compared to the State standards, even if the intersections were more congested as a result of the proposed amendment, the CO concentrations would not exceed the State standards and would not result in a significant local air quality impact for CO concentrations.

PM10 Hot Spot Analysis Results

The results of the CALINE4 modeling are summarized in Table 4-11 for 24-hour PM10 concentrations. The pollutant levels, expressed in ug/m³ for each receptor are reported. The PM10 concentration levels reported in Table 4-11 are composites of the background levels of PM10 coming into the area plus those generated by the local roadways.

Table 4-11 Future Projections of 24-Hour PM10 Concentration (ug/m³)								
Receptor	Year 2007		2025 Build-out Toll W/ MP II		2025	2025	2025	2025
	No Proj. 24 Hour	W/ Proj. 24 Hour	No Proj. 24 Hour	W/ Proj. 24 Hour	W/ EI Toro Aviation Plan 24 Hour	Prob. Future 24 Hour	No Crossing 24 Hour	W/ Crossing 24 Hour
1	120	120	117	118	120	120	--	--
2	121	121	122	123	124	124	--	--
3	118	118	119	120	123	123	--	--
4	120	120	123	126	127	127	--	--
5	117	118	121	121	124	124	--	--
6	123	123	128	128	*	*	--	--
7	--	--	--	--	--	--	119	119
Summary:	No. of Sites exceeding PM10 <u>State</u> standards of 50 ug/m3							
Exceedances	6	6	6	6	5	5	1	1
Summary:	No. of Sites exceeding PM10 <u>Federal</u> standards of 150 ug/m3							
Exceedances	0	0	0	0	0	0	0	0
<i>Note: Concentrations include background PM10 concentrations of 111 ug/m³ for 24 hour. The 24 hour PM10 concentrations were determined based on a persistent factor of 0.6.</i> <i>* This roadway section is eliminated under these future scenarios.</i> <i>-- Not applicable</i>								

According to Table 4-11, the future 24 hour PM10 concentration levels for *2007 no project* will be in the range of 117 to 123 ug/m³. The future PM10 concentration levels for *2007 with project* will be in the range of 118 to 123 ug/m³. The *2007 with and without project* PM10 concentration levels will be essentially the same for most of the receptor locations, except for an increase of 1 ug/m³ at Receptor 5 under with project conditions. For *2025 Buildout Toll with and without project*, the future PM10 levels will be between 117 and 128 ug/m³, and 118 and 128 ug/m³, respectively.

The *2025 Buildout Toll with project* PM10 concentration levels will be slightly higher than *no project* at Receptors 1 through 4; the future PM10 emissions will be the same at the other two receptor locations. The *2025 Buildout Toll with project* PM10 concentration levels will increase over *no project* by 1 to 3 ug/m³, with the maximum increase at Receptor 4. The increases in PM10 with the project are very small and are not considered to be significant. The PM10 modeling results in Table 4-11 show that the future PM10 concentration levels for all future scenarios will comply with the Federal PM10 standard of 150 ug/m³. However, the future PM10 concentrations will exceed the State PM10 standard of 50 ug/m³ for all cases due to the high background concentrations which already exceed the state standard.

With respect to project impacts, the project does not increase significantly the levels of PM10 adjacent to roadways serving the project. Although exceedances of State PM10 standards are projected, these exceedances would occur without the project. The incremental contribution of the project is not considered significant, and therefore the project is not considered to have a significant impact on local PM10 concentrations. The project's proposed amendment to the Circulation Element to establish LOS "E" as the acceptable level of service for specific intersections would not significantly increase the "with project" 24-hour PM 10 levels beyond that already projected with LOS "D" as the target level of service. As noted previously, exceedances of the State PM 10 are projected for all receptor locations even without the project. The incremental contribution of the project with either LOS "D" or "E" will not be so substantial as compared to the without project condition as to contribute a significant impact.

In conclusion, the project will generate little or no increase in pollutant concentrations along the roadways assessed. No violations of the state or federal CO standards are projected with the project. Exceedances of State PM 10 standards have been projected, however, the project will not increase significantly the levels of PM10 adjacent to roadways serving the project. Therefore, no significant local air quality impacts are anticipated for the project.

LOS "E" PM10 Hot Spot Analysis

The consideration of the proposed amendment to the City's Circulation Element to establish LOS "E" as the acceptable level of service for specific intersections would not significantly increase the "with project" 24-hour PM 10 levels beyond that already projected with LOS "D" as the target level of service. In urban areas, PM10 generation is a function of transportation sources, including both emissions and vehicular movement which may generate particulate matter. The PM10 hot spot analysis was based upon unmitigated traffic volumes and capacity levels, and therefore the

intersections modeled represent congested intersections prior to any mitigation that may be required to bring that intersection to either LOS “D” or LOS “E” levels of service. Some of the intersections have been modeled with more congested levels of service than LOS E, and improving the level of service to “E” may result in a slight improvement. In addition, the PM10 calculations were based upon vehicle miles traveled and the number of vehicle trips that would occur with and without the project. These figures would not change if the intersection level of service were amended from LOS “D” to “E.” As noted previously, exceedances of the State PM10 standards are projected for all receptor locations even without the project. The incremental contribution of the project with either LOS “D” or “E” will not be so substantial as compared to the without project condition as to constitute a significant impact.

Consistency with Air Quality Plans and Policies

Assess Consistency against the most recent federally-approved air plan.

The 1997 AQMP, as amended in 1999, is the current applicable air plan for the South Coast Air Basin (SCAB). As detailed previously, this AQMP provides an overall control strategy for meeting federal and state standards as expeditiously as possible. Control measures to be implemented by stationary, areawide and mobile sources of pollution are contained in the AQMP.

CEQA requires projects to be analyzed for consistency with the AQMP and other applicable regional plans. The primary purpose of a consistency analysis is to establish if the proposed project is inconsistent with assumptions and objectives of the approved Air Plan, and therefore its ability to interfere with attainment of federal and state air quality standards. Section 15125 of the CEQA Guidelines require that EIRs analyze and discuss any inconsistencies between the proposed project and regional plans such as the AQMP.

SCAQMD 1993 CEQA Air Quality Handbook provides advisory guidance on determining consistency of proposed projects in the SCAB with the AQMP. SCAQMD’s CEQA Handbook is widely referenced by lead agencies and project sponsors throughout the SCAB. Consistency review is recommended for new or amended General Plans, Specific Plans and significant projects that are not reflected in current General Plans or the AQMP. A consistency review for the proposed project is appropriate since it involves a General Plan amendment.

SCAQMD’s CEQA Air Quality Handbook recommends two key determinants of consistency with the AQMP:

- 1) Whether the project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (except as provided for in Section 9.4 for relocating CO hot spots).

-
- 2) Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project build-out and phase.

Source: SCAQMD CEQA Air Quality Handbook, 1993, page 12-3.

The following discussion examines the proposed project's consistency with each criterion of the AQMP.

Consistency with Federal and State Standards

The proposed project will not result in an increase in the frequency or severity of existing air quality violations, will not cause or substantially contribute to new violations, nor will it delay timely attainment of any ambient air quality standards.

Specifically, both the proposed project and all of the alternatives considered will comply with State and Federal 1-hour and 8-hour CO standards at all receptor locations. At all but one receptor location, future CO levels are expected to be lower than existing concentrations. Future increases in traffic are more than offset by decreasing background levels and cleaner engines and fuels in the vehicle fleet. (Tables 4-9 and 4-10 present summary information on CO concentrations.)

With regard to PM-10, all receptor sites under all scenarios meet the Federal PM-10 standard. However, all of the receptor sites currently exceed the State PM-10 standard. Neither the proposed project nor its alternatives would significantly increase the frequency or severity of this exceedance.

Consistency with Key Assumptions in the AQMP

SCAQMD's CEQA Handbook guidance calls for consistency with the forecast used in the federally approved AQMP. A key principle in the CEQA Air Quality Handbook is that a project is accommodated by and consistent with the AQMP to the extent that it fits within the regional socio-economic and transportation forecasts assumed in the Plan. The AQMP is based on projections from local general plans, which are incorporated into the SCAG regional growth forecasts that form the foundation for the adopted Regional Transportation Plan.

The 1997 AQMP, as amended in 1999, is the applicable federally-approved air plan against which consistency is determined. The 1997 AQMP is based on SCAG's 1994 growth forecast for the South Coast Air Basin, which includes Orange County and the proposed project. The 1997 AQMP accommodates the level of growth assumed in SCAG's 1994 forecast.

Because of the differences in forecast year reflected in the 1997 AQMP and the proposed project's buildout year, a direct comparison of the proposed project with the 1997 AQMP cannot be made.

The horizon year for the 1994 forecast assumed in the 1997 AQMP is 2015. The full impact of the proposed project will not be realized until build-out in 2025. Thus, the proposed project cannot be compared directly with the AQMP forecast.

Table 4-12 displays the 1994 forecast in the 1997 AQMP with the proposed project. Since the horizon year for the 1994 forecast is 2015, it is not possible to directly compare the AQMP forecast with the project for 2025.

Table 4-12 Comparison of the Proposed Project to 1994 Growth Forecast Assumed in 1997 AQMP						
	2000	2005	2010	2015	2020	2025
Orange County Population						
97 AQMP	2,868,000	--	3,108,000	3,182,000	--	--
Prop. Project	0	—	—	—	—	34,388
Orange County Households*						
97 AQMP	1,005,000	--	1,092,000	1,130,000	--	--
Prop. Project	0	—	—	—	—	12,350
Orange County Employment						
97 AQMP	1,558,000	—	1,886,000	2,006,123	--	--
Prop. Project	1,694	—	—	—	—	17,841
<i>* 1997 AQMP household projections assume a 4% vacancy rate.</i>						
<i>Source: 1997 AQMP/SCAG 1994 Regional Growth Projection in RCGP, 1994</i>						

SCAG's 1994 Regional Growth Forecast has been replaced twice by updated forecasts (in 1998 and 2001) since the 1997 AQMP was prepared. The 1994 forecast underpinning the 1997 AQMP was based on local general plans at the time it was adopted. Efforts are now underway to extend the AQMP growth assumptions through 2025 in the 2001 AQMP update now in progress. These updated projections will more closely reflect OCP-2000 and current General Plans.

While a direct comparison of the proposed project with the 1997 AQMP projections is not feasible, it is possible to approximate the fit between the proposed project and an extrapolation of the 1997 AQMP forecast. Table 4-13 below extrapolates the growth projections in the 1997 AQMP for the years 2020 and 2025 based on the relationship between OCP-2000 and the AQMP growth assumptions. This supplemental comparison of the extrapolated AQMP growth projections with the proposed project is intended to provide a general sense of the project's fit with overall growth accommodated by the AQMP.

Table 4-13
Supplemental Comparison of Proposed Project to Extrapolation of
1997 AQMP Growth Forecast (1997 AQMP-E)

	2000	2005	2010	2015	2020	2025
Orange County Population						
97 AQMP	2,868,000	--	3,108,000	3,182,000	3,259,444(E)	3,323,419(E)
OCP-2000	2,853,757	3,031,440	3,168,942	3,270,677	3,343,829	3,416,037
Difference	14,243		-60,942	-88,677	-84,385	-92,618
Prop. Project	0	—	—	—	—	34,388
% of AQMP-E	0%	—	—	—	—	1.03%
Orange County Households*						
97 AQMP	1,005,000	--	1,092,000	1,130,000	1,147,146(E)	1,167,017(E)
OCP-2000	978,004	1,018,873	1,056,882	1,080,430	1,096,824	1,115,823
Difference	26,966		35,118	49,570	50,322	51,194
Prop. Project	0	—	—	—	—	12,350
% of AQMP-E	0%	—	—	—	—	1.02%
Orange County Employment						
97 AQMP	1,558,000	—	1,886,000	2,006,123	2,088,303(E)	2,160,826(E)
OCP-2000	1,502,434	1,667,778	1,796,726	1,897,350	1,975,074	2,043,665
Difference	55,566		89,274	108,773	113,229	117,161
Prop. Project	1,694	—	—	—	—	17,841
% of AQMP-E	.11%	—	—	—	—	.74%
<i>* 1997 AQMP household projections assume a 4% vacancy rate. For comparison with OCP-2000 dwelling unit projections, this number must be adjusted.</i>						
<i>Source: 1997 AQMP/SCAG 1994 Regional Growth Projection in RCGP, 1995 OCP-2000, Center for Demographic Research, California State University, Fullerton.</i>						

- **Employment.** The AQMP job forecast for 2015 exceeds OCP-2000 by 108,773 jobs. If extrapolated to 2025, this gap widens to 117,161 jobs. The proposed project captures .74% of the County's growth when the 1997 AQMP forecast is extrapolated to 2025.
- **Housing.** The extrapolated AQMP household forecast for Orange County is 1,167,017 occupied dwelling units in 2025. When the total extrapolated units are adjusted to 1,213,698 total units to account for the assumed 4% vacancy rate, the proposed project represents 1.02% of total extrapolated County housing units in 2025.
- **Population.** Population is related to the amount of housing within an area. However, the extrapolated 1997 AQMP population projections call for 92,618 fewer Orange County

residents in 2025 than projected by OCP-2000, while the housing stock would increase at a rate exceeding that of OCP-2000 housing projections. The AQMP projections, developed in 1994, assume a smaller household size and lower birth rate, which do not reflect current trends in Orange County. The project represents 1.03% of the extrapolated County population for 2025, which is consistent with its share of extrapolated County housing.

In summary, a direct comparison of the proposed project with the AQMP forecast is infeasible. Supplemental consideration of extrapolated AQMP growth projections shows that the project fits within employment, housing and population projections for Orange County. On balance, the proposed project is consistent with the growth assumptions of the 1997 AQMP.

Consistency with Recommended Land Use/Air Quality Strategies to Reduce Emissions

In addition to direct comparison with the 1997 AQMP growth projections, as well as a supplemental comparison with an extrapolation of the AQMP projections, this analysis examines the proposed project's consistency with 1997 AQMP control measures and emission reduction strategies.

Transportation Control Measures. The project will not interfere with provision of any regionally significant transportation projects assumed in Transportation Control Measure-01 (TCM-01) in the 1997 AQMP. TCM-01 contains regionally significant, emission-reducing projects for the South Coast Air Basin which are programmed in the Regional Transportation Improvement Program. These projects support the growth and land uses assumed in the 1997 AQMP.

Other Recommended Emission Reduction Strategies. One of the AQMP's major challenges is to insure attainment of federal and state ambient air quality standards despite continued growth within the SCAB. As the Basin has evolved from scattered settlements into a four-county metropolitan area, industrial sources of pollution and emissions from cars, trucks, buses and other vehicles have increased to levels that exceed the federal and state health-based standards.

All new development within the SCAB occurs within a nonattainment area. Although the AQMP accommodates and mitigates growth anticipated in the regional growth forecast, SCAQMD encourages all projects to minimize their emissions to the extent feasible. The proposed project incorporates a coordinated package of emission reduction strategies recommended in SCAQMD's CEQA Air Quality Handbook, CARB's "Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions" (1995), and U.S. EPA's guidance on "Improving Air Quality Through Land Use Activities" (2000). CARB's 1997 "Land Use-Air Quality Linkage" guidance identifies the following "optimum land use strategies for air quality to reduce project Vehicle Miles Traveled and associated emissions or to enhance emission mitigation measure effectiveness:

- Concentrated development design to make use of HOV lanes, carpools, vanpools, bicycle trips and pedestrian trips more viable;

-
- Enhanced activity centers with proximity to transportation corridors and transit centers to encourage efficient use of the transportation system;
 - Mixed land uses incorporating housing, shopping and employment, to encourage pedestrian, bicycle and transit trips.

The proposed project mixes housing and job growth in a manner conducive to walking, biking and transit alternatives to automobile travel. The Project would interface with commercial, residential and mixed-use areas including the existing Irvine Spectrum activity center and future development within Planning Area 51. The proposed project is adjacent to High Occupancy Vehicle lanes on I-5, and the Eastern Transportation Corridor toll lanes (which are priced to insure free flow).

Using these techniques, CARB's report finds that "reductions in the range of 10 to 30 percent in per-household vehicle travel and related emissions are possible at the neighborhood or community level. . . in comparison with typical low density, single-use development." Irvine Spectrum, which is adjacent to the proposed project, provides an example within the City of Irvine of the effectiveness of these strategies under local conditions. Employment is concentrated in Irvine Spectrum near major transportation corridors and transit nodes. The resulting concentration of employees creates opportunities for more effective transportation demand management programs to reduce Vehicle Miles Traveled and associated congestion and emissions. "Spectrumotion" is the comprehensive Transportation Demand Management Program serving Spectrum and consisting of carpooling, vanpooling, riding the bus, commuter rail (Metrolink), bicycling, telecommuting, and compressed work weeks. Participation in Spectrumotion is mandatory for all property owners within Spectrum. Documentation presented to the Institute of Transportation Engineers (ITE) finds that the proportion of drive-alone commute trips within Spectrum is well below comparable rates in Los Angeles and Orange Counties. This in turn results in less congestion and lower emissions (J. Boslet and S. McCaughey, Irvine Spectrum Trip Reduction Program, 2000). These quantified reductions resulting from Spectrum's design and complementary transportation demand management programs fall well within range identified by CARB.

The proposed project's mixed use design and concentration of jobs and housing also improve jobs/housing balance. Jobs/housing balance is a measure of the proximity between job and housing opportunities. Jobs/housing balance holds implications for local and regional air quality: the shorter the distance between job opportunities and housing opportunities, the less Vehicle Miles Traveled and the greater the opportunity that residents and employees will rideshare, walk, or use transit rather than a single-occupant automobile.

The proposed project achieves a 1.44 jobs/housing ratio within a County and City that are imbalanced in favor of jobs. The proposed project would benefit the City of Irvine's overall jobs/housing ratio, as well as the subregion's balance of jobs and housing (Regional Statistical Area E-44). The City's jobs/housing ratio was 3.29 (per OCP-2000) in 2000. With the proposed project, this ratio improves to 2.96. RSA E-44's jobs/housing ratio in 2000 was 2.78. With the proposed project, this ratio improves to 2.57. Although both the City of Irvine and the Project's Regional

Statistical Area E-44 are projected to grow more jobs-rich by 2025, they would be even more jobs-rich without the proposed project.

In summary, the proposed project supports TCM-01 and implements a number of land use/air quality strategies recommended by the SCAQMD, CARB and EPA to reduce Vehicle Miles Traveled and the emissions associated with them.

Local and Regional Mitigation Measures Supportive of the AQMP

CEQA allows lead agencies to approve projects that are found to be inconsistent with the AQMP. However, a primary intention of SCAQMD's consistency guidance is to identify ways in which all projects can be modified or strengthened to support the AQMP, as well as ways in which projects inconsistent with the AQMP can mitigate their impacts.

The proposed project includes measures designed to reduce emissions to the degree feasible. While not required by SCAQMD, these measures are intended to support AQMP objectives:

- The proposed project will implement all applicable City and SCAQMD rules and regulations which will reduce emissions (e.g. Rule 403, Fugitive Dust.)
- The proposed project will include all feasible mitigation measures for construction and operation emissions applied to adjacent parcels or projects with similar characteristics within the City of Irvine.

Section 4.3.3 details mitigation measures aimed at reducing short-term construction emissions. The measures range from dust abatement controls to traffic congestion mitigations, consistent with SCAQMD and City of Irvine dust control requirements. In addition, Section 4.3.3 identifies Transportation Demand Management (TDM) and Energy Efficiency measures that would minimize emissions within the South Coast Air Basin. In particular, the TDM measures would require programs patterned after successful techniques developed by Spectrumotion, the Transportation Demand Management program that has significantly reduced trips and congestion in the Spectrum development adjacent to the proposed project.

Documentation presented to the Transportation Research Board finds that the proportion of drive-alone commute trips within Spectrum is well below comparable rates in Los Angeles and Orange Counties. This in turn results in less congestion and emission reductions. Similar results are expected from the mitigation measures for the proposed project. (J. Boslet and S. McCaughey, Irvine Spectrum Trip Reduction Program, 2000).

In summary, the proposed project includes mitigation measures that reduce emissions to the degree feasible, as recommended by SCAQMD's CEQA Air Quality Handbook.

Odors

Construction activity will require the operation of equipment which may generate exhaust from either gasoline or diesel fuel. Construction and development will also require the application of paints and the paving of roads which could generate odors from materials such as paints and asphalt. As these odors are short-term in nature and quickly disburse into the atmosphere, this is not considered significant.

Future residential and commercial development would involve minor, odor-generating activities, such as backyard barbeque smoke, lawn mower exhaust, application of exterior paints from home improvement, etc. These types and concentrations of odors are typical of residential communities and are not considered significant air quality impacts.

The proposed Research and Industrial uses have the potential to generate odors depending upon the nature of the operations and actual uses proposed. These types of uses will be subject to regulation under the Irvine Zoning Code and may require a conditional use permit and would be subject to further site-specific review at that time. It is not anticipated that the majority of office- and research-uses would, however, generate significant odors.

Cumulative Impacts

Consistent with the future cumulative development scenarios analyzed in the traffic study and discussed in Section 4.14, "Transportation/Traffic," this EIR air quality analysis reflects the three other future potential land use/transportation scenarios. These scenarios are: *2025 Buildout Toll With Project (including the Millennium Plan II)*, *2025 Buildout Toll With Project with El Toro Aviation Plan*, and *2025 with "Probable Future" Projects*. All of these cumulative development scenarios include the proposed project. This analysis shows the difference in vehicular emissions with alternative land use and/or roadway network scenarios around the project. Therefore, changes in vehicular emissions are primarily due to the increases or decreases in traffic generation and distribution for the alternative cumulative development scenarios. The emissions for the project will remain essentially unchanged for all of the alternative cumulative development scenarios considered.

The emission factors were derived from EMFAC2000 prepared by CARB. The EMFAC2000 emission factors, at an average speed of 25 miles per hour, were utilized in the estimates. These data are provided as technical data in the appendix. The results of the vehicular emissions for the various scenarios are presented in Table 4-14, and will be compared with the proposed project (*2025 Buildout Toll*) shown previously in Table 4-7.

Table 4-14				
Total Daily Emissions - Cumulative Scenarios				
Pollutant	Vehicular Emissions (Pounds/Day)			
	2025 Buildout Toll	2025 Oak Canyon Crossing	2025 El Toro Aviation Plan	2025 “Probable Future”
CO	3,447	3,435	2,716	1,284
TOG/ROG	127	127	103	55
NOx	587	585	445	166
PM10	50	50	42	26
SOx	437	435	319	59
<i>Note: 2025 scenarios include the Millennium Plan.</i>				

2025 General Plan Buildout (Toll With Project) with the Millennium Plan II

The VMT for the *2025 General Plan Buildout with Millennium Plan II* represents the difference between the regional VMT for the *2025 Buildout Toll No Project* subtracted from the *2025 Buildout Toll With Project*. The results of the vehicular emissions for the General Plan Buildout with Millennium Plan II are presented in Table 4-14.

Cumulative development in accordance with the adopted City of Irvine General Plan, which includes Millennium Plan II, will contribute to the cumulative air quality problems in the SCAB mostly due to the generation of motor vehicle traffic. The addition of emissions from cumulative development to the SCAB, a non-attainment area, is considered a Significant Unavoidable Adverse Impact.

2025 General Plan Buildout with OCX (El Toro Aviation Plan)

The El Toro Aviation Plan represents the County of Orange's adopted proposed land use for the former El Toro military base. The regional VMT for the *2025 Buildout Toll No Project* was subtracted from the regional VMT for the *2025 El Toro Aviation Plan (With Project)*. Therefore, the emissions presented below represent the emissions due to the project emissions generated by the El Toro Aviation Plan. The results of the vehicular emissions for the El Toro Aviation Plan are presented in Table 4-14. As can be seen from the data in Table 4-14, the emissions decrease with the El Toro Aviation Plan and the cumulative impacts of the aviation plan and the project are an improvement in air emissions. The decrease in emissions is because the El Toro Aviation Plan would generate less vehicular miles traveled than the land uses for the El Toro base that are currently adopted by the City of Irvine.

Cumulative development in accordance with the adopted City of Irvine General Plan with the El Toro Aviation Plan, as adopted by the County of Orange, will contribute to the cumulative air quality problems in the SCAB mostly due to the generation of motor vehicle traffic. The addition

of emissions from cumulative development to the SCAB, a non-attainment area, is considered a Significant Unavoidable Adverse Impact.

Probable Future Projects

The "Probable Future Projects" scenario presents a sensitivity run under *2025 Buildout Toll* network conditions assuming the build-out of the Northern Sphere Area and the inclusion of "probable future projects" developments. These "probable future projects" have either filed applications, are expected to be included in the March 2002 ballot measure or have been announced by The Irvine Company with the intent to modify existing approved plans. This sensitivity scenario is compared to the baseline *2025 Buildout Toll* with project forecasts. These "probable future projects" include Lower Peters Canyon Intensity Transfer (including Planning Area 4), Irvine Spectrum Housing (Planning Areas 17, 31, 33 and 34) and the Woodbridge General Plan Amendment (Irvine Planning Area 15). The City of Irvine's proposed Great Park Plan for the former Marine Corps (MCAS) El Toro is included. The City of Irvine's proposed Master Plan of Arterial Highways (MPAH) Amendment to delete Culver Drive between Portola Parkway and SR-241 is also included. Lastly, development reductions have been assumed in the East Orange area reflecting The Irvine Company's intention to expand permanent open space within this area.

The emissions presented in Table 4-13 represent the emissions due to the project plus the increase or decrease in emissions caused by the *Probable Future Projects* land uses. The results of the vehicular emissions for the *Probable Future Projects* case are presented in Table 4-14. As can be seen from the data in Table 4-14, the emissions decrease significantly with the *Probable Future Projects* land uses and the cumulative impacts of these land uses and the project are an improvement in air emissions. The decrease in emissions is because the land uses and roadway network for this scenario would generate less vehicular miles traveled than currently approved plans. In fact, this alternative scenario results in the lowest emissions of all the alternative cumulative development scenarios considered. However, the addition of emissions from cumulative development to the SCAB, a non-attainment area, would remain a Significant Unavoidable Adverse Impact.

CO and PM10 Localized "Hot Spot" Analysis

As shown on Tables 4-9 to 4-11, the localized CO and PM10 concentrations under the "special future case scenarios" were also assessed for the seven receptor locations.

Tables 4-9 and 4-10 show the future projections of 1-hour and 8-hour CO concentrations for the three "special future case scenarios." If the project were developed under the *2025 El Toro Aviation Plan* and *2025 with "Probable Future Projects"* scenarios, the future CO concentrations will be generally in the same range or in most cases less than the 2025 Build-out Toll calculations. The future CO concentrations for these two scenarios will be between 6.4 and 6.7 ppm for 1 hour, and 3.6 and 3.8 ppm for 8 hour. The *2025 with El Toro Aviation Plan* and *2025 with "Probable Future Projects"* CO concentration levels will be the same for most receptors.

For both *2025 with and without the Oak Canyon Crossing* scenarios, the future CO levels will be the same at Receptor 7; the CO concentration levels for these scenarios will be approximately 6.4 ppm for 1 hour and 3.6 ppm for 8 hour. The *2025 with and without the Oak Canyon Crossing* CO concentration levels will be the same at the Sand Canyon Avenue/Oak Canyon intersection. The congestion level at this intersection will be improved from an existing level-of-service “D” to “C” for year 2025.

Table 4-11 show the future projections of 24-hour PM10 concentrations. For the *2025 with El Toro Aviation Plan* and *2025 with “Probable Future Projects,”* the future PM10 levels for both scenarios will be in the range of 120 to 127 ug/m³, and are calculated to be the same for all of the receptor locations. The concentrations, however, for both of these two future scenarios increase slightly over the project’s *2025 Buildout Toll* scenario. The future PM10 concentration levels for *2025 with and without the Oak Canyon Crossing* scenarios will be approximately 19 ug/m³. The PM10 concentration levels for *2025 with and without the Oak Canyon Crossing* will be the same at the Sand Canyon Avenue/Oak Canyon intersection (Receptor 7). The congestion level at this intersection will be improved from an existing level-of-service “D” to “C.” In terms of PM10, the concentration levels for 2025 with and without the Oak Canyon Crossing will not change.

The PM10 modeling results in Table 4-11 show that the future PM10 concentration levels for all future scenarios will comply with the Federal PM10 standard of 150 ug/m³. However, the future PM10 concentrations will exceed the State PM10 standard of 50 ug/m³ for all cases due to the high background concentrations which already exceed the state standard. The State PM10 standard would be exceeded, however, even without the project. The incremental increase calculated for these two future scenarios is not considered significant as compared to the no project conditions, and therefore, is not considered significant.

Oak Canyon Crossing

The Oak Canyon Crossing represents a potential circulation improvement. The traffic data for the alternatives were provided by Austin-Foust Associates, Inc. (November 2001). The VMT for the *2025 Buildout Toll* represents the difference between the regional VMT for the *2025 Buildout Toll No Project* subtracted from the *2025 Buildout Toll With Project*. Similarly, the *2025 Buildout Toll No Project* was subtracted from the *2025 with Oak Canyon*. Since the land uses for this alternative do not change, the change in VMT and emissions is due strictly to changes in travel patterns with the Oak Canyon overcrossing. Therefore, the emissions presented below represent the emissions due to the project plus the increase or decrease in emissions caused by the Oak Canyon Crossing. The results of the vehicular emissions for the Oak Canyon Crossing are presented in Table 4-14, and are compared to the proposed project (*2025 Buildout Toll*) shown previously in Table 4-7. As can be seen from the data in Table 4-14, the emissions decrease slightly with the Oak Canyon Crossing and the cumulative impacts of the crossing and the project are a very slight improvement in air emissions. The decrease in emissions is due to the shorter travel distances that would be made available by the Oak Canyon Crossing.

Post 2040 Long Term Impacts

Cumulative impacts for air quality are analyzed based upon the traffic data for a post 2040 scenario as provided by Austin-Foust Associates, Inc. (November 2001). The cumulative scenario represents the buildout of the proposed project plus the buildout of the City's General Plan and assumes toll-free corridors. The VMT is estimated for the project to be 567,379 for post *2040 Buildout Toll-Free*. Again, the project's VMT were determined by subtracting the regional VMT without the project from the regional VMT with the project.

The emission factors were derived from EMFAC2000 prepared by CARB. The EMFAC2000 emission factors, at an average speed of 25 miles per hour, were utilized in the estimates. These data are provided as technical data in the appendix. The results of the vehicular emissions for the cumulative scenario are presented in Table 4-15.

The emissions for the Post 2040 Buildout are reduced in comparison to the 2025 Buildout emissions. Even though the Post 2040 case represents additional development in the City of Irvine, the continued reduction in vehicular emissions more than offsets the additional development. The emissions for the cumulative scenario will be significant, when compared to the daily significance thresholds. As a result, the project related emissions in the Post 2040 scenario would still result in a Significant Unavoidable Adverse Impact.

Table 4-15	
Vehicle Emissions for the Project - Cumulative (Post-2040)	
Vehicular Emissions (Pounds/Day)	
Pollutant	Post 2040 Buildout Toll-Free
CO	1,974
TOG/ROG	49
NOx	494
PM10	42
SOx	402

4.3.3 MITIGATION MEASURES

Existing Regulations and Standard Conditions

- 3.1 The proposed project shall include suppression measures for fugitive dust and those associated with construction equipment in accordance with SCAQMD Rule 403 and other AQMD requirements. Prior to issuance of each grading permit, the landowner or subsequent project applicant shall obtain the appropriate permits from the SCAQMD and submit them to the City.

Project Design Features/Special Development Requirements

No project design features or special development requirements related to air quality are proposed.

Additional Mitigation Measures

- 3.2 Prior to the issuance of grading permits, the landowner or subsequent project applicant shall include a note on all grading plans which requires the construction contractor to implement following measures during grading. These measures shall also be discussed at the pregrade conference.
- a. Use low emission mobile construction equipment.
 - b. Maintain construction equipment engines by keeping them tuned.
 - c. Use low sulfur fuel for stationary construction equipment.
 - d. Utilize existing power sources (i.e., power poles) when feasible.
 - e. Configure construction parking to minimize traffic interference.
 - f. Minimize obstruction of through-traffic lanes. When feasible, construction should be planned so that lane closures on existing streets are kept to a minimum.
 - g. Schedule construction operations affecting traffic for off-peak hours.
 - h. Develop a traffic plan to minimize traffic flow interference from construction activities (the plan may include advance public notice of routing, use of public transportation and satellite parking areas with a shuttle service).

-
- 3.3 Prior to the issuance of grading permits for commercial/medical and science uses, the landowner or subsequent project applicant shall submit a plan to the Community Development Department for approval which promotes the utilization of alternative forms of transportation through incorporation of the following measures:
- a. Annexation to the Irvine Spectrum Transportation Management Association (TMA) (Spectrumotion) for all medical and science zoned projects.
 - b. Scheduling of truck deliveries and pickups during off-peak hour when feasible.
 - c. Provision of adequate ingress and egress at all entrances to public facilities to minimize vehicle idling at curbsides.
 - d. Provision of dedicated turn lanes as appropriate and provide roadway improvements at heavily congested roadways.
- 3.4 Prior to approval of each building permit for a medical and science zoned use, the landowner or subsequent project applicant shall submit to the Director of Community Development for approval, an operational emissions mitigation plan. The plan shall identify implementation procedures for each of the following emissions reduction measures. If certain measures are determined infeasible, an explanation thereof shall be provided in the operational emissions mitigation plan.
- Utilize energy-efficient appliances to reduce energy consumption and emissions.
 - Utilize energy-efficient and automated controls for air conditioners and lighting to reduce electricity consumption and associated emissions.
- 3.5 Prior to approval of each tentative tract map, the landowner or subsequent project applicant shall submit to the Director of Community Development for approval, a plan showing pedestrian/bicycle trails that facilitate connections to public facilities such as schools, parks, and regional trails, as well as between residential neighborhoods.
- Where possible, connect residential areas to public facilities, parks, regional trails and other residential neighborhoods with pedestrian/bicycle trails.
 - Where possible, connect commercial areas to adjacent residential areas via bike/walking paths.
 - Coordinate with OCTA and the City regarding the location of bus turnouts and bus routes within the project area.

4.3.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Construction activities were shown to possibly cause PM10 significance thresholds to be exceeded even if accelerated dust control measures are implemented. Construction equipment exhaust emissions were shown to be significant for all air pollutants in the first construction phase, and for NOx and PM10 in the second construction phase. Although the mitigation measures listed above will reduce potential construction-related air quality impacts, they remain a temporary Significant Unavoidable Adverse Impact.

The mitigation measures listed above are expected to reduce project-related emissions. However, even after the application of mitigation measures, the proposed project is expected to generate emissions levels in exceedance of AQMD's threshold criteria for CO, ROG, NOx, and PM10 in the SCAB, which is classified as a non-attainment area. As a result, project-related air quality impacts are considered a Significant Unavoidable Adverse Impact and a Statement of Overriding Considerations must be adopted concurrent with project approval.

Although the project will result in significant regional air quality impacts, the proposed project is consistent with AQMP and other regional plan strategies to reduce the number of trips and the length of trips in the region, and to improve the balance between jobs and housing at the subregional level. The AQMP recognizes that emissions due to trips and mode choices are not only a function of the transportation system, but also relate to the proximity of housing and job-generating land uses, and proximity of jobs to transportation infrastructure and transit.

The future CO emissions are projected to be in compliance with the 1-hour and 8-hour state and federal standards, and therefore, the local CO impacts due to all future scenarios are not considered to be significant. Although the future with project PM10 concentrations exceed the State 24-hour standard, the standard would be exceeded under no project conditions, and because the project does not increase the concentrations significantly over the no project condition, this is not considered a significant impact.

The emissions for the Post 2040 Buildout are reduced in comparison to the 2025 Buildout emissions. Even though the Post 2040 case represents additional development in the City of Irvine, the continued reduction in vehicular emissions more than offsets the additional development. However, the emissions for the cumulative scenario will be significant, when compared to the daily significance thresholds. As a result, the project related emissions are considered a Significant Unavoidable Adverse Impact on a project-specific and cumulative basis.

4.4 Biological Resources

A biological survey was prepared for the proposed project by Harmsworth and Associates in October 2001. A supplement to the biological survey which addresses Implementation District “P” was prepared in November, 2001. A Jurisdictional Wetland Delineation and an assessment of the relative value of riparian and aquatic resources based on the San Diego Creek Special Area Master Streambed Alteration Agreement for the proposed project was prepared by Glenn Lukos Associates, Inc. A Eucalyptus Windrow Report was prepared by David Evans and Associates, Inc. for the proposed project. These studies are summarized in the following section and included in their entirety in Appendix E of this document.

4.4.1 ENVIRONMENTAL SETTING

Regulatory Setting

The project is located within the Orange County Central/Coastal NCCP Area. The following discussion describes the Orange County Central/Coastal NCCP Area and its regulatory setting. On October 1991, the Natural Community Conservation Planning Act (the “NCCP Act”), codified at Fish and Game Code sections 2800 – 2840, was signed into law. The NCCP Act represented an alternative to “single species” conservation efforts that were relied on prior to the NCCP Act. The evolution in approach to species protection represented by the NCCP Act was described by the State of California Resources Agency in a Resources Bulletin, “Natural Communities Conservation Planning: Questions and Answers”:

“Experience over the 20-year life of the Federal Endangered Species Act (ESA) [prior to the NCCP Act] has shown that the results of listing species individually as threatened or endangered under the ESA often does not achieve its objectives. Such listings – despite intensive regulatory powers available under the law – do not necessarily assure the long-term survival of the species and can have serious economic consequences in affected regions. This is because the listing of a single species in a multi-species habitat makes it difficult for land management agencies and developers to determine how best to plan for all the species that may someday be in danger in that area. Bureaucratic indecision encouraged by this uncertainty can thwart not only needed private development, but also sound habitat management efforts crucial to species survival.

The NCCP Program is an innovative State effort to protect critical habitat ... before it becomes so fragmented or degraded by development and other uses that a listing of individual species as threatened or endangered is required under the State or Federal Endangered Species Acts. The program is designed to save critical habitat and, at the same time, allow for reasonable economic activity and development on affected land, much of which is privately owned.”

Under the NCCP Act, rather than address biological impacts of a project on a species-by-species, project-by-project basis, the California Department of Fish and Game (“CDFG”) was authorized to prepare non-regulatory guidelines and “enter into agreements with any person for the purpose of preparing and implementing a natural community conservation plan,” or NCCP Plan, “to provide comprehensive management and conservation of multiple wildlife species” through a regional or areawide essential habitat protection program. As explained in an uncodified section of the NCCP Act, the Legislature determined that habitat-based conservation effort implemented through an NCCP Plan:

“provides a regional planning focus which can effectively address cumulative impact concerns, minimizes wildlife fragmentation, promotes multispecies management and conservation, ... and promotes the conservation of broad based natural communities and species diversity.”

Following enactment of the NCCP Act, the CDFG prepared non-regulatory guidelines for the preparation of NCCP Plans, in coordination with the United States Fish and Wildlife Service (USFWS). And, as a pilot program, the CDFG and USFWS with the cooperation of local agencies and landowners in Orange County commenced preparation of an NCCP Plan for Coastal Sage Scrub (“CSS”) habitat in the Central and Coastal Subregions of Orange County. When the coastal California gnatcatcher, an CSS-obligate species, was listed as “threatened” under the ESA in 1993, planning for the central and coastal Orange County NCCP Plan had sufficiently progressed that the listing notice expressly recognized that effort:

“[I]ncidental take of the coastal California gnatcatcher will not be considered a violation of Section 9 of the Endangered Species Act of 1973, as amended (Act), if it results from activities conducted pursuant to the State of California’s Natural Community Conservation Planning Act of 1991 (NCCP), and in accordance with a NCCP Plan for the protection of coastal sage scrub habitat, prepared consistent with the State’s NCCP Conservation and Processing Guidelines....”

The *Natural Communities Conservation Plan & Habitat Conservation Plan – County of Orange Central & Coastal* (“NCCP/HCP”) was approved in 1996 to address protection and management of CSS habitat and CSS-obligate species, and other covered habitats and species, and mitigate anticipated impacts to those habitats and species, on a cumulative, areawide basis. The development portions of the project were identified in the NCCP Plan for development, while at the same time a habitat Reserve of in excess of 37,000 acres was established for the protection of CSS, other upland habitats, the coastal California gnatcatcher and other primarily CSS dependent species.

The NCCP/HCP was reviewed and approved by CDFG and USFWS. An EIR/EIS on the plan was prepared under the auspices of the County of Orange and the USFWS as lead agencies, while the CDFG and the City of Irvine were responsible agencies. Following approval of the EIR/EIS, the participating agencies (including the City of Irvine) and landowners (including The Irvine Company), the USFWS, the CDFG and the County of Orange signed an Implementation Agreement.

The Implementation Agreement sets forth the implementation requirements for the NCCP/HCP, including requirements related to dedication, creation and adaptive management of a 37,000-acre Reserve as well as procedures and minimization measures related to take of identified species and modification of habitat in those areas designated for development under the NCCP/HCP.

Based upon the NCCP/HCP, the USFWS and CDFG authorized “take” of 38 “Identified Species” of plants and animals, as shown on Table 4-16.

Disturbance of the following habitats was specifically addressed, and these habitats are designated as “covered habitats” under the NCCP/HCP.

- coastal sage scrub
- oak woodlands
- chaparral (Coastal sub area only)
- Tecate cypress forest
- cliff and rock

Additionally, several others species, such as least Bell’s vireo and Foothill mariposa lily, were addressed in the NCCP/HCP as “conditionally covered.” Substantial wetland/riparian habitats and grasslands were included within the approved habitat reserve system, but wetland and grassland habitats were not a specific focus of habitat conservation planning.

The Reserve established under the NCCP/HCP was designed and approved consistent with the reserve design tenets established by the NCCP program. These tenets call for design and establishment of reserves consistent with the following principles:

- Conservation of focus species and their habitats throughout the planning area;
- Conservation of large habitat blocks;
- Conservation of habitat diversity;
- Keeping reserves contiguous and connected;
- Protecting reserves from encroachment and invasion by non-native species.

Table 4-16 Species authorized for take by the NCCP/HCP and USFWS 10A Permits (Identified “Covered” Species)	
Category	Species
Plants	Catalina mariposa lily (<i>Calochortus catalinae</i>) Coulter’s matilija poppy (<i>Romneya coulteri</i>) Heart-leaved pitcher sage (<i>Lepichinia cardiophylla</i>) Laguna Beach dudleya (<i>Dudleya stolonifera</i>) Nuttall’s scrub oak (<i>Quercus dumosa</i>) Santa Monica Mts. dudleya (<i>Dudleya cymosa</i> spp. <i>ovatifolia</i>) Small-flowered mountain mahogany (<i>Cercocarpus minutifolius</i>) Tecate cypress (<i>Cupressus forbesii</i>)
Amphibians	Arboreal salamander (<i>Aneides lugubris</i>) Black-bellied salamander (<i>Batrachoseps nigriventris</i>) Western spadefoot toad (<i>Scaphiophis hammondi</i>) – Coastal subarea only
Reptiles	Coastal rosy boa (<i>Lichanura trivirgata rosafusca</i>) Coastal western whiptail lizard (<i>Cnemidophorus tigris multiscutatus</i>) Coronado skink (<i>Eumeces skiltonianus interparietalis</i>) Orange-throated whiptail lizard (<i>Cnemidophorus hyperythrus beldingi</i>) Red diamond rattlesnake (<i>Crotalis ruber ruber</i>) San Bernardino ringneck snake (<i>Diadophis punctatus modestus</i>) San Diego horned lizard (<i>Phrynosoma coronatum blainvillei</i>)
Birds	Coastal California gnatcatcher (<i>Poliophtila californica californica</i>) Coastal cactus wren (<i>Campylorhynchus brunneicapillus</i>) Northern harrier (<i>Circus cyaneus</i>) Peregrine falcon (<i>Falco peregrinus</i>) Red-shouldered hawk (<i>Buteo lineatus</i>) Rough-legged hawk (<i>Buteo lagopus</i>) Sharp-shinned hawk (<i>Accipiter striatus</i>) Southern California rufous-crowned sparrow (<i>Aimophila ruficeps canescens</i>)
Mammals	Coyote (<i>Canis latrans</i>) Gray fox (<i>Urocyon cinereoargenteus</i>) San Diego desert woodrat (<i>Neotoma lepida intermedia</i>)

Under the NCCP/HCP, it was determined that the reserve design was sufficiently large and diverse. It was determined that the Reserve design incorporated sufficient connectivity for purposes of wildlife movement, and that impacts of development within development areas designated by the NCCP/HCP do not require further mitigation. Likewise, given the ecosystem-based approach to Reserve design, it was determined that the Reserve design adequately addressed buffer and edge considerations to fulfill the NCCP Reserve design tenets. Accordingly, impacts of development within designated development areas outside the NCCP/HCP Reserve do not require further mitigation. These determinations were consistent with non-regulatory guidance issued by the CDFG and USFWS jointly on March 17, 1995, stating:

“After a subregional NCCP has been prepared and approved, project-related impacts to CSS and target species (including all species receiving regulatory coverage under the NCCP) shall be considered to be mitigated to insignificant levels and consistent with the NCCP Guidelines if the project and its related impacts to CSS/target species are carried out ... consistent with the subregional or subarea NCCP and its associated Implementing Agreement.....

“Within the context of an approved subregional NCCP, it is neither necessary nor appropriate to attempt to determine the level of significance of CSS impacts on a project by project basis if the project is consistent with the approved subregional or subarea NCCP and associated Implementing Agreement.”

The Implementing Agreement specifically authorizes disturbance of coastal sage scrub, other covered habitats and “take” of Identified Species listed in Table 4-16 within the Central/Coastal NCCP Subregion. The NCCP reserve system, adaptive management program and other measures of the NCCP/HCP fully mitigate “take” of coastal sage scrub and disturbance of covered habitats resulting from development projects in compliance with the Implementing Agreement. Except for conditionally covered species, direct, indirect and cumulative impacts under CEQA and NEPA to the covered habitats and Identified species resulting from development within designated development areas owned by NCCP participating landowners are fully mitigated by the measures of the NCCP/HCP.

To the extent that conditionally covered species are present on a particular project site, in certain circumstances, consultation with USFWS and CDFG are mandated and, at a minimum a project-specific mitigation plan is developed meeting the requirements of the NCCP/HCP. Conditionally covered species are listed in Table 4-17.

Table 4-17 Species Conditionally Covered under the NCCP/HCP Plan	
Category	Species
Plants	Foothill mariposa lily (<i>Calochortus weedii</i>)
Crustaceans	San Diego fairy shrimp (<i>Branchinecta sandiegoensis</i>) Riverside fairy shrimp (<i>Streptocephalus woottoni</i>)
Insects	Quino (Wright's) checkerspot (<i>Euphydryas editha quino</i>)
Amphibians	Southwestern arroyo toad (<i>Bufo microscaphus californicus</i>)
Birds	Golden eagle (<i>Aquila chrysaetos</i>) Prairie falcon (<i>Falco mexicanus</i>) Southwestern willow flycatcher (<i>Empidonax traillii eximius</i>) Least Bell's vireo (<i>Vireo bellii pusillus</i>)
Mammals	Pacific pocket mouse (<i>Perognathus longimembris pacificus</i>)

Local Setting

The Northern Sphere Area consists of Planning Areas ("PA") 3, 5B, 6, 8A, and 9 and Implementation District "P" (in PA 2). The Northern Sphere Area is located southeast of Lomas de Santiago Hills, in the northeastern Sphere of Influence of the City of Irvine, Orange County, California. The Northern Sphere Area generally lies west and north of the former El Toro Marine Corps Air Station. For purposes of the focused California gnatcatcher and cactus wren surveys, the Northern Sphere Area was divided into those areas proposed for some form of development or disturbance (the "Development Area"), those areas proposed for inclusion in the NCCP Reserve³ (the "Reserve Open Space") and those areas that would be outside both the development area and the NCCP Reserve ("Non-Reserve Open Space"), as shown in Exhibits 4-15 and 4-16. The Development Area consists mostly of agricultural land, but does include some undisturbed areas, primarily in PA 6.

³ In July 1996, a NCCP/HCP was approved, and an Implementing Agreement (IA) was executed, between USFWS and the CDFG, and participating entities. Participants included the City of Irvine, and the County of Orange, The Irvine Company and other public and private entities. As a result of the IA the participants funded and developed "The Nature Reserve of Orange County" (Reserve). The Reserve consists of 38,000 acres of habitat that is protected under the IA. Reserve Open Space in this report refers to parts of the Reserve located within the Northern Sphere Area.

Exhibit 4-15 Natural Community Conservation Plan Area

Exhibit 4-16 NCCP Area (Implementation District “P”)

Biological Survey Area

The assessment of biological resources covers all PAs within the Northern Sphere Area, including PAs 3, 5B, 6, 8A and 9, plus Lambert Ranch and the University of California Agricultural Research Station located adjacent to PA 6 and outside the boundaries of the former MCAS El Toro.⁴ In addition, a biological assessment was completed for the Implementation District “P” open space dedication area located in PA 2, adjacent to the Northern Sphere Project Area. The combination of these areas constitutes the biological survey area. The biological surveys addressed PA 3 and Implementation District “P” because they are to be preserved as open space under the NCCP.

The entire biological survey area consists of approximately 9,456⁵ acres of mostly undeveloped and agricultural land. Implementation District “P” (748 acres) consists of extensive stands of native vegetation in the higher elevations and agricultural lands (mostly avocado orchards) in the lower elevations. PAs 5B (310.6 acres), 8A (73.1 acres) and 9 (1,326.2 acres) consists mostly of actively farmed agricultural land or nursery lands, generally in the flat, lower elevation portions of the Northern Sphere Area. PAs 3 and 6, (3,739.6 and 3,258.2 acres, respectively), comprises the most varied topography and contains the more diverse habitat types. The majority of PA 6 southeast of the Foothill/Eastern Transportation Corridor is comprised of agricultural and ornamental nursery lands with occasional developed and disturbed/graded parcels. Isolated natural habitat fragments occur throughout this area, generally located on hilltops, steeper slopes and on the edges/interface with bordering properties. The most extensive stands of native vegetation occur in Reserve Open Space (in PAs 3 and 6) north and east of the Foothill/Eastern Transportation Corridor near the Frank Bowerman Landfill, Agua Chinon, and Round Canyons and in the vicinity of Siphon Reservoir. However, several developed and agricultural lands occur in PAs 3 and 6, including a nursery, gravel mining operation and office trailers west of Bee Canyon Road, and an occasional orchard of avocado groves in the shallow valleys north of the Foothill/Eastern Transportation Corridor.

The County of Orange's Frank Bowerman Landfill is located within PA 3. The landfill is specifically addressed under the NCCP/HCP. A 173-acre Special Linkage is located within the north-central portion of the existing landfill. The NCCP/HCP allows for the Special Linkage portion to be developed as a golf course after landfill operations are terminated and landfill closure actions have been completed. Per the NCCP/HCP the County will confer with USFWS and CDFG in the design and construction of any golf course to minimize impacts to the adjacent Reserve. Under the NCCP/HCP upon completion of construction and landscaping for the golf course, the remaining 500 acres of the landfill that surrounds the Special Linkage shall become part of the Reserve System and

⁴ *This biology study area covered Lambert Ranch and the University of California Research Station though not part of the proposed project area.*

⁵ *The total acreage calculated for this biological survey includes Lambert Ranch and University of California's South Coast Research and Extension Center, which are not a part of the Northern Sphere Area.*

managed in accordance with the provisions of the Implementation Agreement and then applicable landfill closure requirements.

A significant portion of the coastal sage scrub habitat at Siphon Reservoir (within Reserve Open Space of PA 6) consists of revegetation associated with mitigation for the Foothill/Eastern Transportation Corridor and was installed in 1994/1995 and 1995/1996. A wildfire in 1998 burned approximately 70 percent of the natural habitat northeast of the Foothill/Eastern Transportation Corridor and the vegetation is in various stages of recovery.

Survey area topography varies and includes canyons, hillsides and low lying flat land, with elevations ranging from 170 feet at the western corner of PA 8 to approximately 1,770 feet along the eastern boundary of PA 3, along Loma Ridge. The climate is typically Mediterranean, with warm dry summers and cool wet winters. Early morning coastal fog frequently clouds the hillsides during spring.

Vegetation Communities

A total of thirteen vegetation/habitat communities were identified in the survey area during field reconnaissance, as shown on Table 4-18 and Exhibits 4-17, 4-18, and 4-19. They consisted of coastal sage scrub, chaparral, grassland, irrigation-fed wetlands, freshwater seep, marsh, riparian, woodland, cliff and rock, lakes/reservoirs and basins, watercourse, agriculture, developed, and disturbed. A total of seven vegetation/habitat communities were identified in Implementation District "P," including coastal sage scrub, grassland, marsh, riparian, agriculture, developed and disturbed habitats.

Coastal Sage Scrub

Coastal Sage Scrub is a covered habitat⁶ under the NCCP/HCP. Coastal Sage Scrub is a diverse community forming many associations determined by soil factors, fire, and topography. It is a community of low growing, soft, woody, drought-deciduous subshrubs and herbaceous plants that grow in thin rocky soils. Scrub vegetation varied between relatively moist (mesic) and relatively dry (xeric) sites. Mesic sites generally occurred in microhabitats characterized by north-facing slopes, in canyons and small drainages and xeric habitats occurred in the remaining areas on ridges and south-facing slopes. These mesic microsites included such vegetation as lemonadeberry (*Rhus integrifolia*) and toyon (*Heteromeles arbutifolia*). Xeric scrub habitats were comprised of various proportions of California sagebrush (*Artemisia californica*), bush buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), coast prickly pear cactus (*Opuntia littoralis*) and coastal cholla (*Opuntia prolifer*). In PA 6, southeast of Portola and N

⁶ Covered habitat means those habitat types protected by the NCCP/HCP in a manner comparable to the protection of CSS.

Street, near the General Electric Field Station, several dense patches of prickly pear and cholla (cactus scrub) occurred on the south and southeastern facing slopes.

**Table 4-18
Vegetation Types
(acres)**

Vegetation Type	Development Area					Non-Reserve Open Space		Reserve Open Space			Open Space Total	Survey Area Total
	PA 5B	PA 6	PA 8A	PA 9	Total	PA 3	PA 6	Imp. Dist. "P"	PA 3	PA 6		
Coastal Sage Scrub		173.0		2.9	175.9	17.2	88.9	456.5	2,435.0	828.9	3,826.5	4,002.4
Chaparral					0.0	1.2	7.1		368.3	10.4	387.0	387.0
Grassland		25.7			25.7	41.5	35.3	21.6	256.1	124.4	478.9	504.6
Irrigation-fed Wetland		0.4			0.4						0.0	0.4
Freshwater seep		0.2			0.2						0.0	0.2
Marsh					0.0		3.6	0.1		0.4	4.1	4.1
Riparian ¹		8.1		0.7	8.8		25.0	25.7	134.0	27.7	212.4	221.2
Woodland		2.0			2.0		0.6		192.9	0.5	194.0	196.0
Cliff and Rock					0.0				12.5		12.5	12.5
Lakes, Reservoirs and Basins		5.6			5.6		15.5			1.7	17.2	22.8
Watercourses		7.8	2.4		10.2		7.5		1.9		9.4	19.6
Agriculture	292.6	941.1	70.7	1,073.8	2,378.2		148.8	224.2	2.1	123.5	498.6	2,876.8
Developed ²	18.0	107.2		246.9	372.1	0.1	37.8	1.2	7.4	452.8	499.3	871.4
Disturbed		24.5		2.0	26.5	116.2	5.3	19.0	153.2	16.8	310.5	337.0
TOTAL	310.6	1,295.6	73.1	1,326.3	3,005.6	176.2	375.4	748.3	3,563.4	1,587.1	6,450.4	9,456.0

Vegetation communities according to Jones & Stokes (1993), acreages provided by RBF. ¹ Acreages of riparian, marsh, wetlands and watercourses represent the area covered by these habitat types according to the Jones & Stokes methodology, they do not document acreages that are jurisdictional under either ACOE or CDFG. Habitat mapped as riparian under Jones & Stokes can include areas not jurisdictional under ACOE and/or CDFG, for example areas without a definite streambed and upland areas where artificially supplied water allows riparian/wetland vegetation to develop. Acreages of ACOE and CDFG jurisdiction are provided in the delineation report (Volume 2). ² Tollroad slopes were included in the developed area although many of the slopes were revegetated with CSS, particularly from the confluence of the 241 and the 133 north to the project boundary.

Exhibit 4-17 Vegetation Types (PA 5B, PA 6, PA 8A, and PA 9)

Exhibit 4-18 Vegetation Types (PA 3)

Exhibit 4-19 Vegetation Types (Implementation District “P”)

Portions of the survey area in PAs 3 and 6, northeast of the Foothill/Eastern Transportation Corridor were burned during a wildfire in September 1998 and the vegetation was in various states of recovery. Vegetation sub-associations were not mapped in this area due to difficulty of determining climax communities from successional species. Coastal sage scrub habitat at Siphon Reservoir consisted of naturally occurring vegetation and revegetated habitat (associated with compensatory mitigation for construction of the Eastern Transportation Corridor). Eucalyptus windrows remained from previous agricultural uses of the area.

A total of 4,002.4 acres of coastal sage scrub was recorded in the survey area, 3,720.4 in Reserve Open Space, 106.1 in Non-Reserve Open Space and 175.9 in the Development Area. Most of the scrub was located in PAs 3 and 6 and Implementation District "P," only 2.9 acres occurred in PA 9, none occurred in PA 5B or 8A.

The amount and location of coastal sage scrub in the survey area was not significantly different to that documented in the NCCP/HCP plan. The actual increase since the NCCP/HCP surveys was approximately 1% (33.6 acres). Biological communities can fluctuate markedly over time under natural conditions. Vegetation communities such as coastal sage scrub tend to change gradually in response to climate change and natural ecological succession but can change rapidly after fires or other man-made and natural events. The NCCP/HCP reserve design and adaptive management program were developed in consideration of this fluctuation.

Chaparral

The term chaparral applies to a variety of vegetation associations made up of sclerophyllus shrubs that occur on relatively xeric sites. Most species are adapted to repeated fires and stump sprouting (Holland 1986). Primarily one association occurs on the project site.

North-facing slopes in the higher elevations of the survey area supported toyon-sumac chaparral (Jones & Stokes 1993). North-facing slopes generally provide a more mesic environment where leaf litter accumulates and deeper soils can develop. These conditions support evergreen, broadleaf chaparral species, including hollyleaf redberry (*Rhamnus ilicifolia*), toyon (*Heteromeles arbutifolia*), laurel sumac (*Malosma laurina*) and scrub oak (*Quercus berberidifolia*). The understory supported components of coastal sage scrub including black sage, bush monkeyflower, California buckwheat, and sagebrush. A total of 387.0 acres of chaparral occurred in the survey area, 378.7 acres within Reserve Open Space and 8.3 in Non-Reserve Open Space. Chaparral was absent from the Development Area and Implementation District "P."

Grasslands

The majority of the grasslands in the survey area were characterized by low herbaceous vegetation dominated by annual, ruderal and perennial grass species, which typically occur in deep, well-developed, well-drained soils on gentle slopes and valleys (Jones & Stokes 1993). The assemblage of species within the grasslands were influenced by several environmental, climatic and

edaphic factors including soil structure, texture, parent material and chemistry, slope, aspect and angle, and level of disturbance. During the mapping exercise, grassland sub-associations were assigned as follows: annual, ruderal, and needlegrass. The characteristic components of each sub-association are described below.

Annual grassland occurred primarily on gradual slopes and as small patches in bare openings on steep slopes. The largest contiguous patches occurred in the eastern and southern portions of PA 6, dominated by non-native annual species of Mediterranean origin including genera such as brome (*Bromus* spp.), oats (*Avena* spp.), fescue (*Vulpia* spp.), ryegrass (*Lolium* spp.), and barley (*Hordeum* spp.). Ruderal non-native forb species were invariably scattered in heavily disturbed areas of this community, including filaree (*Erodium* spp.), mustards (*Brassica* spp. and *Hirschfeldia incana*), and artichoke thistle (*Cynara cardunculus*). Smaller patches of non-native annual grassland occurred throughout the survey area interspersed among coastal sage scrub, along ridge tops where disturbances were concentrated, and adjacent developed and agricultural areas.

The most common grassland sub-association within the survey area was grasslands supporting ruderal species. Ruderal grasslands are dominated by tall, early successional forb species that colonize recently disturbed areas. Sweet clover (*Melilotus* spp.) and mustards (*Brassica nigra*, *Hirschfeldia incana*) dominated these grasslands in early spring, replaced by tocalote (*Centaurea melitensis*), cheeseweed (*Malva* spp.), and tumbleweed (*Salsola tragus*) in late spring and summer. Ruderal grasslands differ in density and diversity depending on species composition and soil conditions. For example, solid stands of black mustard (*Brassica nigra*) occurred in heavily disturbed hilltops and provided little opportunity for other species compared to more open disturbed grasslands dominated by tocalote and summer mustard (*Hirschfeldia incana*). Shallow soils contained lower growing species such as filaree (*Erodium botrys* and *E. cicutarium*) and smooth cat's ear (*Hypochaeris glabra*). Early successional native forbs such as doveweed, common sand aster (*Lessingia filaginifolia*), annual bur-weed (*Ambrosia acanthicarpha*) and telegraph weed (*Heterotheca grandiflora*) may also dominate in late summer and fall. Over time, and in the absence of further disturbances, these areas generally succeed to non-native annual grasslands. Ruderal grasslands were scattered throughout the survey area primarily occurring in fallow agricultural fields, along manufactured berms and abandoned roads.

Native perennial grasslands occurred on clay or clay loam soils, and in areas where grazing and past agricultural uses were less intensive. These native grasslands persist as mosaic patches within and adjacent to nonnative annual grassland and coastal sage scrub. These small isolated patches occurred on hilltops, slopes or on rocky soils. The native grassland community is dominated by 10 percent or more cover of perennial bunchgrasses from genera such as needlegrass (*Nassella* spp.) and melic grass (*Melica* spp.) (Jones & Stokes 1993). In the study area, needlegrass (*Nassella pulchra* and *N. lepida*) dominated these grasslands, although other annual and perennial native forbs and geophytes made up a diverse grassland flora. Other grasses that occurred within the community included Italian ryegrass (*Lolium multiflorum*) and oats.

A total of 504.6 acres of grassland was recorded in the survey area, 402.1 in Reserve Open Space, 76.8 in Non-Reserve Open Space and 25.7 in the Development Area. Grassland was only located in PAs 3 and 6 and Implementation District “P,” none occurred in PAs 5B, 8A or 9.

Irrigation-fed wetland and artificial freshwater seep

Perennial and annual herbaceous hydrophytic vegetation dominating seasonally saturated soils constitute artificial freshwater irrigation-fed wetlands consisting of vegetation typically found in natural seeps, many may dry out during drought periods (Jones and Stokes 1993). Two locations within the survey area artificially supported vegetation characterized as a freshwater seep. At one of these locations (between Portola and Foothill/Eastern Transportation Corridor) the seep feature developed as a result of runoff from adjacent agricultural irrigation activities within the avocado orchards and is therefore referred to as an irrigation-fed wetland. This area exhibited vegetation typically associated with freshwater sweeps and was comprised of toad rush (*Juncus bufonius*), great-water speedwell (*Veronica anagallis-aquatica*), rabbitfoot grass (*Polypogon monspeliensis*), cattails (*Typha* sp.), marsh fleabane (*Pluchea odorata*) and Bermuda grass (*Cynodon dactylon*). The irrigation-fed wetland totaled 0.4 acres and occurred in the Development Area of PA 6.

The other artificial freshwater seep was located north of, and adjacent to Portola Parkway, in the Development Area of PA 6. It totaled 0.17 acres and receives water from a concrete pipe that runs under Portola Parkway⁷. Vegetation within the artificial freshwater seep was comprised of hairy willow-herb (*Epilobium ciliatum*), rabbitfoot grass (*Polypogon monspeliensis*), southern cattail (*Typha domingensis*) and Bermuda grass (*Cynodon dactylon*). The artificial seeps described in this section do not have the natural physical features typical of this vegetative category.

Marsh

Marsh habitats consist of permanently or seasonally flooded or saturated sites dominated by persistent herbaceous plants. The only marsh vegetation in the survey area occurred at Siphon Reservoir⁸ and within the south fork of Rattlesnake Canyon was south of the asphalt plant. This freshwater marsh covered 4.1 acres, 3.6 acres in Non-Reserve Open Space and 0.5 acres in Reserve Open Space. The marsh occurred on the fluctuation shoreline and mudflats and the vegetation included California rush (*Scirpus californicus*), mulefat, black willow (see riparian habitat description), rabbitfoot grass, white sweet clover, bull thistle (*Cirsium vulgare*), alkali mallow (*Malvella leprosa*), Spanish sunflower (*Pulicaria paludosa*) and bristly ox-tongue (*Picris echioides*).

⁷ This seep exhibited wetland vegetation, soils and hydrology and is subject to ACOE jurisdiction under 404 as a wetland.

⁸ The water body for Siphon Reservoir is within Non-Reserve Open Space while the surrounding lands and habitat are within Reserve Open Space.

Riparian

Riparian habitats consist of trees, shrubs, or herbs that occur along watercourses and water bodies. The vegetation is adapted to flooding and soil saturation during at least a portion of the growing season⁹. Jones and Stokes define a number of different riparian sub-associations including;

- Herbaceous - an early successional stage of riparian scrub and forest,
- Willow riparian scrub - dominated by willow species,
- Mulefat scrub - dense stands of mulefat with lesser amounts of willows,
- Sycamore riparian woodland - woodland dominated by western sycamore with coast live oak, understory of mulefat or willow scrub,
- Coast live oak riparian forest - woodland dominated by coast live oak with western sycamore, Mexican elderberry and California walnut,
- Arroyo willow riparian forest - forest with closed canopy of arroyo willows,
- Black willow riparian forest - multilayered forest with canopy dominated by black willow,
- Cottonwood-willow riparian forest - multilayered forest dominated by cottonwoods and willows.

Riparian habitats occurred in several locations within the study area including the northern end of Rattlesnake Reservoir, the north and south forks of Rattlesnake Canyon Wash, within basins between the north and south forks of Rattlesnake Canyon Wash, Siphon Reservoir, the northeastern end of Lambert Reservoir, Round and Bee Canyons, Agua Chinon wash, detention basins and riparian corridors scattered through Implementation District “P” and PA 3 and 6.

Herbaceous riparian habitat comprised pioneering early successional species within drainages, channels and sedimentation ponds. The northeastern portion of Lambert Reservoir¹⁰, contained saturated soils with native and non-native herbaceous species persisting in the sandy hydric soils. Species observed within the drained reservoir included rabbitfoot grass, willow smartweed (*Polygonum lapathifolium*), cocklebur (*Xanthium strumarium*), great-water speedwell, tamarisk (*Tamarix* sp.), bent grass (*Agrostis* sp.), green willow herb (*Epilobium ciliatum*), Mexican tea (*Chenopodium ambrosioides*), nutsedges (*Cyperus* sp.), toad rush and mud nama (*Nama stenocarpum*). Herbaceous riparian habitat in earthen drainage channels within PA 6 was sparsely vegetated with spikerush (*Eleocharis* sp.), green willow herb, great-water speedwell, castor bean (*Ricinus communis*), and duckweed (*Lemna* sp.). The large sedimentation pond in the southeastern portion of PA 6 (which is a County maintenance facility and is located within Non-Reserve Open Space) is comprised of species characteristic of both herbaceous riparian and marsh habitats

⁹ Areas defined as riparian by Jones and Stokes are not always subject to CDFG or ACOE jurisdiction.

¹⁰ Lambert Reservoir was artificially created in upland habitat and was used to store water for agricultural activities. Lambert Reservoir no longer receives water for agricultural uses and the soils are expected to dry out over time. The non-jurisdictional status of the majority of Lambert Reservoir is discussed in the delineation report and is the subject of current consultation with ACOE and the majority of CDFG.

including narrow leaved and broad leaved cattail (*Typha augustifolia* and *T. latifolia*), white sweet clover (*Melilotus alba*), Mexican rush (*Juncus mexicanus*), coastal bulrush (*Scirpus robustus*) and salt grass (*Distichlis spicata*). Near the sedimentation earthen berm, black and arroyo willows (*Salix gooddingii* and *S. lasiolepis*) saplings were common.

Willow riparian scrub, dominated by arroyo willow with lesser amounts of mulefat (*Baccharis salicifolius*) and black willow occurred in the vicinity of Siphon Reservoir, the northeastern portion of Lambert Reservoir (with *Typha* marsh understory) and along the riparian corridor in the southeastern portion of PA 6 between Portola and the Foothill/Eastern Transportation Corridor. Black willow riparian forest occurred in the vicinity of Siphon Reservoir, the northeastern portion of Lambert Reservoir and the sedimentation pond in Bee Canyon.

Several isolated patches of mulefat scrub were scattered throughout the study area occurring in shallow canyons, associated with ephemeral drainages and local seeps. Vegetation consisted of dense stands of mulefat with lesser amounts of tarragon (*Artemisia dracunculus*), telegraph weed (*Heterotheca grandiflora*), tree tobacco (*Nicotiana glauca*) and arroyo willows (*S. lasiolepis*). Mulefat also occurred in small patches among coastal sage scrub in low depressions and in areas that were disturbed or along dirt roads.

Sycamore and coast live oak riparian woodland habitats were limited to the natural broad drainages in PA 3 north of the Foothill/Eastern Transportation Corridor in Agua Chinon wash, Hicks Canyon wash, Bee and Round Canyons. Western sycamore (*Platanus racemosa*) and coast live oak (*Quercus agrifolia*) with sub-canopy and understory components representative of willow riparian and mulefat scrub characterized the open woodland community.

A total of 221.2 acres of riparian habitat was recorded in the survey area, 187.4 in Reserve Open Space, 25.0 in Non-Reserve Open Space and 8.8 in the Development Area. In PA 9, the only riparian area was a small linear strip of willow riparian scrub measured approximately 0.7 acre, while no riparian habitats occurred in PAs 5B or 8A.

Woodland

Woodland habitats consist of multilayered vegetation with tree canopy cover between 20 and 80 percent. Coast live oak (*Quercus agrifolia*) woodlands occurred throughout PA 3 in moist areas with deep soil, along canyon bottoms, valleys and on north-facing slopes. The majority of coast live oak woodland was found in Round, Hicks and Bee Canyon and Aqua Chinon wash. A total of 196 acres of woodland occurred in the survey area, no oak woodlands occurred in the Development Area. Oak woodland is a covered habitat under the NCCP. Mexican elderberry (*Sambucus mexicana*) woodlands occurred in one location on the eastern portion of PA 3 and two small areas in the southern portion of PA 6. Mexican elderberry trees dominated the shallow drainages, while mulefat comprised the understory vegetation. A total of 2.0 acres of Mexican elderberry woodland habitat occurred in the Development Areas of PA 6.

Lakes and Reservoirs

Siphon Reservoir comprised the main open body of water within the survey area. Freshwater marsh vegetation occurred on the fluctuation shoreline and mudflats. A small reservoir occurred in the agricultural fields within the Development Area of PA 6. Formerly, Lambert Reservoir contained open water but it no longer receives water for agricultural purposes and was dry at the time of the survey.

Cliff and Rock

Cliff and rock habitats consist of areas with vascular plants and lichens (Jones and Stokes 1993). The only location within the study area where cliff and rock were found was in PA 3. A large cliff and rock area occurred along the northeastern section and a small area was found in the southeastern corner, together totaling 12.5 acres.

Watercourses

Narrow earthen channelized drainage ditches were commonplace throughout the nurseries and row crop agricultural lands. These were not mapped as a unique habitat type since the drainage ditches were created for agricultural activities, are frequently managed for weeds and were generally devoid of vegetation. More extensive earthen berm and concrete lined flood control channels supporting sparse vegetation cover were mapped as watercourses. Approximately 19.6 acres of watercourses occurred within the survey area. The drainage ditches within the agricultural lands were not mapped as watercourses and the majority were not jurisdictional. The jurisdictional status of drainage ditches and concrete lined flood control channels is discussed in the delineation report, Volume 2.

Agriculture

Agriculture lands included active irrigated and non-irrigated annual crops, orchards, and nurseries (mostly container nurseries). Earthen and concrete trapezoidal drainages ditches were common throughout the nurseries and agricultural lands but were not called out on the vegetation map since these were created for agricultural activities. Similarly, eucalyptus trees which lined many of the irrigated fields and nurseries were not mapped as a unique habitat type since they provided windbreaks and thus were also treated as a feature of the agricultural land use. Common agricultural weeds were observed on the edges of the fields, including knotweed (*Polygonum arenastrum*), flax-leaved horseweed (*Conyza bonariensis*), Johnson grass (*Sorghum halepense*), cheeseweed (*Malva parviflora*) and dense-flowered sprangletop (*Leptochloa univervia*).

A total of 2,876.8 acres of agriculture was recorded in the survey area, 348.9 in Reserve Open Space, 148.8 in Non-Reserve Open Space and 2,378.2 in the Development Area. Agricultural lands within Implementation District “P” (224.2 acres) consisted primarily of avocado orchards. Most of PA 5B (292.6 acres) within the survey limits comprised agricultural lands. Strawberry row crops comprised the landscape in the southern portion of PA 5B immediately adjacent to Irvine Boulevard

extending north to the eucalyptus windrows. North of the windrows, a nursery comprised the remainder of the Planning Area. Most of PA 8A (70.7 acres) was comprised of tomato row crops bisected by a Eucalyptus windrow. Row crops are rotated seasonally, results presented represents the row crops present at the time of the survey.

A total of 1,073.8 acres of agricultural lands occurred in PA 9. Tomato and strawberry row crops (rotated seasonally) and other associated agricultural facilities comprised the portion of PA 9 south of Irvine Boulevard, north of Trabuco Road and between the Eastern Transportation Corridor and Jeffrey Road. Nurseries comprised the remainder of PA 9 north of Irvine Boulevard.

PA 6 contained nursery lands, row crops and avocado orchards primarily located south of the Foothill Transportation Corridor, although there was several orchards located north of the Corridor, and one nursery located north of Portola Parkway, west of Bee Canyon Road. A total of 1,213.4 acres of agricultural lands occurred in PA 6. Only 2.1 acres of agriculture land occurred in PA 3, and was an existing use at the time the NCCP/HCP was created.

Developed

Developed sites within the survey area totaled 871.4 acres and included non-urban commercial and rural buildings. Developed areas within PA 5B included the nursery buildings and facilities comprising 18.0 acres. Developed areas within PA 6 included nursery buildings and facilities, other buildings and tollroad slopes comprising 597.8 acres. Developed sites within PA 9 included the Northwood Golf Center at the corner of Trabuco and Jeffrey Roads, Irvine Valencia Growers and Garguila, and Irvine Packing and Cooling Plant and water tank/reservoir locality adjacent Sand Canyon Avenue and tollroad slopes (246.9 acre). Developed areas within the PA 3 were located in the Frank R. Bowerman Landfill. Developed areas within Implementation District "P" (1.2 acres) consisted of the access road between Jeffery Road and the American Asphalt Plant.

Disturbed

Disturbed areas were characterized as recently cleared areas lacking vegetation, mined areas, or disturbed industrial sites. Disturbed areas within PA 6 include fertilizer operations, a General Electric Field Station, and disked lands within the vicinity of Lambert Reservoir comprised approximately 46.6 acres. Disturbed areas within PA 3 occurred within the Frank R. Bowerman Landfill and totaled 269.4 acres. Within Implementation District "P" disturbed sites, characterized as cleared areas lacking vegetation and included dirt, totaled 19.0 acres.

Eucalyptus Windrows

The windrows are comprised of Blue Gum Eucalyptus (*Eucalyptus globulus*) and are estimated to be between 20- and 40- years old, or older. Blue Gums are characterized as tall trees that can grow to 200 feet in ideal settings. They are most successfully established and long-lived in locations where they receive deep, infrequent watering. Under agricultural conditions, this species of eucalyptus has received very little attention and few management and cultural practices have been provided. Windrows 1 - 13, 17 - 22, and 29 - 31 within the survey area are located in agricultural areas that are currently being farmed for row crops. The remaining windrows (14 - 16, 23 - 28, and 32 - 38) are located in open space areas where current land use is unassigned and where there is not currently any form of irrigation (A map is provided in the technical study contained in the appendices). Many of the eucalyptus trees are 50- to 80- feet tall and have crown spreads of approximately 10- to 40- feet. None of the windrow trees are receiving regular maintenance. A perforated polypipe irrigation system currently exists on some windrows, but it is not efficiently supplying water to windrow trees in most cases. There are several windrows that do not currently include irrigation. However, most trees receive some supplemental water, due to their location adjacent to the row crops. The lack of adequate supplemental water to some of the windrow trees is likely a contributing factor to their stress and decline. Supplemental irrigation has been provided over at least the last 2 to 3 years to some of the trees. Generally, windrow irrigation is tied to the agriculture operations. Hence, when crops or groves are watered, the eucalyptus trees that have irrigation lines designated for them are watered. This watering schedule is not ideal for the trees, but is better than if the trees were not receiving any water. There are areas in PA 9 where tree irrigation is separate from crops.

Soil compaction remains a visible deleterious condition in many areas around the windrows. Soil compaction from agricultural roads and the operation of equipment near the windrows has resulted in the reduction of aeration and water uptake capabilities of the trees' roots, causing reduced tree vigor. To date, no form of fencing or other protection exists around the windrows.

Piles of soil, old and cut logs, and scattered debris are located under the canopies and adjacent to the trunks of many trees. Eucalyptus long-horned borer has been discovered in moderate numbers along with tortoise beetle, aphids, and limited numbers of lerp psyllid in areas with a combination of water-starved trees and piled debris. The long-horned borer is native to Australia and has been a threat to eucalyptus populations in California for a decade or more. Tortoise beetles are relatively new to California and are defoliating insects that can occur on trees at relatively high populations. Lerp psyllid has been a pest of California for some time, but only recently has gained increased attention due to the Redgum lerp psyllid. Psyllid are sucking insects that feed on fluids from eucalyptus foliage. Aphids are common sucking insects that can add to tree stress and defoliation. Trees susceptible to an infestation by these pests are typically stressed due to drought, improper pruning, poor soil nutrients, changes in grade or water tables, or other factors that may reduce a tree's natural defenses.

Jurisdictional Waters and Wetlands

A jurisdictional delineation of the waters, wetlands and streambeds located within the survey area was conducted by Glenn Lukos Associates. That report provides the acreages subject to ACOE and CDFG jurisdiction. The vegetation mapping done as part of this report followed the Jones & Stokes methodology and the acreages reported for riparian, marsh, seasonal wetlands, watercourses and lakes/reservoirs/basins will not necessarily match exactly with the acreages in the delineation report. The wetlands delineation did not address Implementation District “P,” because it is proposed solely for dedication and inclusion in the NCCP Reserve and no development will occur in Implementation District “P.”

Habitat mapped as riparian under Jones & Stokes can include areas not jurisdictional under ACOE and/or CDFG. For example isolated areas of mulefat scrub without a definite streambed are typically not jurisdictional under CDFG but are considered riparian under Jones & Stokes, and upland areas where artificially supplied water allows riparian vegetation to develop is mapped as riparian under Jones & Stokes but may not be jurisdictional under ACOE and/or CDFG.

The survey area includes extensive areas of Reserve and Non-Reserve Open Space¹¹ that support approximately 187.02¹² acres of riparian habitat. This riparian habitat consists of:

- 141.369¹³ acres of riparian habitat that are not ACOE or CDFG jurisdictional. Much of this habitat consists of sycamore and coast live oak riparian woodland that covers the broad drainages in PA3 (Exhibit 4-18) but also includes isolated patches of mulefat scrub scattered throughout the survey area. The remaining 45.66 acres of riparian habitat are associated with stream/drainage features and are ACOE and/or CDFG jurisdictional,
- 3.96 acres of the jurisdictional riparian habitat that qualifies as wetlands under the ACOE identification guidelines, the most restrictive of the jurisdictional resources,
- 16.37 acres of the riparian habitat, including 4.6210¹⁴ acres that are ACOE and/or CDFG jurisdictional (which includes 0.310 acres of wetlands), constitute potential vireo nesting habitat.

¹¹ 162.02 acres in Reserve Open Space and 25.0 acres in Non-Reserve Open Space.

¹² Excluding Implementation District “P.”

¹³ Approximately 29 acres of the total riparian vegetation (141.369 acres) located at Siphon Reservoir in Agua Chinon sedimentation basin that was not delineated for CDFG or ACOE jurisdiction, but may be jurisdictional.

¹⁴ Does not include any jurisdictional areas at Siphon Reservoir, as these have not been delineated.

The Development Area contains a total of 8.8 acres of riparian habitat that would potentially be impacted by the project. This riparian habitat consists of:

- 4.70 acres of riparian habitat not subject to regulation under ACOE Section 404 or CDFG Section 1603 program. These riparian areas are not subject to these regulations since they are isolated and not associated with drainage features (see jurisdictional report, Volume 2). Of these 4.70 acres;
 - 2.11 acres do not constitute least Bell's vireo habitat,
 - 0.7 acres consists of unoccupied vireo habitat and,
 - 1.89 acres consists of vireo habitat occupied in 2001.
- 4.10 acres of riparian habitat subject to regulation under Section 404 or Section 1603. Of these 4.10 acres;
 - 1.29 acres do not constitute least Bell's vireo habitat (0.05 acres of this habitat does qualify as wetlands under ACOE jurisdiction),
 - 2.28 acres consists of unoccupied vireo habitat (0.21 acres of this habitat qualify as wetlands under ACOE jurisdiction) and,
 - 0.53 acres consists of vireo habitat occupied in 2001 (all of this 0.53 acres of occupied habitat qualify as wetlands under ACOE jurisdiction but none qualify as CDFG jurisdiction under the 1603 program).

Occupied and unoccupied least Bell's vireo habitat totaled 5.4 acres (2.59 acres not subject to CDFG jurisdiction under Section 1603 or ACOE under Section 404 and 2.81 acres subject to CDFG jurisdiction under Section 1603 and/or ACOE under Section 404).

The survey area also includes extensive areas of non-riparian streambeds subject to CDFG jurisdiction (mostly mapped as watercourses in this report). These consist of:

- 8.81 acres in Reserve and Non-Reserve Open Space and,
- 2.80 acres in the Development Area.

Non-riparian wetlands subject to ACOE jurisdiction in the survey area consist of:

- 0.02 acres in Reserve and Non-Reserve Open Space and,
- 0.17 acres in the Development Area.

Non-wetland waters of the U.S. subject to ACOE jurisdiction in the survey area consist of:

- 17.47 acres in Reserve and Non-Reserve Open Space and,
- 2.75 acres in the Development Area.

Floral Inventory

Weather conditions were optimal for locating special status plants. Above normal spring rains occurring in late May prolonged the flowering season and temperatures remained cool through much of May and early June. In mid to late June, temperatures increased although many early flowering species were still readily identifiable. Directed surveys were conducted on May 28, June 1, 4, 13, 14, 20, 26, 27, and July 5 and 10. In early June, several of the species, which typically fade by early to mid May, were in bloom (e.g. *Calochortus splendens*), as a result of the extended May rainfall. In addition, typically early and late summer flowering taxa bloomed early.

A total of 233 vascular plant species were recorded within the study area, representing 56 families. This only includes those species growing in natural areas and does not include species under agriculture or in the nurseries. Of the 233 total species detected, 156 species (67%) were native, and the remaining 77 species (33 %) exotic. Over half of the species (121 species, 52 %) belong to six families, namely Asteraceae (54 species: 38 native, 16 exotic), Poaceae (29 species: 13 native, 16 exotic), Brassicaceae (9 species: 4 native, 5 exotic), Fabaceae (8 species: 4 native, 4 exotic), Scrophulariaceae (10 species: 9 native, 1 exotic) and Liliaceae (11 species: 8 native, 3 exotic).

Special Status Plant Species

Based on a review of the California National Diversity Data Base (CNDDDB) and the County GIS database, suitable habitat existed within the study area for 19 special status plant species, as shown on Table 4-19 and Exhibits 4-20 and 4-21. Of the 21, five special status species were observed during the surveys, namely:

- Intermediate/Foothill mariposa lily (*Calochortus weedii* var. *intermedius*),
- Catalina mariposa lily (*Calochortus catalinae*),
- many-stemmed dudleya (*Dudleya multicaulis*),
- prostrate spineflower (*Chorizanthe procumbens*), and,
- mud nama (*Nama stenocarpum*).

An additional special status species, small-flowered microseris (*Microseris douglasii* ssp. *platycarpa*) was observed within the area in 1998, but was not detected during the 2001 survey. Special status plant species (and their respective federal, state and California Native Plant Society [CNPS] status) detected onsite are tabulated in Table 4-19.

Table 4-19
Special Status Plant Species

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Abronia villosa</i> var <i>aurita</i> Chaparral sand-verbena	Fed: none State: none CNPS: 1B	NC	N/A	Low	Occurs on sandy soils in coastal sage scrub and chaparral, below 1,600 feet. Considered extirpated in Orange County. Blooms January through August.
<i>Astragalus brauntonii</i> Brauton's rattleweed	Fed: endangered State: none CNPS: 1B	NC	N/A	Low	Limited habitat onsite. Occurs only on limestone outcrops in disturbed chaparral, short-lived perennial flowering after fires in February through June.
<i>Atriplex coulteri</i> Coulter's saltbush	Fed: none State: none CNPS: 1B	NC	Low	Medium	Limited habitat onsite. Occurs from Santa Barbara County south to Baja California, the Channel Islands, and east to San Bernardino County. Alkaline depressions or clay soils and ridges in poorly drained soils on coastal bluffs, coastal sage scrub, valley foothill grassland. Blooms March through October.
<i>Brodiaea filifolia</i> thread-leaved brodiaea	Fed: threatened State: endangered CNPS: 1B	NC	Low	Low	Limited habitat onsite. Occurs on clays, or silty alkaline substrates on edges of vernal pools, valley and foothill grasslands, coastal sage scrub, chaparral, and cismontane woodlands, below 2000 feet. Blooms March through June.
<i>Calochortus catalinae</i> Catalina mariposa lily	Fed: none State: none CNPS: 4	C	Medium	Occurs	Detected onsite in the openings of CSS in the vicinity of Siphon Reservoir, perennial herb; blooms February to May; occurring in heavy soils, open grassy slopes and opening in brush in chaparral, coastal sage scrub, and valley and foothill grassland.
<i>Calochortus weedii</i> var. <i>intermedius</i> intermediate mariposa lily	Fed: FSC State: none CNPS: 1B	CC	Occurs	Occurs	Detected onsite in the vicinity of Siphon Reservoir, Hicks Canyon Road Ridges, etc. Perennial herb; in bloom from May-July; habitat is dry rocky open slopes and hills in chaparral, coastal sage scrub, valley & foothill grassland.
<i>Chorizanthe procumbens</i> Prostrate Spineflower	Fed: none State: none CNPS: 4	NC	Occurs	High	Detected onsite in the openings of CSS in Planning Area 6, annual herb, blooms April through June, occurs in chaparral, coastal sage scrub, pinyon juniper woodlands, valley foothill grasslands in gabbroic clay/granitic (Skinner 1994)

Table 4-19
Special Status Plant Species

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Convolvulus simulans</i> small flowered morning glory	Fed: none State: none CNPS: 4	NC	Low	Medium	Moderate habitat onsite but easily overlooked. Occurs from Baja north to San Luis Obispo County and inland to Riverside and Kern Counties, on wet clay, serpentine seeps and ridges, near rock outcrops, south-facing slopes in shallow or clay soils on edges of coastal sage scrub and perennial grasslands. Blooms March through June.
<i>Cupressus forbesi</i> Tecate Cypress	Fed: FSC State: none CNPS: 1B	C	Low	Low	Limited habitat onsite. Closed-cone coniferous forest, Chaparral. Known from the upper Fremont, Gypsum and Coal Canyons in the Santa Ana Mountains.
<i>Deinandra paniculata</i> San Diego tarweed	Fed: none State: none CNPS: 4	NC		Low	Often confused with <i>D.conjugens</i> and <i>D.fasciculata</i> , occurs in dry hills, mesas, grasslands below 300 feet. Blooms May through November.
<i>Dichondra occidentalis</i> Western dichondra	Fed: none State: none CNPS: 4	NC	Low	Low	Limited habitat onsite. Occurs on channel islands and south from Santa Barbara County to northern Baja, California. Fire follower, occurs in rock outcrops, under shrubs in loamy alluvium, Huerfuerco complex, Hambright gravelly clay loam in southern mixed chaparral, Diegan sage scrub, oak woodland and grasslands. Blooms January through July.
<i>Dudleya multicaulis</i> many-stemmed dudleya	Fed: FSC State: none CNPS: 4	NC	Medium	Occurs	Detected onsite in the openings of CSS in the vicinity of Siphon Reservoir, perennial herb; flowering in May-July; microhabitat is rocky outcrops, clay soil in chaparral, coastal sage scrub, valley & foothill grassland.
<i>Fritillaria biflora</i> var. <i>biflora</i> California Chocolate Lily	Fed: none State: none CNPS: none Local concern	NC	Low	Medium	Moderate potential to occur. Occurs on mesic native bunchgrass grasslands on north-facing slopes on clay soils, mesas and serpentine barrens in Southern coastal needlegrass grasslands. Flowers usually early in February but may extend until June.
<i>Harpagonella palmeri</i> Palmer's grapplinghook	Fed: FSC State: none CNPS: 2	NC	Medium	Medium	Moderate potential to occur. Occurs on clay soils, dry slopes and mesas in coastal sage scrub openings and grasslands. Flowers March to April. More readily found after fires.
<i>Holocrpha virgata</i> ssp. <i>elongata</i> Graceful tarplant	Fed: none State: none CNPS: 4	NC	N/A	Low	Limited habitat onsite. Occurs in annual and perennial grasslands; blooms June to November.

Table 4-19
Special Status Plant Species

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Lepidium virginicum</i> var. <i>robinsonii</i> Robinson's peppergrass	Fed: none State: none CNPS: 1B	NC	Low	Medium	Grows in openings of coastal sage and chaparral, typically away from the coast. Few recent collections of these species from cismontane southern California. Blooms January through July.
<i>Microseris douglasii</i> var. <i>playcarphyia</i> small-flowered microseris	Fed: none State: none CNPS: 4	NC	Medium	Occurs	Detected onsite in the interstitial grasslands in the vicinity of Siphon Reservoir, annual herb; blooms March to May ; occurs on clay soils in coastal sage scrub, valley and foothill grasslands, and cismontane woodland habitats.
<i>Nama stenocarpum</i> Mud Nama	Fed: none State: none CNPS: 2	NC	Occurs	Medium	Detected onsite in Lambert Reservoir, annual/perennial herb; blooms January to July; occurs along lake margins and riverbanks.
<i>Nolina cismontana</i> Chaparral beargrass	Fed: none State: none CNPS: none Local concern	NC	Low	Low	Limited habitat onsite. Distributed from western Ventura County south through Simi Hills, Santa Ana Mountains to the foothills of Palomar and Cuyamaca Mountains in San Diego County. Bloom from April through June.
<i>Pentachaeta aurea</i> Goldern-flowered Pentachaeta	Fed: none State: none CNPS: 4	NC	Medium	Medium	Occurs in Los Angeles, Orange, Riverside, San Bernardino, San Diego Counties, Baja California. Habitat includes cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland. Blooms March through July.
<i>Piperia cooperi</i> Chaparral rein orchid	Fed: none State: none CNPS: 4	NC	Low	Medium	Occurs in chaparral, cismontane woodland, valley and foothill grassland Blooms March through April. Limited habitat in Development Areas. Occurs in Los Angeles, Orange, Riverside, Santa Barbara, San Diego, Ventura, Baja California in chaparral, cismontane woodland, and riparian woodland. Blooms May through August.
<i>Polygala cornuta</i> var. <i>fishiae</i> Fish's Milkwort	Fed: none State: none CNPS: 4	NC	Low	Medium	Limited habitat onsite. Occurs from Pasadena inland region to San Dimas to east San Diego Co., and one tree left on Santa Catalina Island (Skinner 1994). Dry fans, foothills, and slopes in Chaparral, valley and foothill grassland, riparian woodland, and cismontane woodland. Deciduous tree which blooms from April to May.

Table 4-19 Special Status Plant Species					
Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Quercus engelmannii</i> Engelmann oak	Fed: none State: none CNPS: 4	NC	Low	Low	Moderate potential to occur in upper portions and slopes of Bee, Round and Agua Chinon Canyons. Occurs in Los Angeles, Orange, Riverside, San Diego in chaparral, coastal scrub / often in burns. Blooms March through July
<i>Romneya coulteri</i> matilija poppy	Fed: none State: none CNPS: 4	NC	Low	Medium	Occurs in coastal sage scrub and extends from Contra Costa County to Baja California and on the Channel Islands. Known from lower Hicks Canyon and UCI ecological preserve. Blooms January through April, and easily overlooked.
<i>Senecio aphanactis</i> Rayless raywort	Fed: none State: none CNPS: 2	NC	Medium	Medium	
<p>1 California Native Plant Society: (CNPS) List 1B indicates species rare, threatened, or endangered in California and elsewhere); 2: CNPS List 2 denotes plants rare, threatened, or endangered in California, but more common elsewhere, 3: CNPS List 4 denotes plants of limited distribution (a watch list); FSC = federal species of concern.</p> <p>Note: Development Area (DA); Non-Reserve Open Space or Reserve Open Space (OS). NCCP status as a covered species (C), conditionally covered species (CC) or non covered species (NC) is also listed. Definitions: low = possible but unlikely to occur onsite; medium = could occur onsite; high = probably does occur onsite but not recorded during recent surveys; occurs = recorded onsite during 2001 surveys and/or during other recent surveys in the Northern Sphere Area..</p>					

Exhibit 4-20 Special Status Plant Locations and Populations

Exhibit 4-21 Implementation District “P” Special Status Plant Locations

Other special status plants that have moderate potential to occur within the survey area, but were not detected during the surveys included:

- chocolate lily (*Fritillaria biflora*, locally rare),
- Palmer's grapplehook (*Harpagonella palmeri*, CNPS List 2),
- small-flowered morning glory (*Convolvulus simulans*, CNPS List 4),
- Fish's milkwort (*Polygala cornuta* var. *fishiae*, CNPS List 4),
- Coulter's matilija poppy (*Romneya coulteri*, CNPS List 4),
- golden flowered pentachaeta (*Pentachaeta aurea*, List 1B),
- rayless ragwort (*Senecio aphanactis*, CNPS List 2),
- Cooper's rein orchid (*Piperia cooperi*, CNPS proposed List 4),
- Robinson's peppergrass (*Lepidium virginicum* var. *robinsonii*, CNPS List 1B), and
- San Diego tarweed (*Deinandra paniculata*, CNPS List 4).

Although suitable habitat was present and was surveyed within the study area, these species may have been overlooked since the majority of the surveys were conducted after the peak flowering period for these species.

Other special status species that were not found during the surveys and for which suitable habitat is limited within the project site included:

- chaparral beargrass (*Nolina cismontana*, CNPS list 1B),
- Coulter's saltbush (*Atriplex coulteri*, CNPS List 1B),
- thread-leaved Brodiaea (*Brodiaea filifolia*, Federal threatened, State endangered, CNPS List 1B),
- Tecate cypress (*Cupressus forbesi*, CNPS List 1B),
- Engelmann oak (*Quercus engelmannii*, CNPS List 1B), and
- western dichondra (*Dichondra occidentalis*, CNPS List 4).

Intermediate/Foothill mariposa lily (Calochortus weedii var. intermedius)

Intermediate mariposa lily is a federal species of concern, a conditionally covered species¹⁵ under the NCCP and CNPS List 1B species. It is a near Orange County endemic (Roberts 1999) and occurs in the coastal ranges and Northern Peninsula Ranges and is known from Chino Hills, San Joaquin Hills, Santa Ana Mountains, Starr Ranch and Gypsum Canyon. Riverside populations include Vail Lake north to Winchester (Bramlet, pers. comm.). The geophyte is found in chaparral, coastal sage scrub, and valley & foothill grassland primarily on dry rocky open slopes and hills in sandstone outcrops.

¹⁵ Conditionally covered species means those species which the NCCP/HCP addresses as if they were listed as endangered species under Federal Endangered Species Act (FESA) and California Endangered Species Act (CESA), and whose conservation and management is provided for in the NCCP/HCP, under the specific conditions listed for that species.

Not all bulbs flower in any given year and plants are more conspicuous after fires and other disturbances. Typically, more plants are present than can be detected above ground. Salvage operations have found between three and ten times more bulbs in the ground than were detected during above ground surveys (Bomkamp Pers. Comm.).

Foothill mariposa lily was abundant in the survey area, eighty-two (82) colonies, totaling 3,489 individuals, of intermediate mariposa lily were located in the survey area. Only two (2) colonies, totaling 28 individuals, occurred within the Development Area, four (4) colonies, 184 individuals, occurred in Non-Reserve Open Space and the remaining seventy-six (76) colonies, 3,277 individuals, occurred within Reserve Open Space, as shown in Table 4-20. Six of these colonies were recorded by Roberts (1999) within PA 3. PA 3 was not surveyed for special status plants during the current surveys. The species was found in open CSS vegetation primarily along ridgelines, and on calcareous soils on steep slopes or rocky barrens. Indicator species for the lily included our Lord's candle (*Yucca whipplei*), black sage along ridgelines, and foothill needlegrass (*Nassella lepida*).

Table 4-20 Colonies and Individuals of Foothill Mariposa Lily		
	Foothill Mariposa Lily	
	Colonies	Individuals
Development Area	2	28
Open Space		
Non-Reserve	4	184
Reserve	76	3,277
Total Open Space	80	3,461
Northern Sphere Area Total	82	3,489

Catalina Mariposa Lily (Calochortus catalinae)

The Catalina mariposa lily is an NCCP/HCP covered¹⁶ and CNPS List 4 species. Its range extends from San Luis Obispo County south to central Orange County and is also found near Portuguese

¹⁶ Covered species means those species which the NCCP/HCP addresses as if they were listed as endangered species under FESA and CESA, and whose conservation and management is provided for in the NCCP/HCP.

Bend, in the Santa Monica Mountains in Los Angeles County, and the Channel Islands. This perennial herb occurs in heavy soils on open grassy slopes and amongst openings in chaparral, coastal sage scrub, and valley and foothill grassland. It blooms from February to May.

Twenty colonies, totaling 3,485 individuals, of Catalina mariposa lily were located in the survey area, all within Reserve Open Space. Fifteen of these colonies were recorded by Roberts (1999) within PA 3. One colony with fifteen (15) individuals was recorded on Implementation District "P" in 1998, when a location 0.5 km west of the asphalt plant supported. PA 3 was not surveyed for special status plants during the current surveys. No colonies were located in the Development Area or Non-Reserve Open Space.

Mariposa lily species (Calochortus spp.)

At twenty-six locations within open space Implementation District "P," totaling 624 individuals, plants were mapped as *Calochortus* spp. since they could not be identified to species with certainty. These plants were likely either Foothill mariposa lily or Catalina mariposa lily. Most of the locations supported a small number of individual plants (only five locations supported more than 20 individuals) but one location consisted of 415 individuals. The Catalina mariposa lily is a covered species under the NCCP/HCP.

Many-stemmed Dudleya (Dudleya multicaulis)

Many-stemmed dudleya (*Dudleya multicaulis*) is a drought deciduous leaf-succulent perennial that remains dormant below ground throughout late summer and fall. It is listed as rare by the CNPS (List 1B) but is not federally or state listed as endangered or threatened nor is it a NCCP covered species. The species ranges from Los Angeles County south to northern San Diego County and east to western Riverside and San Bernardino Counties

The many-stemmed dudleya is a distinctive succulent with terete leaves and evident but non-showy flowers. This species primary habitat is thin well-drained soils on slopes, ridge tops, rock outcrops, cliff faces, and hillside grasslands. This dudleya species has also suffered from loss of habitat due to urbanization and direct loss of plants and habitat to cattle grazing. The cattle eat the succulent dudleyas and trample the shallow soils on rock ledges leading to erosion and sloughing off of soil to form bare rock.

Four populations, totaling 1,823 individuals, occurred within Reserve Open Space within PA 6 and Implementation District "P." No colonies were located in the Development Area or Non-Reserve Open Space. One small population of 57 many-stemmed dudleya individuals (DM1) was located southwest of Siphon Reservoir in openings in coastal sage scrub dominated by rattail fescue, sagebrush, buckwheat, lanceleaved dudleya (*Dudleya lanceolata*), wild oats, common popcorn flower (*Cryptantha intermedia*), fascicled tarweed, derived microseris, and smooth cat's ear.

The second population (DM2) comprised 516 plants in a single colony on a north-west facing slope on the east side of Hicks Canyon Road, 1.25 miles northwest of the canyon mouth (Roberts 1991, CNDDDB rarefind). This locality was not confirmed during the surveys, although the habitat is extant.

Mud Nama (Nama stenocarpum)

Mud nama is distributed from Los Angeles County to San Diego County and Baja, California, and across the Colorado Desert. The small prostrate to ascending annual or perennial herb occurs in intermittently wet or muddy areas, lake margins and river banks of marshes and swamps. Mud Nama is a CNPS List 2 species. It blooms from January to July.

One population of Mud nama was recorded in the survey area in 2001. This population was located in Lambert Reservoir, in the Development Area (Table 4-19, Exhibit 4-20). Most of the plants were found in the low area with moist soils in the northeastern portion of the former reservoir but a few were found on the southern edge of the former reservoir. Mud nama was also recorded at this southern edge during a special status wetland plant survey conducted in 1998 (Harmsworth Associates 1999). At this southern location mud nama occurred within a *Scirpus* marsh in association with red-stem (*Ammania robusta*), grass poly (*Lythrum hyssopifolia*), and toad rush. At the northeastern location, more than 140 individuals were observed in the former reservoir with Mexican speedwell (*Veronica peregrina*), curly dock (*Rumex crispus*), prickly sows thistle (*Sonchus asper*), cocklebur, and western yellow cress (*Rorippa curvisiliqua*). Mud nama had been recently recorded at a few other localities in Orange County (Fairview Park, Peter's Canyon channel, Emerald Canyon, Laguna Lakes, Chiquita Ridge and two locations in south Orange County) and also at one location in Riverside County (Provance et al. 2000, Bonkamp Pers. Comm.).

Prostrate spineflower (Chorizanthe procumbens)

Prostrate spineflower is a CNPS list 4 species. Although not abundant in Orange County (Roberts 1990) this spineflower is known from Los Angeles, Riverside, San Bernardino, San Diego, Ventura Counties and Baja California. In Orange County, the species is known from the San Joaquin Hills in little Sycamore Canyon (Harmsworth Associates 1999). It blooms April through June, occurs in chaparral, coastal sage scrub, pinyon juniper woodlands, valley foothill grasslands in gabbroic clay/granitic (Skinner 1994).

The prostrate spineflower was recorded at three locations, totaling 970 individuals, in the survey area, all localities within PA 6 in the Development Area (Table 4-19, Exhibit 4-20). The first colony (CP1) of more than 700 individuals occurred on heavy clay soils supporting cryptogamic crusts with scattered sagebrush, buckwheat, fasciated tarweed, goldenbush (*Isocoma menzeisii*), rattlesnake root, scarlet pimpernel (*Anagallis arvensis*). The second colony (CP2) occurred east of the General Electric Field Station where over 150 individuals persisted on bare eroding soils between buckwheat, summer mustard, soft chess (*Bromus hordeaceus*), red brome and sagebrush. The third colony comprised more than 120 individuals on clay and sandy soils west of Agua Chinon, south of ETC, and east of Portola Parkway. The plants were distributed along the exposed soils in open

CSS dominated by our Lord's candle, prickly pear cactus, buckwheat, black sage, chalk-leaved dudleya (*Dudleya pulverulenta*), foothill mariposa lily, sagebrush, cholla, laurel sumac, red brome, and summer mustard.

Small-flowered microseris (Microseris douglasii ssp. platycarpa)

Small flowered microseris is distributed from Los Angeles County to Baja, California, and from the channel islands of Santa Catalina and San Clemente. The species is reported as common in rapidly disappearing grassy areas in San Diego County (Reiser 1998), and is also known from Lake Mathews area in Riverside County, and San Jose Hills in Los Angeles County (Bramlet 1996). The flower and fruit are required for species identification. The main character for the species is the length of the pappus awn (bristle) versus the length of the scale. Distinguished from *M.d. douglasii* whose pappus scales are much smaller than the fruit length; *Stebbinoseris heterocarpa* whose flowers are generally larger, with spined pappus scales; and *Uropappus lindleyi* whose fruit is widest at center with deep yellow flowers.

Small-flowered microseris is a CNPS List 4 species. This annual herb, which blooms from March to May occurs on clay soils in coastal sage scrub, valley and foothill grasslands, and cismontane woodland habitats.

No small-flowered microseris plants were recorded during the 2001 surveys, however, during the 1998 sensitive grassland plant survey at Siphon Reservoir, small-flowered microseris was observed southeast of the spillway, in Reserve Open Space. Individuals occurred along ridgetops and grassy knolls in purple needlegrass grassland growing in association with snakeroot (*Sanicula* sp.), blue dicks (*Dichelostemma capitatum*), and mosses. Over an acre of suitable habitat was identified. This locality was not confirmed during the current surveys although the grassland habitat where the species was detected was extant.

Wildlife

Endangered/Threatened Wildlife

Three Federal and/or State endangered/threatened wildlife species occur or have the potential to occur in the survey area: the California gnatcatcher, least Bell's vireo and southwestern willow flycatcher. Focused presence/absence surveys were designed and conducted for the California gnatcatcher, least Bell's vireo and southwestern willow flycatcher.

Coastal California Gnatcatcher

The California gnatcatcher was listed as a "threatened" species by the United States Fish and Wildlife Service (USFWS) in 1993, pursuant to Section 4(d) of the Federal Endangered Species Act ("FESA"), and it is a covered and target species under the NCCP/HCP. It is an obligate resident of coastal sage scrub ("CSS") habitat, and the rapid conversion of occupiable CSS to developed area

was the basis for the listing. The final Section 4(d) "special rule" listing the California gnatcatcher as a threatened species, recognizes this basis for the listing, and states:

"Incidental take of the coastal California gnatcatcher will not be considered a violation of Section 9 of the Endangered Species Act of 1973, as amended (Act), if it results from activities conducted pursuant to the State of California's Natural Community Conservation Planning Act of 1991 (NCCP), and in accordance with a NCCP Plan for the protection of coastal sage scrub habitat, prepared consistent with the State's NCCP Conservation and Processing Guidelines...."

The survey area is part of the Central/Coastal Orange County NCCP approved in 1996. The Development Area was identified in the NCCP for development, while at the same time a habitat reserve of in excess of 37,000 acres was established for the protection of the coastal California gnatcatcher and other CSS dependent species.

During the preparation of the NCCP/HCP all habitat within the plan area was evaluated. Within the survey area the Development Area and most of the Non-Reserve Open Space is considered of low conservation value, while most of the Reserve Open Space and the Non-Reserve Open Space adjacent Agua Chinon Wash is considered of high conservation value (NCCP/HCP Map Section, Map 35). Habitat with high evaluations are 1) larger, 2) close to or contiguous with other habitat types, 3) provide linkages between areas, 4) contain a diversity of habitat types, associations, elevations, etc. or 5) can be protected from encroachment to remain viable over the long term.

Exhibits 4-22 and 4-23 documents the locations of gnatcatchers in the survey area:

- Locations in the Development Area are from surveys conducted in 2001,
- Locations in Non-Reserve Open Space (except the landfill area within PA 3) are from surveys conducted in 2001,
- Locations in the Reserve Open Space and in Non-Reserve Open Space at the landfill within PA 3 and Implementation District "P" are from the NCCP/HCP baseline data (County of Orange Environmental Management Agency 1995).

In the Development Area gnatcatchers were recorded at 19 locations (16 pairs and three unpaired adult gnatcatchers), all within PA 6. Gnatcatchers were not recorded from PAs 5B, 8A or 9. Gnatcatchers were sighted at seven locations (four pairs and three unpaired adult gnatcatchers) in the Development Area of PA 6 during the NCCP baseline surveys (County of Orange Environmental Management Agency 1995). Gnatcatchers were not recorded from PAs 5B, 8A or 9 during the NCCP baseline surveys.

In the Non-Reserve Open Space, gnatcatchers were recorded at two locations (two pairs), both within PA 6 (Exhibit 22). Within the Reserve Open Space gnatcatchers were sighted at 67 locations (41 pairs and 26 singles), all in PAs 3 and 6 (County of Orange Environmental Management Agency 1995).

Exhibit 4-22 California Gnatcatcher and Cactus Wren Locations

Exhibit 4-23 California Gnatcatcher and Cactus Wren Locations (Implementation District "P")

As described in the NCCP/HCP and its EIR/EIS bird populations are not static entities, they can fluctuate markedly over time under natural conditions. California gnatcatcher populations can change significantly between years for many reasons, including climate change, habitat changes, population dynamics and immigration from adjacent areas where habitat has been altered. Population changes in excess of 50% between successive years have been documented for the California gnatcatcher at several sites in Orange County (Harmsworth Associates 2001b,c). In the Palos Verdes peninsula the gnatcatcher population decreased by 54% one year and increased by 50% the following year (Atwood et al. 1998).

In the Development Area there has been an increase in the gnatcatcher population since the NCCP data was collected, in 1991/1992. The average yearly increase was within the range previously documented for this species (Atwood et al. 1998, Harmsworth Associates 2001). These population fluctuations were considered and anticipated in the development of the NCCP Plan.

Cactus wren

The cactus wren is not a listed species but it is discussed here because it is a NCCP covered species and it is shown on the same exhibit as the gnatcatcher and is also an obligate resident of coastal sage scrub.

Previous Exhibits 4-22 and 4-23 document the locations of cactus wren in the survey area:

- Locations in the Development Area are from surveys conducted in 2001.
- Locations in Non-Reserve Open Space (except the landfill area within PA 3) are from surveys conducted in 2001.
- Locations in the Reserve Open Space and in Non-Reserve Open Space at the landfill within PA 3 Implementation District "P" are from the NCCP/HCP baseline data (County of Orange Environmental Management Agency 1995).

In the Development Area cactus wrens were recorded at eight locations (8 pairs), all were within PA 6. Cactus wrens were not recorded from PAs 5B, 8A or 9 in 2001. Cactus wrens were recorded at four locations (two pairs and two singles) in the Development Area of PA 6 during the NCCP baseline surveys (County of Orange Environmental Management Agency 1995). Cactus wrens were not recorded from PAs 5B, 8A or 9 during the NCCP baseline surveys.

In Non-Reserve Open Space cactus wrens were recorded at two locations (two pairs) in PA 6 and at two additional locations (one pair and one single) in PA 3. Within the Reserve Open Space cactus wrens were sighted at 150 locations (82 pairs and 68 singles), all in PAs 3 and 6 (County of Orange Environmental Management Agency 1995).

Cactus wren populations have not been as well studied as California gnatcatcher populations but are thought to undergo similar fluctuations. Population changes on the order of 25% between years have been recorded at Chiquita Canyon (Harmsworth Associates 2001b,c) and in the Palos Verdes peninsula (Atwood et al. 1998). In the Development Area there has been an increase in the wren population since the NCCP data was collected, in 1991/1992. The average yearly increase is within that recorded previously for this species, and increases as well as decreases in population are anticipated by the NCCP.

Least Bell's vireo

The least Bell's vireo is a federal and state endangered species and is a conditionally covered species under the NCCP. This vireo is an obligate resident of willow dominated riparian woodland. Vireos occurred in the Development Area and in Reserve Open Space at Siphon Reservoir. In the Development Area a single vireo pair occurred in a small area of willow woodland (0.53 acres) adjacent to the northern end of Lambert Reservoir, within PA 6, as shown on Exhibit 4-24. This pair made several nesting attempts, all of which failed. The pair likely also used the two adjacent isolated patches of woodland at the northeastern portion of Lambert Reservoir totaling 1.89 acres, as these were suitable for vireos.

One vireo pair and two additional unpaired territorial male vireos occurred at Siphon Reservoir. All these vireos occurred in the willow scrub adjacent the reservoir. This land is Reserve Open Space and would not be impacted by the proposed project. The vireo pair at Siphon nested successfully, fledgling four young. Least Bell's vireo had not previously been recorded in these areas despite focused surveys in recent years (Harmsworth Associates 1998A). Vireos were absent from the suitable habitat located northeast of Portola Parkway. Vireos were also absent from PAs 5B, 8A and 9 during the 2001 surveys. No suitable vireo habitat occurred within PA 3. Least Bell's vireo locations within Implementation District "P" are shown on Exhibit 4-25.

Willow flycatcher

The willow flycatcher is a state endangered species and is a conditionally covered species under the NCCP. One subspecies, the southwestern willow flycatcher (*Empidonax trillii extimus*) is also a federal endangered species. Only the southwestern subspecies breeds in southern California but northern subspecies (*E. t. brewsteri* and *E. t. adastus*) do pass through southern California during migration. The willow flycatcher is an obligate resident of willow dominated riparian woodland. No willow flycatcher was recorded in the project Development Area or Reserve Open Space during the 2001 focused surveys. During the 1997 focused surveys no willow flycatcher was recorded in the Development Area but a single migrant willow flycatcher was recorded in Reserve Open Space, at Siphon Reservoir, (Harmsworth Associates 1998a, Exhibit 4-24). Siphon Reservoir holds the only potential flycatcher breeding habitat within the survey area.

Exhibit 4-24 Least Bell's Vireo and Southwestern Willow Flycatcher Locations

Exhibit 4-25 Least Bell's Vireo and Southwestern Willow Flycatcher Locations (Implementation District "P")

Other listed species

Four federal endangered species that do not have potential to occur in the survey area are also addressed here since they are all conditionally covered species under the NCCP.

Two federal endangered fairy shrimps, the San Diego fairy shrimp and the Riverside fairy shrimp occur exclusively in vernal pools. No vernal pools exist within the survey area and therefore no suitable habitat for either fairy shrimp species exists.

The quino checkerspot butterfly is another conditionally covered endangered species. Surveys to locate the quino checkerspot's host plants were conducted in the survey area in 1998 as part of a more extensive survey within the Coastal/Central NCCP Subregion. As shown on Exhibit 4-26, three locations, all north of Rattlesnake Reservoir supported host plant species. Patch size varied from 25 to 1000 square meters, densities ranged from 3 to 300 plants per square meter, and percent cover estimated from 5 to 25 percent. Two of the three patches contained only owl's clover (*Orthocarpus purpurascens* [= *Castilleja exserta*]) in openings within coastal sage scrub with dwarf plantain (*Plantago erecta*) absent. Smooth cat's ear (*Hypochoeris glabra*), rattail fescue (*Vulpia myuros*), and red brome (*Bromus madritensis*) dominated the clearings. In one location plantain occurred along gravel roads that traversed the coastal sage scrub north of the reservoir. Yellow pincushion (*Chaenactis glabriuscula*), bluedicks (*Dichelostemma capitatum*), popcorn flower (*Cryptantha* sp.), ground pink (*Linanthus dianthiflorus*), and sanicle (*Sanicula crassicaulis*) were present in low numbers in the vicinity of the larval host species. These three locations have the potential to support quino butterflies. However, the 1998 surveys found that the quino butterfly was absent from all Irvine Company lands (Harmsworth Associates 1998b) and no quino butterfly adults or larvae were recorded during the 2000 or 2001 surveys in Implementation District "P." The quino checkerspot butterfly was last observed in Orange County in 1967 (Orsak 1978, Mattoni *et al.* 1997) and currently has a low probability of occurring in Implementation District "P."

The arroyo toad is also a conditionally covered endangered species. The survey area was assessed for arroyo toad habitat in 1998 as part of a more extensive survey within the Coastal/Central NCCP Subregion (Harmsworth Associates 1998c) and again during the 2001 surveys. No suitable arroyo toad habitats existed within the survey area.

Exhibit 4-26 Quino Checkerspot Butterfly Habitat in Implementation District "P"

Unlisted Sensitive Wildlife

A number of California Department of Fish and Game "species of special concern" (CSC) occur or have the potential to occur in the project area, as shown in Table 4-21. These species are considered sensitive due to declining populations, partially as a result of habitat destruction.

Amphibians

The western spadefoot toad was not recorded in the survey area during the 2001 surveys, however populations of western spadefoot toads are known from near Hicks Canyon Haul Road, Bee Canyon and Agua Chinon, all within Reserve Open Space (Harmsworth Associates 1998c, Fisher 2000, CNDDB 2001). No records exist for the Development Area. Suitable breeding and foraging habitat does exist for this species in the Development Area. Due to the presence of suitable habitat and the close proximity of known populations the spadefoot toad is presumed to occur in the Development Area. The western spadefoot toad is a NCCP covered species in the coastal subarea only.

Reptiles

Four sensitive reptile species occurred or are presumed to occur in the survey area. The San Diego horned lizard was recorded during the 2001 surveys in the Development Area and in the Reserve Open Space. The horned lizard is a NCCP covered species.

The Coronado skink (*Eumeces skiltonianus interparietalis*) was not recorded in the survey area during the 2001 surveys but is known to occur in the Reserve Open Space. It probably also occurs in the Development Area and Non-Reserve Open Space as suitable habitat occurs there for the skink. The skink is a NCCP covered species.

The orange-throated whiptail was recorded in Reserve Open Space during the 2001 surveys and is presumed to occur in the Non-Reserve Open Space and Development Area. The whiptail is a NCCP covered species.

The northern red-diamond rattlesnake (*Crotalus ruber ruber*) was recorded in Reserve Open Space during the 2001 surveys and is presumed to occur in the Non-Reserve Open Space and Development Area. The northern red-diamond rattlesnake is a NCCP covered species.

The southwestern pond turtle (*Clemmys marmorata pallida*) is also considered a sensitive species but is not covered under the NCCP. Surveys for the pond turtle were conducted throughout the Central/Coastal NCCP Subregion in 1998. No turtles were recorded from the survey area. All of the potential turtle habitat in the survey area was categorized as poor, except Siphon Reservoir and Rattlesnake Reservoir which was categorized as moderate (Harmsworth Associates 1998). No turtles were recorded in 1998 but it was discovered that the Irvine Ranch Water District had released two or three turtles into Rattlesnake Reservoir around 1995. One turtle was recorded in the reservoir

in 2001 during the vireo and flycatcher surveys. The southwestern pond turtle is unlikely to occur in the Development Area, but could occur at Siphon Reservoir.

**Table 4-21
Special Status Wildlife Species**

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Euphydryas editha quino</i> quino checkerspot butterfly	FE ¹	CC	low ⁶	low	scrub and chaparral habitats with openings containing host plant and nectar species
<i>Taricha torosa torosa</i> coast range newt	CSC ²	NC	low	medium ⁷	scrub, chaparral, woodland; ponds, reservoirs and slow moving streams for breeding
<i>Scaphiophis hammondi</i> western spadefoot toad	CSC	C	high ⁸	occurs ⁹	grassland, open habitats with sandy or gravelly soil; temporary rainpools for breeding
<i>Clammys marmorata pallida</i> southwestern pond turtle	CSC	NC	low	medium	slow-water aquatic habitats, ponds, marshes, rivers, streams and irrigation ditches
<i>Phrynosoma coronatum blainvillei</i> San Diego horned lizard	CSC	C	occurs	occurs	sandy washes and open sandy areas within coastal sage scrub, grassland, chaparral, oak and riparian woodland
<i>Eumeces skiltonianus interparietalis</i> Coronado skink	CSC	C	medium	occurs	mesic areas of coastal sage scrub, chaparral, grasslands and woodlands; heavily forested areas and dense brush avoided
<i>Cnemidophorus hyperthrus beldingi</i> orange-throated whiptail	CSC	C	high	occurs	open, sparsely covered land, often with well-drained sandy or loose soils in coastal sage scrub, grassland, chaparral, oak woodland and riparian habitats
<i>Anniella pulchra pulchra</i> silvery legless lizard	CSC	NC	medium	medium	chaparral, oak woodland, coastal sage scrub
<i>Thamnophis hammondi</i> two-striped garter snake	CSC	NC	low	low	associated with freshwater wetlands
<i>Salvadora haxalepis virgultea</i> coast patch-nosed snake	CSC	NC	medium	medium	associated with brushy or shrubby vegetation
<i>Crotalus ruber ruber</i> northern red-diamond rattlesnake	CSC	C	high	occurs	chamise, coastal sage scrub, desert slope scrub and other habitats with heavy brush associated large rocks or boulders
<i>Phalacrocorax auritus</i> double-crested cormorant	CSC	NC	low	occurs	primarily coastal, but also utilize inland lakes

**Table 4-21
Special Status Wildlife Species**

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Plegadis chichi</i> white-faced ibis	CSC	NC	low	occurs	freshwater marshes, lake edges, irrigated fields, ditches and channels
<i>Circus cyaneus</i> northern harrier	CSC	C	medium	medium	grassland, marshes, agricultural land, open areas in scrub and chaparral; ground or shrub nesting
<i>Elanus caeruleus</i> white-tailed kite	CSC	NC	high	occurs	forages in grasslands; nests and roosts in oak and riparian woodland
<i>Accipter striatus</i> sharp-shinned hawk	CSC	C	high	high	wide variety of habitats used by wintering and migrating birds, but mostly associated with woodland and scrubland; breeds in mountains
<i>Accipiter cooperi</i> Cooper's hawk	CSC	NC	occurs	occurs	mature forests, open woodlands, wood edges, river groves, riparian woodland
<i>Buteo lineatus</i> red-shouldered hawk	none ³	C	occurs	occurs	riparian woodland specialist, oak and sycamore woodlands
<i>Buteo regalis</i> ferruginous hawk	CSC	NC	medium	medium	plains, prairies, grasslands
<i>Aquila chrysaetos</i> golden eagle	CSC	CC	medium	occurs	open mountains, foothills, plains, open country
<i>Falco peregrinus</i> peregrine falcon	delisted	C	medium	medium	nest on cliffs or rock outcroppings, usually near water; forages over open country (grassland, scrub, marshes)
<i>Speotyto cunicularia</i> burrowing owl	CSC	NC	low	low	grasslands, farmland and other open habitats
<i>Asio flammeus</i> short-eared owl	CSC	NC	low	low	grasslands
<i>Asio otus</i> long-eared owl	CSC	NC	low	low	widespread forager; nests in dense woodlands
<i>Eremophila alpestris actia</i> California horned lark	CSC	NC	occurs	occurs	Open areas with little or no ground cover, such as grassland or ruderal vegetation
<i>Campylorhynchus brunneicapillus</i> cactus wren	CSC	C	occurs	occurs	cactus patches and yucca within coastal sage scrub and chaparral habitats
<i>Poliophtila californica californica</i> California gnatcatcher	FT ⁵ , CSC	C	occurs	occurs	coastal sage scrub

**Table 4-21
Special Status Wildlife Species**

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Empidonax trallii extimus</i> southwestern willow flycatcher	FE	CC	medium	occurs	dense riparian habitats, especially willow dominated woodland
<i>Lanius ludovicianus</i> loggerhead shrike	CSC	NC	high	high	grassland, scrub and other open habitats with perching structures; nests in trees and shrubs
<i>Vireo belli pusillus</i> least Bell's vireo	FE ₄ SE	CC	occurs	occurs	dense riparian habitats, especially willow dominate woodland
<i>Dendroica petechia brewsteri</i> yellow warbler	CSC	NC	occurs	occurs	riparian habitats, streams, wet thickets
<i>Icteria virens</i> yellow-breasted chat	CSC	NC	occurs	occurs	riparian habitats, streams, wet thickets, marshes
<i>Amphispiza belli belli</i> Bell's sage sparrow	CSC	NC	low	occurs	primarily chaparral, also coastal sage scrub
<i>Aimophila ruficeps canescens</i> southern California rufous-crowned sparrow	CSC	C	occurs	occurs	grass covered hillsides in coastal sage scrub and chaparral
<i>Ammodramus savannarum</i> grasshopper sparrow	none	NC	medium	occurs	grasslands
<i>Agelaius tricolor</i> tricolored blackbird	CSC	NC	low	low	freshwater emergent marsh with nearby grasslands
<i>Macrotus californicus</i> California leaf-nosed bat	CSC	NC	low	low	roosts in caves or old mines
<i>Antrozous pallidus</i> pallid bat	CSC	NC	medium	high	coastal sage scrub, oak woodland and chaparral; roosts in caves, mines, rock crevices, trees and buildings
<i>Eumops perotis californicus</i> California mastif bat	CSC	NC	medium	medium	widespread forager; roosts in cliffs and buildings
<i>Lepus californicus bennettii</i> San Diego black-tailed jackrabbit	CSC	NC	medium	occurs	coastal sage scrub, grassland and chaparral
<i>Chaetodipus fallax fallax</i> northwestern San Diego pocket mouse	CSC	NC	medium	medium	coastal sage scrub, grassland and chaparral
<i>Neotoma lepida intermedia</i> San Diego desert woodrat	CSC	C	occurs	occurs	cactus patches and rock outcroppings in coastal sage scrub

Table 4-21
Special Status Wildlife Species

Species	Status	NCCP	DA	OS	Comments/Habitat
<i>Onychomys torridus ramona</i> Ramona grasshopper mouse	CSC	NC	medium	medium	annual grassland and coastal sage scrub
<i>Canis latrans</i> Coyote	none	C	occurs	occurs	widespread, habitat generalist
<i>Taxidea taxus</i> American badger	CSC	NC	medium	occurs	widespread in natural habitats
¹ Federal endangered species; ² California species of special concern; ³ no federal or state listing; ⁴ State endangered species; ⁵ Federal threatened species; ⁶ possible but unlikely to occur onsite; ⁷ could occur onsite; ⁸ probably does occur onsite but not recorded during recent surveys; ⁹ recorded onsite during 2001 surveys and /or during other recent surveys in the survey area.					

Birds

A number of sensitive bird species are known to use the survey area. Two species which have occasionally been recorded at Siphon Reservoir are the double-crested cormorant (*Phalacrocorax auritus*) and the white-faced ibis (*Plegadis chichi*). Both species are closely associated with aquatic habitats, the ibis requiring freshwater marshes or flooded fields. The agricultural fields in the survey area never flood and are not suitable for the ibis. Neither species is expected to occur in the Development Area due to lack of appropriate habitat.

Several sensitive raptor species are known to use the survey area. The white-tailed kite was recorded foraging within Reserve Open Space during the 2001 surveys. Suitable nesting habitat occurs at Siphon Reservoir. Oak or sycamore woodlands (kites favored nest sites) were absent from the Development Area and the willow trees in the Development Area were likely too small or too prone to disturbance for nesting kites. Kites are unlikely to nest within the Development Area. Kites are presumed to forage there occasionally. No kites were recorded in the Development Area during the 2001 surveys.

The sharp-shinned hawk (*Accipiter striatus*) does not breed in Orange County but is a common migrant and winter resident. It is presumed to forage in the Development Area, Non-Reserve Open Space and Reserve Open Space during migration and winter. It is a NCCP covered species.

The Cooper's hawk was recorded foraging in the Development Area, Non-Reserve Open Space and in Reserve Open Space during the 2001 surveys. The majority of Cooper's hawk nests are located in small groves of oak trees but dense stands of mature willows are also used. Suitable nesting sites exist in the Reserve Open Space but are very limited in the Development Area. No nest sites were recorded during the 2001 surveys or during surveys conducted in 1998 (Bloom 1999).

Red-shouldered hawks were recorded foraging during the 2001 surveys in the Development Area and are presumed to forage in Non-Reserve Open Space and Reserve Open Space also. Although breeding could occur in the Development Area, Non-Reserve Open Space and Reserve Open Space, none were recorded breeding onsite during surveys conducted in 1998 (Bloom 1999). The red-shouldered hawk is a NCCP covered species.

The golden eagle is a conditionally covered species under the NCCP. It may occasionally forage in the survey area, although no foraging birds were recorded during the 2001 surveys. A golden eagle was recorded foraging in Implementation Area "P" during the 2001 surveys. Nesting opportunities do not exist in the Development Area for the eagle but there may be some suitable nesting locations within PA 3. The nearest current or historic golden eagle nest site is in Black Star Canyon (Gallagher 1997) which is approximately four miles from the Development Area.

The peregrine falcon (*Falco mexicanus*) was formerly a state endangered species but was recently delisted as the population has recovered. The peregrine is also a NCCP covered species. This species was not recorded in the Impact Area or Reserve Lands during the 2001 surveys but may

occasionally forage within the project area. Peregrines forage over open country in a variety of habitats, including grassland, marsh and scrub. They nest on cliffs, rock outcroppings or on the tops of buildings, usually near water. The only current nesting site in Orange County is in Newport Beach, on the top of a building (Hamilton and Willick 1996, Gallagher 1997). There are no potential nest sites within the project vicinity.

Another sensitive raptor is the burrowing owl. Burrowing owls require flat ground or rolling hills with short grass. Over grazed areas seem to be preferred. They nest in holes in the ground, which are usually made by California ground squirrels (*Citellus beecheyi*). Suitable habitat is limited in the survey area and where grasslands do occur they generally do not consist of short grass due to the lack of grazing. There was no evidence from the surveys conducted in 2001 that burrowing owls occurred in the survey area. Their potential for occurring in the survey area is low. In addition, Gallagher (1997) predicted that the burrowing owl would be extirpated from Orange County, outside Seal Beach National Wildlife Refuge, by the year 2000.

Six sensitive passerine species, California horned lark, cactus wren (already discussed), yellow warbler, yellow-breasted chat, southern California rufous-crowned sparrow and grasshopper sparrow were recorded in the survey area during the 2001 surveys. The rufous-crowned sparrow is a NCCP covered species. Rufous-crowned sparrows and grasshopper sparrows both nested in Implementation District "P," the rufous-crowns occurred in coastal sage scrub and the grasshopper sparrows occurred in grassland areas.

Horned larks and rufous-crowned sparrows were recorded in the Development Areas, Non-Reserve Open Space and Reserve Open Space during the 2001 surveys. The grasshopper sparrow was only recorded in Reserve Open Space but may also occur in the Development Area.

Yellow-breasted chats were recorded at one location in the Development Area in 2001. The chat utilized a Mexican elderberry woodland and an adjacent area of mulefat scrub in PA 6. Yellow-breasted chats were recorded at three locations in Reserve Open Space in 2001. All three were detected in willow or mulefat scrub at Siphon Reservoir. Yellow-breasted chats nested in the willows at Rattlesnake Reservoir, yellow warblers also used the willow woodlands but only during migration. A few migrant yellow warblers were recorded in both the Development Area, at PA 6, and in Reserve Open Space in 2001. Good quality habitat does occur in the Reserve Open Space for yellow warblers.

The loggerhead shrike was not recorded in 2001 but is presumed to occur in the Development Area, Non-Reserve Open Space and Reserve Open Space as suitable nesting and foraging habitat occurs there for this species. Loggerhead shrike was recorded just offsite in 2000 and a small breeding population of Bell's sage sparrow was recorded within Implementation District "P" in 1997 (Keane Biological Consulting 1997).

Mammals

Two sensitive mammalian species, the San Diego desert woodrat and the San Diego black-tailed jackrabbit were recorded in the survey area. The San Diego desert woodrat, which is covered under the NCCP/HCP, occupies cactus patches and rock outcroppings in coastal sage scrub and was recorded in both the Development Area and Reserve Open Space. The San Diego black-tailed jackrabbit occurs in grassland and openings in coastal sage scrub and were recorded in Implementation District "P."

Focused mammal surveys were not conducted for this project and there is little specific data available on the usage of the survey area by mammals. Therefore mammals, such as bats, pocket mouse and American badger, are not discussed here. Mammalian species whose habitat requirements coincide with those present in the survey area are listed in Table 4-21.

A number of additional sensitive wildlife species, including coast range newt, Bell's sage sparrow and tricolored blackbird (*Agelaius tricolor*), have a medium or low potential to occur in the survey area. These species are addressed in Table 4-21 but are not addressed in the text unless specific information on these species is available from the project vicinity. Although the habitat requirements of these species generally coincide with the existing native habitats located in the survey area they have a low or medium potential to occur due to the size and nature of the existing habitat, the fact that they have not been recorded in the project vicinity in recent years and since there is no evidence to indicate they occur onsite currently.

Other Wildlife

In total 223 wildlife species, including 8 amphibian, 27 reptile, 163 bird and 25 mammal species, were recorded in the survey area during the current surveys and/or recent surveys conducted as part of the Nature Reserve of Orange County monitoring program. This is not an exhaustive list of the species that occur onsite as no surveys were conducted in fall or winter, or at night and, no trapping or other special techniques were used. Within the Reserve Open Space, 117 wildlife species, including 5 amphibian, 13 reptile, 85 bird and 14 mammal species, were recorded. In the Development Area 79 wildlife species, including 4 amphibian, 4 reptile, 62 bird and 9 mammal species, were recorded. In the Development Area most species were recorded in PA 6, few species were recorded in PAs 5B, 8A and 9.

In addition to the threatened/endangered and sensitive species, the following NCCP covered species were recorded in the survey area:

- coastal western whiptail lizard (*Cnemidophorus tigris multiscutatus*)
- coyote
- gray fox (*Urocyon cinereoargenteus*).

Wildlife Corridors and Habitat Linkages

The Reserve Open Space within the survey area is contiguous with more Reserve Open Space at Hicks Canyon, Rattlesnake Canyon and Loma Ridge to the northwest and with Loma Ridge, Limestone Canyon and upper Borrego Canyon to the northeast. These areas provide a linkage with Reserve Open Space further to the north, the North Ranch Policy Plan Area and the Cleveland National Forest. A wildlife movement corridor created as part of the mitigation for the construction of the Eastern Transportation Corridor is located just east of Siphon Reservoir at the interchange of SR-241 and SR-133. This corridor serves as a link between Siphon Reservoir and Reserve Open Space to the north and east of the Eastern Transportation Corridor. Due to this corridor and the contiguous nature of the habitat, wildlife can move freely throughout the entire Central subarea.

Another corridor, located where the Eastern Transportation Corridor crosses Agua Chino Wash, serves to link Non-Reserve Open Space within the survey area with Reserve Open Space to the north of the corridor.

Significance Criteria and Overall Framework for Riparian Habitat

The project has been designed to avoid and preserve areas of riparian habitat that exhibit the highest levels of function; nevertheless, the project will result in unavoidable impacts to areas of fragmented and/or isolated stands of mulefat scrub and southern willow scrub. In order to evaluate the level of significance associated with the proposed impacts the following criteria have been applied to the impact analysis set forth below. Impacts affecting one or more of the following would be considered significant prior to mitigation.

- The loss of threatened or endangered species;
- The loss of sensitive habitats (as identified by the CNDDB);
- The loss of riparian resources subject to CDFG jurisdiction;
- Filling of wetlands subject to ACOE jurisdiction, and/or
- Filling of drainages subject to ACOE and CDFG jurisdiction.

In order to provide an additional framework for evaluating impacts to wetlands, riparian habitat and other jurisdictional waters, this CEQA analysis has utilized two additional documents that address riparian habitat within the survey area: 1) the Assessment of Riparian Ecosystem Integrity in the San Diego Creek Watershed, Orange County, California¹⁷ and 2) Planning Level Delineation and Geospatial Characterization of Riparian Ecosystems of San Diego Creek Watershed, Orange County, California.¹⁸ These documents have been recently prepared by the Army Corps of Engineers (ACOE) Waterways Experiment Station (WES) for the Los Angeles District of the ACOE. These documents have been utilized in two ways. First, these documents provide a watershed-level context that allows for an evaluation that considers the hydrologic, water quality, and habitat value of upstream and downstream resources. Second, by using the data set forth by the ACOE and provided in the above-mentioned documents, Glenn Lukos Associates (GLA) has prepared an analysis of the hydrologic, water quality, and habitat functions associated with the survey area Open Space areas and Development Area.¹⁹ The methodology and results set forth by the ACOE were utilized by GLA for a number of reasons: 1) they provide a quantitative tool for evaluating the jurisdictional resources, 2) the methodology is a recognized wetland/riparian assessment tool developed by a federal agency (the ACOE) that has been used in various parts of the country including a number of southern California areas (e.g., Camp Pendleton), 3) they are part of the assessment tools that the ACOE is utilizing to support the SAMP associated with the San Diego Creek Watershed, and 4) the methods were developed by the ACOE to evaluate areas of riparian habitat that extend beyond ACOE jurisdiction, extending to the limits CDFG jurisdiction, and in some instances beyond CDFG jurisdictional limits, providing a suitable tool for evaluating impacts to CDFG jurisdiction as well as ACOE jurisdiction.²⁰

The Assessment conducted by the ACOE and utilized by GLA indicates that for hydrologic, water quality, and habitat function, "Integrity Indices" are substantially higher for the open space areas

¹⁷ Smith, R. Daniel. 2000. *Assessment of Riparian Ecosystem Integrity in the San Diego Creek Watershed, Orange County, California*. Prepared for the ACOE of Engineers, Los Angeles District Regulatory Branch by the ACOE of Engineers Engineering Research and Development Center, Waterways Experiment Station, Vicksburg, Mississippi.

¹⁸ Lichvar, Robert, Gregg Gustina, Dan MacDonald, and Mike Ericsson. 2000. *Planning Level Delineation and Geospatial Characterization of Riparian Ecosystems of San Diego Creek Watershed, Orange County, California*. Prepared by the Army ACOE of Engineers Engineering and Research Development Center and the Cold Regions Research and Engineering Laboratory, Hanover NH.

¹⁹ Glenn Lukos Associates. 2001. *Riparian Ecosystem Integrity Assessment of PAs 3, 5, 6, 8, and 9 (The Northern Sphere Area) Including potential Development Areas and the Open Space*. Prepared for The Irvine Company (Volume 2).

²⁰ Smith, R. Daniel. 2000. *Assessment of Riparian Ecosystem Integrity in the San Diego Creek Watershed, Orange County, California*. Prepared for the ACOE of Engineers, Los Angeles District Regulatory Branch by the ACOE of Engineers Engineering Research and Development Center, Waterways Experiment Station, Vicksburg, Mississippi. See pages 6-8 for a discussion of riparian habitats and the scope of the assessment relative to ACOE and CDFG jurisdiction.

than for the Development Area.²¹ The extent of the jurisdictional resources subject to ACOE and CDFG is substantially greater for both ACOE and CDFG within the Open Space areas than within Development Areas. Tables 4-22 and 4-23 provide a summary the hydrologic, water quality, and habitat functional capacities for the Proposed Development Areas (PDA) and Open Space Areas associated with the survey area. Acreage totals for ACOE and CDFG jurisdiction are also provided in the tables.²² Calculation of "Functional Capacity," is obtained multiplying the integrity index by the acreage of the aquatic feature under analysis. Calculation of the functional capacity in this manner is the standard practice when conducting functional assessments.²³

As summarized in Tables 4-22 and 4-23, the functional capacity associated with hydrologic, water quality and habitat functions, exhibited by the drainage courses and associated riparian habitat within preserved openspace substantially exceeds the same functions that would be impacted within the Development Area. For example, drainage courses and riparian areas subject to CDFG jurisdiction within open space portions of the project exhibits eight times greater functional capacity than habitat within the Development Area. Land use and conservation planning and project design have ensured that all medium and high quality riparian resources have been avoided and that only areas that exhibit low function will potentially be impacted by development.

²¹ *In order to conduct the Assessment, the ACOE divided the San Diego Creek watershed into Riparian Reaches and associated sub-watersheds. Each Riparian Reach was evaluated for indicators of hydrologic, water quality, and habitat integrity that were the Assessment endpoints. Based upon the conditions identified for each Riparian Reach, an "Integrity" value or "Index" was calculated by the ACOE for each Riparian Reach. In determining the Integrity Index for each Riparian Reach, the Assessment considered the degree to which the Riparian Reaches exhibit characteristics typical of conditions that existed before cultural alteration. For each of the assessment endpoints (hydrology, water quality, and habitat) indicators were examined and assigned a value from one to five, with five representing the highest value. Six separate indicators were examined for hydrologic and habitat integrity, while nine separate indicators were examined for water quality integrity. This equates to highest possible scores for each Riparian Reach of 30 for hydrologic and habitat integrity and 45 for water quality integrity.*

²² *Acreages taken from jurisdictional report (Glenn Lukos Associates 2001, Volume 2).*

²³ *Smith, R. Daniel, Alan Ammann, Candy Bartoldus, and mark Brinson. An Approach for Assessing Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indice.*

Table 4-22 Summary of Hydrologic, Water Quality and Habitat Functions for Riparian Habitat within ACOE Jurisdiction									
Area	Hydrologic Integrity			Water Quality Integrity			Habitat Integrity		
	Index 30 possible	Acres	Functional Capacity	Index 45 possible	Acres	Functional Capacity	Index 30 possible	Acres	Functional Capacity
PDA (West)	7.20	0.4	2.88	15.40	0.4	6.16	5.33	0.4	2.13
PDA (East)	13.90	5.62	78.14	22.38	5.62	125.76	8.55	5.62	48.07
Open Space	20.92	19.14	400.40	30.60	19.14	585.69	18.38	19.14	351.71

Table 4-23 Summary of Hydrologic, Water Quality and Habitat Functions for Riparian Habitat within CDFG Jurisdiction									
Area	Hydrologic Integrity			Water Quality Integrity			Habitat Integrity		
	Index 30 possible	Acres	Functional Capacity	Index 45 possible	Acres	Functional Capacity	Index 30 possible	Acres	Functional Capacity
PDA (West)	7.20	0.40	2.88	15.40	0.40	6.16	5.33	0.40	2.13
PDA (East)	13.90	11.57	160.85	22.38	11.57	258.93	8.55	11.57	98.94
Open Space	20.92	45.30	947.68	30.60	45.30	1386.17	18.38	45.30	832.39
<i>This habitat includes coastal California gnatcatchers, cactus wren, and other CSS obligate species. Actual numbers of displaced individuals will depend on occupancy of habitat at time of project grading.</i>									

4.4.3 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on biological resources if it will:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Implementation District "P"

All of Implementation District "P" is proposed for open space dedication and is within the NCCP/HCP Reserve although no development will occur. As a result, there will be no direct impacts to Implementation District "P" due to implementation of the proposed project.

Urban development adjacent to the NCCP Reserve creates certain potential indirect impacts to the biological resources in the Reserve. These potential impacts include; intrusion of humans and domestic pets into the Reserve, predation of sensitive wildlife by domestic animals, increase populations of species adapted to urban development (raccoons, opossums, skunks) at the expense of more sensitive wildlife, increased fire risk and increased risk of invasion by exotic plant species.

Indirect impacts associated with construction activities include potential erosion on exposed slopes, sedimentation of watercourses, dust accumulation on native vegetation and increased dumping of trash and other pollutants. However, these potential impacts are not likely to be significant, and can be mitigated by the NCCP/HCP (County of Orange, Environmental Management Agency 1996).

CSS and Federal/State Listed and NCCP/HCP Covered and Conditionally Covered Species

The potential direct impacts of the proposed project on CSS and federal or state listed species and NCCP/HCP covered and conditionally covered species, are summarized in Table 4-24.

Table 4-24 Potential Direct Impacts on CSS and Federal or State Listed Species and NCCP/HCP Covered and Conditionally Covered Species.		
Habitat/ Species	Acreage/Numbers Impacted	NCCP Status
CSS ¹	175.9 acres	Fully Covered
California gnatcatcher	19 locations	Fully Covered
Cactus wren	8 locations	Fully Covered
least Bell's vireo	One pair	Conditionally Covered
Intermediate/Foothill Mariposa Lily	2 colonies (currently 28 individuals)	Conditionally Covered
¹ <i>This habitat includes coastal California gnatcatchers, cactus wren, and other CSS obligate species. Actual numbers of displaced individuals will depend on occupancy of habitat at time of project grading.</i>		

*Coastal Sage Scrub and Associated Species*²⁴

As explained in the EIR/EIS for the Central/Coastal Orange County NCCP, the NCCP Program was established by the California Legislature when it enacted the NCCP Act of 1991. The purpose of the NCCP Program is to provide long-term, regional protection of natural vegetation and wildlife diversity while allowing compatible land uses and appropriate development and growth. The NCCP process was initiated to provide an alternative to "single species" conservation efforts that were relied on prior to the NCCP Act. The shift in focus from single species, project-by-project conservation efforts to conservation planning at the natural community level was intended to facilitate regional protection of a range of species that inhabit a designated natural community, in this instance CSS.

²⁴ *This habitat includes coastal California gnatcatchers, cactus wren, and other CSS obligate species. Actual numbers of displaced individuals will depend on occupancy of habitat at time of project grading.*

The evolution and focus of the NCCP Program was described by the State of California Resources Agency as follows (excerpted from the Resources Bulletin, "Natural Communities Conservation Planning: Questions and Answers"):

"Experience over the 20-year life of the Federal Endangered Species Act (ESA) has shown that the results of listing species individually as threatened or endangered under the ESA often does not achieve its objectives. Such listings--despite intensive regulatory powers available under the law--do not necessarily assure the long-term survival of the species and can have serious economic consequences in affected regions. This is because the listing of a single species in a multi-species habitat makes it difficult for land management agencies and developers to determine how best to plan for all the species that may someday be in danger in that area. Bureaucratic indecision encouraged by this uncertainty can thwart not only needed private development, but also sound habitat management efforts crucial to species survival.

The NCCP Program is an innovative State effort to protect critical habitat ... before it becomes so fragmented or degraded by development and other use that a listing of individual species as threatened or endangered is required under the State or Federal Endangered Species Acts. The program is designed to save critical habitat and, at the same time, allow for reasonable economic activity and development on affected land, much of which is privately owned.

The first application of NCCP is a pilot program in an ecosystem called Coastal Sage Scrub in southern California The ecosystem ... is the home of the California gnatcatcher and more than 50 other potentially threatened or endangered species."

The IA allows incidental take of Covered Habitats and Identified Species based on a comprehensive conservation program that includes the conservation of over 18,500 acres of CSS in the Reserve, mitigation requirements in the IA, the adaptive management plan, and implementation of construction minimization measures such as: no grading during the breeding season and flushing of species immediately prior to clearing.

As described in the NCCP/HCP EIR/EIS the project specific and cumulative impacts that would occur to CSS in the Development Area have been mitigated to a level of less than significant through this NCCP Program. The direct and cumulative impacts to species associated with CSS, including the coastal California gnatcatcher and cactus wren, are also mitigated to a level of less than significant through this NCCP Program.

The clearing of the CSS within the Development Area would be undertaken outside of the breeding season which would allow the birds to relocate to other areas that are conserved by the NCCP/HCP plan. Adjacent areas include the 3,369 acres of CSS that would be preserved in the survey area Open Space areas. Also, the 1,100 acres of CSS in the El Toro MCAS area would provide additional suitable habitat.

The proposed development of the Development Area is consistent with, and indeed was contemplated by, the NCCP. The NCCP was approved by the USFWS, CDFG, County of Orange, City of Irvine, and other governmental entities and agencies, as full and adequate mitigation for anticipated development impacts to CSS and its obligate species, including the coastal California gnatcatcher.

Least Bell's vireo

Impacts would occur to one pair of least Bell's vireos and to approximately 2.42 acres of habitat likely used by this pair, as well as to several small patches scattered throughout the Development Area, totaling another 2.97 acres. The habitat where the vireo pair was detected totaled 0.53 acres. This small area is close to the minimum territory size required for least Bell's vireo (USFWS 1998). It is unlikely that this area could support more than one vireo pair. The pair likely also used the two adjacent patches of woodland at the northeastern portion of Lambert Reservoir totaling 1.89 acres, as these were suitable for vireos. Most of the other areas where potentially suitable vireo habitat would be impacted were unlikely to support breeding pairs because these areas were typically small and contained few willows, being dominated mostly by mulefat scrub. One area of potentially suitable habitat (approx. 3.15 acres), within PA 6 that could support breeding vireos was located north of Portola Parkway and was part of a larger area of willow woodland, most of which would be protected as Non-Reserve Open Space.

The vireo habitat in the Development Area consisted of several small patches that could support migrants and a very limited number of breeding birds. Higher quality vireo habitat occurred within the survey area at Siphon Reservoir and offsite within the same watershed at Rattlesnake Reservoir, Peter's Canyon Reservoir, San Diego Creek at Spectrum V, Sand Canyon Wash, Mason Park and San Joaquin Marsh (Harmsworth Associates 1998A). These are the areas with potentially significant long term conservation value. The best vireo habitat in the survey area was located at Siphon Reservoir (11.75 acres of riparian habitat) and in Round Canyon, just north of Portola Parkway (3.15 acres of riparian habitat). These areas would be preserved as Reserve Open Space (Siphon Reservoir) or Non-Reserve Open Space (at Portola Parkway) and would not be impacted by the proposed project (all but 0.2 acres would be preserved).

The least Bell's vireo population has increased dramatically in California over the past decade, due to conservation efforts. When the USFWS listed the least Bell's vireo as an endangered species in 1986 the vireo population was estimated to be 300 pairs (Franzreb 1989) and is currently estimated to be in excess of 1,500 pairs throughout its range. This increase also occurred in Orange County (Harmsworth Associates 1998A) and appears to be continuing, as evidenced by the new locations documented during the current surveys. The impacts to the vireo pair must be set in the context of this increasing local and regional vireo population.

In conclusion, the least Bell's vireo habitat which would be impacted by the proposed development supports migrants and a very limited number of nesting birds in locations with lesser long term conservation value than Siphon Reservoir, Rattlesnake Reservoir or the other sites listed above.

Although available data shows that the Development Area is not an area of long term conservation value, however, under the NCCP, that final determination must be made by USFWS and CDFG.

Under the NCCP, least Bell's vireo is a conditionally covered species, subject to specific requirements of the NCCP. If USFWS and CDFG determine that the Development Area is of lesser long term conservation value, potential impacts to least Bell's vireo within the Development Area would be covered under the NCCP/HCP, but would still require development of a special mitigation plan in consultation with USFWS, CDFG and the NCCP Non-Profit Corporation (NCCP/HCP IA, Section 8.3).

As provided in the NCCP Implementation Agreement:

"Planned activities that would affect habitat of this species shall be consistent with a mitigation plan that: 1) addresses design modifications and other on-site measures that are consistent with the project's purposes, minimizes impacts, and provides appropriate feasible protections, 2) provides for compensatory habitat restoration/enhancement activities at an appropriate location (which may include land in the Reserve System or other open space) and which may include planting of riparian trees and shrubs and/or cowbird trapping, and 3) provides for monitoring and Adaptive Management of habitat, within the Reserve System including cowbird trapping, consistent with Chapter 5 of the NCCP/HCP. The mitigation plan will be developed in coordination with USFWS, CDFG, and the NCCP Non-Profit Corporation."

If the least Bell's vireo habitat is determined to be of long term conservation value, a Section 7 consultation or other appropriate authorization would be required to impact the habitat. Under either the NCCP/HCP, or a Section 7 consultation or other appropriate authorization, absent adequate mitigation, direct impacts to the least Bell's vireo would be significant.

Intermediate/Foothill Mariposa Lily

Two colonies of the Intermediate/Foothill Mariposa Lily (consisting of 28 individuals) would be impacted by the proposed project. The Intermediate/Foothill mariposa lily is a conditionally covered species under the NCCP/HCP. Planned activities affecting populations smaller than 20 individuals are fully authorized and fully mitigated for by the NCCP/HCP plan. If activities will affect lily populations larger than 20 individuals, a mitigation plan must be prepared in consultation with CDFG and USFWS. Two colonies would be impacted by the proposed project. One consisted of a single individual and is therefore mitigated by the NCCP/HCP. The other consisted of 27 individuals and therefore a mitigation plan must be prepared under the terms of the NCCP/HCP.

The NCCP/HCP IA (Section 8.3) details the mitigation plan participating landowners must develop for planned activities that would affect populations larger than 20 individuals. The mitigation plan must; 1) address design modifications or other on-site measures that are consistent with the project's purposes, minimize impacts to the foothill mariposa lily habitat, and provide appropriate protections for any adjoining conserved foothill mariposa lily habitat, 2) provide for an evaluation of salvage,

restoration/enhancement/management of other conserved mariposa lily, or other mitigation techniques to determine the most appropriate mitigation technique to offset impacts, and implement mitigation consistent with the foregoing evaluation, and, 3) provide for monitoring and adaptive management of foothill mariposa lily consistent with Chapter 5 of the NCCP/HCP, 4) the mitigation plan must be developed in coordination with USFWS, CDFG and the NCCP Non-Profit Corporation, and approved by the USFWS.

This mitigation plan, and the other conservation and mitigation measures of the NCCP/HCP, reduce the project impacts to a level of less than significant.

Unlisted Species and Habitats

Direct impacts would occur to 25.7 acres of grasslands located in the project Development Area. All plant and animal species using grassland in the Development Area would also be directly impacted, including white-tailed kite and California horned lark. Grassland habitat for these species would no longer exist in the Development Area.

Direct impacts would occur to 8.8 acres of riparian habitat located in the project Development Area. All plant and animal species using riparian habitat in the Development Area would also be impacted, including white-tailed kite, Cooper's hawk, yellow warbler and yellow-breasted chat. Riparian habitat for these species would no longer exist in the Development Area.

Direct impacts would occur to 2.0 acres of Mexican elderberry woodland located in the project Development Area. All plant and animal species using this woodland habitat in the Development Area would also be impacted, including yellow-breasted chat.

Direct impacts would occur to 0.4 acres of irrigation-fed wetlands and 0.17 acres of freshwater seep located in the project Development Area.

Direct impacts would also occur to two special status plant, the mud nama and the prostrate spineflower. A population of Mud nama at Lambert Reservoir would be impacted by the proposed development. Three colonies of prostrate spineflower would be impacted by the proposed development. Three other special status plant species that occur in the survey area, the Catalina mariposa lily, many-stemmed dudleya and small-flowered microseris were not recorded in the Development Area and therefore no impacts would occur to these species.

Direct impacts may occur to potential breeding and foraging habitat of the western spadefoot toad. Although the toad was not recorded in the Development Area it is presumed to occur and, potential breeding and foraging habitat does exist in the Development Area. This habitat would be impacted by the proposed development and therefore it is likely that the project would impact toads.

Direct impacts may also occur to potential breeding and foraging habitat of the loggerhead shrike. Although the shrike was not recorded in the Development Area it is presumed to occur and, potential

breeding and foraging habitat does exist in the Development Area. This habitat would be impacted by the proposed development, and therefore it is likely that the shrike would be impacted.

Chapparral, marsh and Cliff and Rock habitats are not present within the Development Area and therefore no impacts would occur to these habitats.

Riparian Habitat

A total of 8.8 acres of riparian habitat would potentially be impacted by project grading. As noted previously 4.70 acres of this riparian habitat is not subject to regulation by ACOE under Section 404 or CDFG under Section 1603 Exhibit 4-27. Findings of significance are addressed below:

Of the 4.70 acres of riparian habitat not subject to regulation under Section 404 or Section 1603;

- The loss of the 2.11 acres that does not constitute least Bell's vireo habitat, would not be considered significant because 1) the loss would not result in impacts to least Bell's vireo or any federally or state-listed species or other special-status species; 2) the loss would not result in impacts to ACOE or CDFG jurisdictional areas; 3) this habitat (mulefat scrub) is not listed as a special-status vegetation association in the CNDDDB, and 4) these areas exhibit very low habitat functional capacity and no hydrologic or water quality values because they are not associated with, or connected to aquatic features,
- The 0.7 acres of unoccupied least Bell's vireo habitat exhibits low hydrologic, water quality, and habitat integrity values due to isolation (it is not connected to upstream or downstream riparian resources), however, due to its potential to support vireos, loss of this 0.7 acre willow woodland would be considered significant. In order to avoid significant impacts, the project proponent is proposing mitigation measures that would require coordination with FWS, CDFG and the ACOE. Regardless of the significance finding, avoidance of this area is not warranted due to the low level of hydrologic, water quality, and habitat function exhibited,
- The 1.89-acre area of southern willow scrub that exhibited use by one pair of least Bell's vireo would be considered significant because of the presence of a listed species. In order to avoid significant impacts, the project proponent is proposing mitigation measures that would require coordination with USFWS, CDFG and the ACOE, to avoid impacts to occupied vireo habitat areas.

Exhibit 4-27 Riparian areas within the Development Area

Of the 4.10 acres of riparian habitat subject to regulation under Section 404 or Section 1603;

- Loss of the 1.29 acres that does not constitute least Bell's vireo habitat would not result in impacts to least Bell's vireo or any federally or state-listed species or other special-status species. These areas exhibit low hydrologic, water quality, and habitat integrity values. However, impacts to these habitat patches would be considered significant because of their CDFG and ACOE jurisdictional status (0.05 acres of this habitat qualify as wetlands under ACOE jurisdiction). Regardless of the significance finding, avoidance of these areas is not warranted due to their low level of hydrologic, water quality, and habitat function.
- The 2.28 acres of unoccupied least Bell's vireo habitat occurs in several different drainages. One 0.2 acre area within the Development Area is adjacent to 2.95 acres of willow riparian habitat located in Open Space and located between Portola Parkway and SR 241. This 0.2 acre of habitat, when considered together with the 2.95 acres of habitat exhibits the potential for supporting least Bell's vireo and other sensitive avian species.²⁵ Impacts to this 0.2-acres would be considered significant. In order to avoid significant impacts, the project proponent is proposing mitigation measures that will require coordination with CDFG and the ACOE, and replacement, restoration, or enhancement of habitat. The remaining 2.08 acres of unoccupied least Bell's vireo habitat has a low potential to support vireos due to the small size of the patches. In addition these areas exhibits low hydrologic, water quality, and habitat integrity values. However, impacts to these habitat patches would be considered significant because of their CDFG jurisdictional status (0.21 acres of this habitat qualify as wetlands under ACOE jurisdiction). Regardless of the significance finding, avoidance of these areas is not warranted due to their low level of hydrologic, water quality, and habitat function.
- The 0.53-acre area of southern willow scrub that exhibited use by one pair of least Bell's vireo would be considered significant because of the presence of a listed species. In addition, this area was determined to exhibit wetland hydrology, soils, and vegetation and would be regulated by the ACOE as a jurisdictional riparian wetland, although it is not subject to CDFG jurisdiction under the 1603 program. In order to avoid significant impacts, the project proponent is proposing mitigation measures that would require coordination with FWS, CDFG and the ACOE, to avoid impacts to occupied vireo habitat areas.

²⁵ *Many of the listed and special-status avian species exhibit meta-population dynamics and isolated patches as small as one acre can provide refugia for individuals or pairs during years when other more suitable habitat areas are at carrying capacity. While such areas can be important in contributing to the overall stability of such meta-populations avoidance of specific areas is not as important as is maintaining the overall carrying capacity within a region through ensuring no-net-loss of suitable (or at least potentially suitable) habitat. It is important to note that there is no evidence that the 3.15-acre area has been used by listed or sensitive species; rather, surveys indicate that this area is not being used by listed or sensitive species. Nevertheless, because of its size (greater than one acre), it is capable of supporting least Bell's vireo and other special-status avian species at least on an occasional basis.*

Finally, the project would impact 3.71 acres of ACOE jurisdiction, including 0.96 acres of jurisdictional wetlands (including the 0.17 acre freshwater seep and the 0.79 acres of riparian habitat noted above) and 2.75 acres of ephemeral drainage channels. The project would also impact 6.37 acres of CDFG jurisdiction, including 3.57 acres of riparian habitat (noted above) and 2.80 acres of ephemeral drainage channels. Regardless of the significance finding, avoidance of these areas is not warranted due to their low level of hydrologic, water quality, and habitat function. A total of 186 acres of riparian areas have been avoided as a function of project design and will be preserved in Non-Reserve or Reserve open space.

Grasslands

The direct and cumulative impacts that would occur to grasslands and its associated species are not likely to be significant. Grasslands are not a major component of the survey area. Only 25.7 acres of grassland would be impacted by the proposed project. A total of 380.5 acres would be preserved in the Reserve Open Space and a further 76.8 acres in Non-Reserve Open Space of the survey area. The 380.5 acres are part of the approximately 7,500 acres of grasslands that are included in the NCCP/HCP Reserve. These preserved grasslands, including the 457.3 acres within the survey area, provide habitat for sensitive species that utilize grasslands and would reduce any impacts to a level of less than significant.

Mexican elderberry woodland

The direct impacts that would occur to Mexican elderberry woodland and its associated species are not likely to be significant. This habitat is found throughout the county. The plant and animal species found in this woodland are also typical of scrub, chaparral and riparian habitats. No unique flora or fauna occur in this habitat. The small area of Mexican elderberry woodland (2.0 acres) that would be impacted is less than significant.

Irrigation-fed wetland

The 0.4 acre irrigation-fed wetland that would be impacted is associated with agricultural runoff. The vegetation in the wetland consisted of herbaceous species and did not provide habitat for any federal or state listed or sensitive species. Species using the wetland are common and widespread. The impacts to any species using this wetland are not significant. This irrigation-fed artificial wetland is not subject to ACOE jurisdiction.

Mud nama

A population of mud nama located at Lambert Reservoir²⁶ would be impacted by the proposed project. Mud nama is neither state or federally listed but is on the CNPS list 2, which means it is rare or endangered in California but common elsewhere. This species has recently been recorded at several other locations in Orange County, including a number of locations that are protected (Fairview Park, Emerald Canyon, Laguna Lakes, Chiquita Ridge, Provance et al. 2000, Bonkamp Pers. Comm.). Because agricultural water is not longer stored at Lambert Reservoir, it is unlikely that sufficient water will be available to allow the species to persist at Lambert even if the plant is not impacted by the proposed project. In addition, this site is degraded, as it was recently disked. Although this population would be impacted by the proposed project, due to the elimination of agricultural water storage of the site, the degraded nature of the site, and the extant populations in nearby protected areas, this impact is not significant.

Prostrate spineflower

Three colonies of prostrate spineflower would be impacted by the proposed development. Prostrate spineflower is neither state or federally listed but is on the CNPS list 4, which means it is of limited distribution and must be watched. It's CNPS R-E-D status is 1-2-2, which means it is rare but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time. In San Diego county the prostrate spineflower is regarded as stable and wide ranging (Reiser 1994), although it is apparently less common in Orange County. Habitat for this species (CSS and chaparral) would continue to exist within the survey area in Non-Reserve Open Space and in Reserve Open Space. Impacts to this species are not significant.

Western spadefoot toad

Any project specific and cumulative impacts that would occur to the western spadefoot toad habitat are not likely to be significant. No spadefoot toads were recorded in the Development Area although suitable habitat does occur there. Extant populations are known from three areas in Reserve Open Space within the survey area. These populations, and others in the Reserve System, will provide for the continued existence of the toad in the NCCP/HCP area. Any impacts that would occur are therefore less than significant.

White-tailed kite

Any project specific and cumulative impacts that would occur to the white-tailed kite habitat are not likely to be significant. No kites were recorded in the Development Area. Kites are unlikely to nest

²⁶ Lambert Reservoir was artificially created in upland habitat and was used to store water for agricultural activities. Lambert no longer receives water for agricultural uses and the soils are expected to dry out over time.

in the Development Area but probably do forage there. Loss of the limited foraging habitat (25.2 acres of grasslands) available in the Development Area is unlikely to significantly impact the white-tailed kite, in light of nearby habitat in Reserve Open Space.

Loggerhead shrike

Any project specific and cumulative impacts that would occur to the loggerhead shrike habitat are not likely to be significant. No shrikes were recorded in the Development Area in 2001 and there are no previous records for this area. Shrikes could possibly nest in the Development Area and probably do forage there. Loggerhead shrikes prefer relatively flat, open country with lookout posts and areas of dense vegetation for nest sites. Such habitat is present in PA 6. While the proposed project would result in the loss of this habitat, this is not likely to be significant as that the bird itself has not been recorded onsite, also suitable habitat would remain within the Reserve Open Space.

Eucalyptus Windrows

Following removal of the citrus trees, the eucalyptus became even more visible, dominating views from within and outside the survey area. Because they are such visible features, preservation of healthy trees will benefit and enhance future development. They will help to retain the ambiance of the area's agricultural history. The trees will also harmonize with similar themes in adjacent areas of Irvine.

The majority of survey area windrow trees are considered to be in good overall condition and consequently, 36 of the 38 windrows are considered candidates for preservation. Table 4-25 presents each windrow and the number of trees recommended for preservation and removal.

Several very large windrows, numbers 2 (885 trees), 3 (805 trees), 5 (369 trees), 27 (341 trees), 4 (292 trees), and 33 (201 trees) are the most significant rows on site, representing 50.8 percent of the entire tree populations. These windrows are rated either "A," "B," or "C."²⁷ Each of these ratings designates windrows that are candidates for preservation. Two small windrows, numbers 34 and 16 received poor ratings, resulting in their status as candidates for removal. These two windrows account for only 23 total trees. The trees in these windrows, and the removal trees from the 36 windrows for retention, exhibit poor structure and inferior health that are the result of several factors including soil compaction, improper spacing, drought, secondary infestations of eucalyptus borers and other pests, and historical neglect.

As presented in Table 4-25, Windrow number 16 is recommended for 100% removal (7 trees) while windrow number 34 is recommended for 75% removal (12 out of 16 trees). As mentioned, trees

²⁷ Windrow ratings are based on number of retain trees versus number of remove trees. "A" windrows retain at least 80% of their trees, "B" windrows between 60% and 79%, "C" windrows between 40% and 59%, "D" windrows between 20% and 39%, and "F" windrows retain no more than 19% of their trees.

within these windrows are in poor conditions and would have high hazard potential in an urban setting.

Table 4-25 Windrow Condition Assessment					
Windrow Number	Total Number of Trees	Trees that may be Preserved	Trees that should be removed	Percentage Removal	Windrow Grade*
Planning Area 9					
1	183	116	67	37%	B
6	63	33	30	48%	C
Planning Areas 8A and 9					
2	885	472	413	47%	C
3	805	383	422	52%	C
Planning Areas 5B and 9					
4	292	182	110	38%	B
5	369	230	139	38%	B
Planning Area 6					
7	137	74	63	46%	C
8	134	80	54	40%	B
9	91	46	45	49%	C
10	17	12	5	29%	B
11	56	38	18	32%	B
12	147	116	31	21%	B
13	62	46	16	26%	B
14	161	87	74	46%	C
15	12	8	4	33%	B
16	7	0	7	100%	F
17	42	29	13	31%	B
18	56	38	18	32%	B
19	51	30	21	41%	C

Table 4-25 Windrow Condition Assessment					
Windrow Number	Total Number of Trees	Trees that may be Preserved	Trees that should be removed	Percentage Removal	Windrow Grade*
20	46	30	16	35%	B
21	154	102	52	34%	B
22	7	6	1	14%	A
23	177	101	76	43%	C
24	89	59	30	34%	B
25	135	62	73	54%	C
26	52	27	25	48%	C
27	341	228	113	33%	B
28	102	64	38	37%	B
29	196	140	56	29%	B
30	127	63	64	50%	C
31	162	113	49	30%	B
32	82	37	45	55%	C
33	201	164	37	18%	A
34	16	4	12	75%	D
35	55	33	22	40%	B
36	53	37	16	30%	B
37	58	39	19	33%	B
38	68	32	36	53%	C
Total	5,691	3,361	2,330	41%	
<p>* Windrow ratings are based on number of retain trees versus number of remove trees. "A" windrows retain at least 80% of their trees, "B" windrows between 60% and 79%, "C" windrows between 40% and 59%, "D" windrows between 20% and 39%, and "F" windrows retain no more than 19% of their trees.</p> <p>SOURCE: David Evans and Associates, Inc., May 2001</p>					

All “A,” “B,” and “C” windrows may be partially preserved to varying degrees. However up to 60% of the trees in some of these windrows are recommended for removal. All of the “A,” “B,” and “C” windrows are classified as candidates for preservation in this assessment. The two “D” and “F” windrows are classified as windrows not considered for preservation. The 36 windrows recommended for retention would include 3,357 trees following removal operations, averaging 93 trees per row. Some of the “A,” “B,” and “C” windrows may require replacement tree planting following removals. Gaps may be created when removal trees are clustered. Clustered tree mortality is common with insect and disease outbreaks in the windrows.

The eucalyptus windrows located on the project site are considered to be significant trees under the City of Irvine’s Urban Forestry Ordinance. As described in the Urban Forestry Guidelines Manual, any proposal to remove the trees would require that an application be submitted and reviewed and a permit be issued by the City of Irvine’s Community Development Department, Building and Safety Division. The City’s arborist would review the application for tree removal and approve or deny the application based on the City’s tree removal criteria.

The proposed project will retain the onsite eucalyptus windrows to the extent feasible and in accordance with the City’s Urban Forestry Ordinance. The project applicant is currently working with City staff on a plan to preserve interior windrows to the extent feasible. Since the proposed project would retain the windrows to the extent feasible and since the City of Irvine has discretionary authority as to how and to what extent the windrows are incorporated into the future development of the project site, removal of the windrows will be consistent with the Urban Forestry Ordinance and would not be considered significant.

Wildlife Corridors and Habitat Linkages

No wildlife corridors or habitat linkages would be impacted by the proposed project. The two wildlife corridors at Aqua Chinon and the 241/133 interchange within the survey area which serve as links across the Eastern Transportation Corridor would be unaffected by the proposed project. Wildlife movement and existing wildlife movement corridors were extensively reviewed during the planning phase of the NCCP/HCP. The location of future developments were considered during this review.

One of the design objectives of the NCCP Reserve System was to provide linkages between core habitat areas and areas of locally high concentrations of target species. This connectivity assists in the proper functioning of the Reserve System. The Central subarea Reserve, which includes the Reserve Open Space within the survey area, incorporates habitat linkages and corridors that serve to connect all of the important habitat blocks within the reserve into a contiguous Reserve System. The Reserve Open Space within the survey area is contiguous with Reserve Open Space at Hicks Canyon, Rattlesnake Canyon and Loma Ridge to the northwest and with Loma Ridge, Limestone Canyon and upper Borrego Canyon to the northeast. These areas provide a linkage with Reserve Open Space further to the north, the North Ranch Policy Plan Area and the Cleveland National

Forest. These habitat linkages provide connectivity throughout this area and provide for animal movement within the Central Reserve subarea.

No wildlife movement corridors or habitat linkages are located in the Development Area and therefore no impacts would occur.

Indirect and Offsite Impacts

In addition to direct impacts to habitats within the Development Areas, urban development adjacent to the NCCP Reserve creates certain potential indirect impacts to the biological resources in the Reserve. These potential impacts include; intrusion of humans and domestic pets into the Reserve, predation of sensitive wildlife by domestic animals, increase populations of species adapted to urban development (eg. raccoons, opossum, skunk) at the expense of more sensitive wildlife, increased fire risk and increased risk of invasion by exotic plant species.

Indirect impacts associated with construction activities include potential erosion on exposed slopes, sedimentation of watercourses, dust accumulation on native vegetation and increased dumping of trash and other pollutants.

Any indirect and offsite impacts to Reserve and Non-Reserve Open Space are not likely to be significant. Any such impacts are mitigated by the NCCP/HCP (County of Orange, Environmental Management Agency 1996). Any mitigation plan developed for least Bell's vireo in consultation with USFWS and CDFG will have to take into account indirect impacts to the species.

Conclusions

Implementation of the adopted NCCP/HCP and the mitigation measures listed in Section 4.4.4 will reduce all project-specific and cumulative biological impacts to a level of insignificance. It should be noted that the EIR/EIS prepared for the NCCP/HCP was a Program EIR (553). Pursuant to Section 8.7 of the NCCP Implementing Agreement, Final Program EIR 553 is to be used as a program environmental document for impacts to Identified Species, coastal sage scrub, Covered Habitats, species dependent on Covered Habitats, and conditionally covered species.

Natural Community Conservation Planning Act and the Federal Endangered Species Act authorized the formation of an NCCP/HCP reserve plan. The central/coastal Orange County NCCP/HCP established a sub-regional conservation reserve design and adaptive management program administered by the Nature Reserve of Orange County (NROC). The NROC mitigates direct and indirect impacts to the covered habitats and species identified in the Implementing Agreement (IA), the NCCP/HCP, the EIR/S documents and the Mitigation and Implementing Agreement Monitoring Program (MIAMP) collectively called the Documents.

The Documents, agreed to and signed by The City of Irvine, note that local governments shall rely on and utilize the EIR prepared in conjunction with the NCCP/HCP in evaluating planning decisions

and issuing permits with regard to planned activities (Section 8.7 of the IA). Development as proposed in the Northern Sphere is a planned activity authorized in the documents.

The USFWS has agreed that the Reserve design and the elements of the NCCP/HCP conservation strategy as set forth in the document adequately provides for the conservation, protection, restoration, enhancement, and management of the Identified Species and their habitats within the Central/Coastal sub-region and that no additional mitigation for Identified Species and their habitats will be required of participating landowners. (MIAMP 8.3.1 (d)).

The California Department of Fish and Game has also agreed (MIAMP Section 8.4) that the NCCP/HCP fully mitigates the impacts to both the Identified Species and their habitats.

Cumulative Impacts

As described in Section 3.9, the City of Irvine will continue to develop in accordance with the adopted General Plan. The primary cumulative impact on biological resources is the fragmentation of ecosystems resulting from incremental losses of native habitats. As fragmentation continues, the remaining ecosystems will become more isolated and fragmented. The result will be that connectivity between patches of habitats and the wildlife populations they support will be lost.

As described previously, the establishment of The Nature Reserve of Orange County, a 37,000 acre reserve that was approved on July 17, 1996, will provide regional biological benefits which would be unlikely to occur with a piecemeal conservation strategy. The Nature Reserve was designed to prevent incremental loss of native habitat and the fragmentation of ecosystems, as well as to compensate for impacts of individual projects. Establishment of the Reserve System will protect approximately forty Identified Species, including three Target Species (gnatcatcher, cactus wren and orange-throated whiptail lizard) which are the focus of NCCP planning, and utilize the CSS and related habitat. The implementation of the NCCP, dedication of lands and endowment by the participating land owners mitigate impacts of proposed and future development on covered habitats and identified species. As a result, cumulative biological impacts are considered mitigated to a level of insignificance.

4.4.4 MITIGATION MEASURES

Existing Regulations and Standard Conditions

- 4.1 This project will involve removal of native plant communities and wildlife habitat. Prior to the issuance of permits for any grading activity including but not limited to clearing, grubbing, mowing, discing, trenching, grading, fuel modification, agriculture planting activity and/or other related construction activity, the [landowner or subsequent project] applicant shall obtain written authorization from the appropriate Federal, State, and local agencies that said activity complies with the regulations enforced by those agencies. Additionally, any mitigation requirements set forth by such agencies shall be incorporated

into the project's final design plans. This written authorization, along with plans and mitigation measures, shall be submitted to the Director of Community Development for review and shall have been approved prior to any grading activity. (Standard Condition 2.6.) [Note: This standard condition only applies to the removal of non-covered habitats. Covered habitats are subject to the provisions of the NCCP/HCP as set forth in Mitigation Measure 4.7.]

- 4.2 Prior to the issuance of grading permits for any Planning Area potentially affecting eucalyptus windrows, an application to remove the trees shall be submitted by the landowner or subsequent project applicant and a permit must be received from the City of Irvine's Community Development Department, Building and Safety Division, in accordance with the City of Irvine's Urban Forestry Ordinance.

Project Design Features/Special Development Requirements

No project design features or special development requirements related to biological resources are proposed.

Additional Mitigation Measures

- 4.3 Prior to the issuance of a grading permit covering impacted areas, the landowner or subsequent project applicant shall 1) provide evidence to the City of Irvine Community Development Director that (a) all necessary permits or authorizations have been obtained from the CDFG (pursuant to Section 1601-1603 of the Fish and Game Code) and the ACOE (pursuant to Section 404 of the Clean Water Act), or (b) that no such permits or authorizations are required, and 2) provide evidence to the City of Irvine Community Development Director that the project and the riparian mitigation and restoration program has been coordinated with the SAMP/MSAA for the San Diego Creek Watershed.
- 4.4 If a Section 404 Permit or other authorization is required from the ACOE, the landowner or subsequent project applicant shall provide, to the Community Development Director of the City of Irvine, evidence of a Section 401 Water Quality Certification from the California Regional Water Quality Control Board, Santa Ana Region.
- 4.5 Prior to issuance of a grading permit for any area containing resources subject to the jurisdiction of CDFG and ACOE other than occupied or potential least Bell's vireo habitat, a detailed riparian mitigation and restoration program shall be developed which has been coordinated with the SAMP/MSAA, and shall address the following items:
- a. *Responsibilities and qualifications of the personnel to implement and supervise the plan.* The responsibilities of the landowner, specialists and maintenance personnel that will supervise and implement the plan will be specified.

-
- b. *Site selection.* The site for mitigation within or adjacent to the Northern Sphere Area will be determined in coordination with the project applicant, CDFG and ACOE. The site will either be located within the Northern Sphere Area in a dedicated open space area, or land will be purchased or preserved adjacent to, but off site within the San Diego Creek watershed. Potential sites include: Agua Chinon south of the sedimentation basin; upland areas adjacent to the 3.15 acres willow woodland north of Portola Parkway; and upland areas adjacent to the three patches of riparian woodland which was occupied by vireos (if vireos remain and the area is preserved).
- c. *Restoration and Creation of Habitat:* The plan shall require the creation of riparian habitat in the amount and of the type required by CDFG and ACOE, provided, however, that, in order to assure no net loss of jurisdictional resources on an acre-for-acre basis, all impacted Corps and CDFG jurisdictional habitat shall be compensated by restoration, enhancement or creation at a minimum of 1.25:1 ratio.
- d. *Site preparation and planting implementation.* The site preparation will include: 1) protection of existing native species, 2) trash and weed removal, 3) native species salvage and reuse (i.e. duff), 4) soil treatments (i.e. imprinting, decompacting), 5) temporary irrigation installation, 6) erosion control measures (i.e. rice or willow wattles), 7) seed mix application, and 8) container species.
- e. *Schedule.* A schedule will be developed which includes planting to occur in late fall and early winter, between October and January 31.
- f. *Maintenance plan/guidelines.* The maintenance plan will include: 1) weed control, 2) herbivory control, 3) trash removal, 4) irrigation system maintenance, 5) maintenance training, and 6) replacement planting.
- g. *Monitoring plan.* The monitoring plan will include: 1) qualitative monitoring (i.e., photographs and general observation), 2) quantitative monitoring (i.e., randomly placed transects), 3) performance criteria as approved by the resource agencies, 4) monitoring reports for three to five years, 5) site monitoring as required by the resource agencies to ensure successful establishment of riparian habitat within the restored and created area. Successful establishment is defined per the performance criteria agreed to by the ACOE, CDFG, and the client.
- h. *Long-term preservation.* Long-term preservation of the site will also be outlined in the conceptual mitigation plan to ensure the mitigation site is not impacted by future development. The plan shall be submitted to the Department of Community Development for review and approval.

4.6 Prior to the approval of a tentative tract map within Planning Area 6, the landowner or subsequent project applicant shall assure avoidance (or minimization in consultation with USFWS and CDFG) of occupied least Bell's vireo habitat. Accordingly, the landowner or subsequent project applicant shall undertake annual surveys (commencing with the next breeding season following certification of this EIR) to determine presence or absence of least Bell's vireo (LBV) within identified occupied and potential LBV habitat in the Northern Sphere Area development areas. Such surveys shall be submitted to CDFG and USFWS, and landowner or subsequent project applicant shall review the surveys with those agencies if any significant changes occur in LBV presence or absence as documented by the surveys. Prior to approval of a tentative tract map for any project that would impact identified occupied or potential LBV habitat, the landowner or subsequent project applicant shall consult with CDFG and USFWS regarding any potential impacts to LBV of the project proposed by the tentative tract map in accordance with the provisions governing conditional coverage of the LBV set forth in the Implementation Agreement for the County of Orange Central and Coastal NCCP/HCP. Pursuant to such review, the landowner or subsequent project applicant shall, in accordance with the NCCP/HCP, obtain from USFWS and CDFG a determination regarding any long-term conservation value of LBV habitat and appropriate avoidance measures. Prior to the issuance of a grading permit, the landowner or subsequent project applicant shall: 1) provide evidence to the City of Irvine Community Development Director that (a) all necessary permits or authorizations for impacts to LBV have been obtained from the State Department of Fish and Game USFWS under the NCCP/HCP; or (b) that no such permits or authorizations are required, and 2) provide evidence to the City of Irvine Community Development Director that the project and the LBV avoidance measures have been coordinated with USFWS and CDFG. Prior to issuance of a grading permit for any area containing occupied LBV habitat, detailed avoidance measures shall be developed in coordination with USFWS and CDFG and in accordance with the NCCP, and such measures shall, at a minimum, address the following items:

- a. *Fencing.* When construction activity occurs in the vicinity of LBV habitat to be preserved, such habitat shall be fenced prior to commencement of construction, and all construction personnel shall strictly limit their activities and vehicles to assure that the fenced areas are not disturbed. Staging and storage areas shall be at least 150 feet away from all such fenced habitat. A contractor education program shall be prepared and implemented to apprise all construction personnel working in the vicinity of protected habitat of the occurrence of sensitive species in the area, the sensitivity of the species to human activities, the legal protection afforded to these species, and the penalties for violations of these legal protections, and the roles and authority of monitoring biologists.
- b. *Biological Monitor.* A biological monitor shall be on-site, to monitor construction activities adjacent to LBV habitat and buffer areas to be preserved to assure that the habitat is preserved, and all minimization measures are followed. The biological monitor shall have the authority to temporarily halt activities that are disturbing the

listed species and to implement minimization measures specified in the avoidance program.

- c. *Construction Noise.* Removal of occupied LBV habitat shall occur outside of the breeding season (March 15 to Sept. 15). If construction will occur adjacent to occupied vireo habitat during the breeding season, surveys shall be conducted prior to construction activity occurring within 500 feet of occupied LBV habitat to determine the location of any nesting LBV. During construction, no activity will occur within 500 feet of active nesting territories of LBV, unless measures are implemented to minimize noise and other disturbance to those adjacent birds. These measures shall include sound walls and/or other measures that assure that sound levels reaching vireo nesting areas do not exceed 60dBA, taking into account, however the noise levels preceding construction activity at the nesting location which may be high due to proximity of nesting sites to Portola.
- d. *Shield Lighting.* To reduce the potential of indirect impacts to conserved LBV habitat, public lighting installed in conjunction with proposed development in proximity to the conserved habitat shall be shielded so that the light is directed away from the conserved habitat.
- e. *Discourage Human Entry.* Post-construction signage, fencing, vegetative barriers or other effective measures shall be taken to discourage human entry associated with project development into conserved LBV habitat areas located adjacent to habitat areas in parks, or community areas where human activity is planned.
- f. *Cowbird Control.* If significant areas of turf are to be installed as a part of proposed development in proximity to the conserved LBV habitat, post-construction cowbird control measures shall be implemented for at least 5 years. These measures can be coordinated with the cowbird control program operated by the Nature Reserve of Orange County. After the five year monitoring period, a biologist shall evaluate the potential for long-term threat and determine if continued post-construction monitoring is necessary.
- g. *Resident/Recreational User Education.* A post-construction education program shall be developed to advise residents living in proximity to conserved LBV habitat of the potential impacts to listed species from human activities and the potential penalties for taking such species. The program shall include, but not be limited to, information pamphlets and education displays at village or recreation centers and the community park. Pamphlets shall be distributed to all residences in areas adjacent to conserved LBV habitat. At a minimum, the program shall include the following topics: occurrence of the listed and sensitive species in the area, their general ecology, sensitivity of the species to human activities, impacts from free-roaming pets (particularly domestic and feral cats), legal protection afforded these species,

penalties for violation of the Federal and State laws, report requirements, and project features designed to reduce impacts to these species.

- 4.7 Prior to the issuance of the first preliminary grading permit for areas adjacent to NCCP Reserve, the landowner or subsequent project applicant shall provide letters from a USFWS/CDFG approved biologist. The letters shall state that these individuals have been retained by the landowner or subsequent project applicant, and that the consultant(s) will monitor all grading and other significant ground disturbing activities in or adjacent to areas of coastal sage scrub or NCCP Reserve areas. The consultant(s) shall monitor these activities to ensure that the landowner or subsequent project applicant complies with the NCCP/HCP Implementing Agreement (IA) which specifies measures that must be taken to minimize construction impacts to CSS during construction including:
- a. To the maximum extent practicable, no grading of CSS habitat that is occupied by nesting gnatcatchers will occur during the breeding season (February 15 through July 15). It is expressly understood that this provision and the remaining provisions of these “construction-related minimization measures,” are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion control measure and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provided USFWS/CDFG with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of gnatcatchers, cactus wrens, and any other CSS Identified Species that are not otherwise flushed and will carry out the following measures only to the extent as practicable in the context of the public health and safety considerations.
 - b. Prior to the commencement of grading operations or other activities involving significant soil disturbance, all areas of CSS habitat to be avoided under the provisions of the NCCP/HCP, shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of CSS, a survey will be conducted to locate gnatcatchers and cactus wrens within 100 feet of the outer extent of projected soil disturbance activities and the locations of any such species shall be clearly marked and identified on the construction/grading plans.
 - c. A monitoring biologist, acceptable to USFWS/CDFG will be onsite during any clearing of CSS. The landowner or relevant public agency/utility will advise USFWS/CDFG at least seven calendar days (and preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow USFWS/CDFG to work with the monitoring biologist in connection with bird flushing capture activities. The monitoring biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-

clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP reserve system. It will be the responsibility of the monitoring biologist to assure that identified bird species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis.

- d. Following the completion of initial grading/earth movement activities, all areas of CSS habitat to be avoided by construction equipment and personnel will be marked by the monitoring biologist with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or storage of equipment will be permitted within such marked areas.
 - e. In areas bordering the NCCP reserve system or Special Linkage/Special Management areas containing significant CSS identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with project construction requirements. Waste dirt or rubble will not be deposited on adjacent CSS identified in the NCCP/HCP for protection. Pre-construction meetings involving the monitoring biologist, construction supervisors and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures.
 - f. CSS identified in the NCCP/HCP for protection and located within the likely dust drift radius of construction areas shall be periodically sprayed with water to reduce accumulated dust on the leaves as recommended by the monitoring biologist.
- 4.8 Prior to issuance of building permits within Planning Area 6, the landowner or subsequent project applicant shall submit, and the Director of Community Development shall have approved, a wildland interface brochure (to be obtained from The Nature Reserve of Orange County) to educate homeowners of the responsibilities associated with living at the wildland interface. The approved wildland interface brochure, along with its attachments, shall be included as part of the rental/lease agreements and as part of the sales literature for the project. The brochure shall address relevant issues, including the role of natural predators in the wildlands and how to minimize impacts of humans and domestic pets on native communities and their inhabitants.
- 4.9 Prior to the issue of the first building permit for Planning Area 6, the landowner or subsequent project applicant shall submit the plant palette for the fuel modification zone or landscape areas within 100 feet of the NCCP Reserve. Invasive exotic plant species, listed on the California EPA list of exotic pest plants, shall be excluded from the described landscape zone to reduce the risk that these species will become established in the Reserve.

The fuel modification zone shall include plants approved by the Orange County Fire Authority (OCFA).

- 4.10 This project will involve removal of native plant communities and wildlife habitat. Prior to the issuance of permits for any grading activity within PA 6 that will impact riparian habitat or raptor nests during the period from February 1 to June 30 including but not limited to clearing, grubbing, mowing, discing, trenching, grading, fuel modification, agriculture planting activity and/or other related construction activity, a qualified biologist with appropriate resource agency permits shall survey the riparian habitat to be impacted for the presence of occupied nests and/or burrows. The survey shall be submitted by the landowner or subsequent project applicant to the Director of Community Development prior to issuance of grading permits. Any occupied nests/burrows found during survey efforts shall be mapped on the construction plans and protected until nesting activity has ended. Nesting activity for raptors in the region of the project site normally occurs from February 1 to June 30. To protect any nest/burrow site, the following restrictions on construction are required between February 1 and June 30 (or unless nest/burrows are no longer active as determined by a qualified biologist): 1) clearing limits will be established a minimum of 100 feet in any direction from any occupied nest/burrow; 2) access and surveying will not be allowed within 50 feet of any occupied nest/burrow. Construction during the non-nesting season, the nest/burrow site will be monitored by a qualified biologist, and when the raptor is away from the nest/burrow, the biologist will flush any raptor to open space areas. The biologist will then remove the nest site or excavate the burrow site with hand tools or fill with soil so owls cannot return to burrow site.
- 4.11 If improvements are proposed within Caltrans Right of Way, the landowner or subsequent applicant shall have the appropriate plant and wildlife surveys completed by a qualified biologist. Official lists and databases shall be consulted for sensitive species such as the California Natural Diversity Database and lists provided by the U.S. Fish and Wildlife Service and the California Department of Fish and Game. Any impacts that affect waterways and drainages and/or open space during construction, or that occur indirectly as a result of the project, must be coordinated with the appropriate resource agencies.

4.4.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the adopted NCCP/HCP and the mitigation measures listed above will reduce all project-specific and cumulative biological impacts to a level of insignificance.

4.5 Cultural Resources

Cultural resources studies were completed for each of the Planning Areas within the project site by The Keith Companies, Inc. (TKCI), Cultural Resources Division, in August and October 2001. TKCI conducted a records search for the Project Area, reviewed previously-written reports on prior archaeological and/or historic resource investigations within and adjacent to the Project Area, and conducted a site survey to identify any unrecorded sites through surface scatter examination. The paleontological resources reports for the project area were completed by Stewart Paleontological Consulting in August 2001. These reports are summarized in the following section and included in their entirety in Appendix F and G, respectively.

Cultural resources are the physical remains of an area's historic and prehistoric heritage and includes historical, archaeological, and paleontological resources. The City of Irvine's General Plan includes a Cultural Resources Element which establishes the following rough delineation of historic, archaeological and paleontological resources. "Historical resources include sites established after 1542 A.D., the date when European contact with California began, which may be significant to history, architecture, or other culture. Archaeological resources include any location containing evidence of human activities which took place prior to 1750 A.D. Historical sites established prior to 1750 A.D. are also archaeological sites. Paleontological resources include any location containing a trace of plant or animals from past ages." (City of Irvine General Plan, Cultural Resources Element at E-1 (adopted March 9, 1999.)

For purposes of CEQA analysis, cultural resources include both historical resources and unique archaeological resources. "Historical resources" are defined in CEQA Guidelines Section 15064.5 and include both archaeological resources (those sites evidencing human activity prior to 1750 A.D.) as well as historic resources (sites evidencing human activity after 1750 A.D.).

The California Environmental Quality Act (CEQA) Guidelines Section 15064.5(a) defines the term "historical resources" as follows:

- (a) For purposes of this section, the term "historical resources" shall include the following:
 - (1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Pub. Res. Code Section 5024.1, Title 14 CCR, Section 4850 et seq.)
 - (2) A resource included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

-
- (3) Any object, building structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) including the following:
- (A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
 - (B) Is associated with the lives of persons important in our past;
 - (C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
 - (D) Has yielded, or may be likely to yield, information important in prehistory or history.
- (4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1

When determining significance of archaeological resources the Lead Agency must first determine whether it falls under the definition of an historical resource, or if not whether it is considered a "unique archaeological resource." (See Cal. Code of Reg. Section 15064.5(c)(1).) Public Resources Code Section 21083.2 defines unique archaeological resource as follows:

- (g) As used in this section "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
 - (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

-
- (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
 - (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

4.5.1 ENVIRONMENTAL SETTING

4.5.1.1 Archeological Resources

Cultural Setting

Prehistory

California prehistory is generally divided into three major periods beginning in 6000 B.C. and extending to 1771 A.D.

The first major period of prehistory (6000 to 1000 B.C.) has been described as the Millingstone Horizon by Wallace (1955, 1978), and is typified by an abundance of milling stones (i.e., manos and metates) and relatively few projectile points, reflecting a primary emphasis on seed collecting. The flaked stone assemblage is dominated by chopping, scraping, and cutting tools (Warren 1968:2). The Millingstone Horizon is followed by Intermediate Period Cultures after about 1000 B.C. (Wallace 1955, 1978). This period sees important technological changes that may be associated with increasing population levels and the beginnings of resource intensification. The appearance of the mortar and pestle is believed to reflect the increasing importance of acorns in the diet, and the transition from dart to arrow points by the end of the period indicates the appearance of the bow and arrow. The Late Prehistoric Period (Wallace's [1955] Horizon IV and Warren's [1968] Shoshonean Tradition) appears in Orange County at about A.D. 600 and extends to A.D. 1771 (Koerper 1981; Mason 1991). Shell beads, small arrow points and, later, ceramics are common at these sites.

History

Although European explorers made brief visits to the California coast in the sixteenth and seventeenth centuries, the Portola expedition in 1769 began the period of Spanish colonization of California and included the founding of permanent Spanish settlements along the coast from the Mexican border to the San Francisco Bay region. Mission San Juan Capistrano, established in 1776, was the first permanent settlement in what is today Orange County.

When California became part of the United States, only one settlement, San Juan Capistrano, existed in what is today Orange County. A village had grown up around the largely abandoned mission compound. Anaheim was established in 1857 as a German Colony on 1,165 acres purchased from Rancho San Juan Cajón de Santa Ana (Cleland 1941:157). History changed with the Great Drought of the 1860s, forcing many cattlemen to sell their land, which in turn encouraged new settlements

to spring up. Communities such as Santa Ana, Tustin, Westminster, Orange and Garden Grove were all founded in the years following the Great Drought. The 1890s were especially important boom years for Southern California. A major cause of the boom years is the linking of Southern California to the outside world via the railroad. Fullerton, Buena Park, Olive, El Modena were settled, followed in time by Laguna Beach, Huntington Beach, San Clemente, and Newport Beach. Former rancho lands were subdivided again and again.

A number of land transactions transpired which resulted in the formation of the historic Irvine Ranch. The vast holdings of the Yorba family were acquired in 1860 by William Wolfskill and then sold six years later to James Irvine, Llewellyn Bixby, and Benjamin and Thomas Flint. Title was confirmed and patented in 1868 for 47,226 acres. In 1862, the Irvine-Bixby-Flint group had purchased Rancho San Joaquin, a 50,000 acre parcel formerly owned by the Sepulveda family. With the addition of this parcel, the group now owned a total of 101,077 acres (Robinson 1963:8-9).

Following the Great Drought, wool production became extremely profitable and the Irvine-Bixby-Flint group began raising sheep on the property. Additional small parcels were added until 1876 when James Irvine bought out his partners, increasing the ranch size to nearly 115,000 acres (Robinson 1963:8-9). The Irvine Ranch, as it was renamed, occupied a strip of land approximately eight miles in width along the coast. In the late 1880s, when sheep and wool became less valuable, much of the Irvine Ranch was leased out for agricultural purposes. In little time, there was a complete conversion from livestock to agriculture.

By 1895, the most productive crop was barley which was used for brewing beer and livestock feed. Around 1905, other crops were raised such as alfalfa, celery, rhubarb, artichokes, peanuts, flax, and sugar beets. For some unexplained reason, Irvine attempted to sell the ranch between 1902 and 1906 but was successful in selling only a few thousand acres (Cleland 1941). About this time, the first successful citrus orchards were being planted on the property. The orchards proved so profitable that in 1913 citrus became the principal product and grazing lands were reduced. Persimmons and avocados were also grown.

Irvine General Plan Cultural Resource Element

The City's Cultural Resource Element identifies several Historical/Archaeological Landmarks within the proposed project area (see Figure E-1, City of Irvine General Plan, Cultural Resources Element (adopted March 9, 1999).) Four of these sites are located within Planning Area 6: the Lambert Reservoir, Portola Campsite, Route of the Portola Expedition, and the "Tomato Springs Bandit." Although the Cultural Resources Element says that two sites in the City, Barton's Mound and the Portola Campsite are listed in the California Inventory of Historic Resources, a records check of the South Central Coastal Information Center (SCCIC), the California State Historic Resources Inventory, the National Register of Historic Places, the listings of the California Historical Landmarks of the Office of Historic Preservation, and the California Points of Historical Interest revealed that the only recorded landmark is Barton's Mound and that there were no recorded historical sites within a quarter mile radius of the project area. The Sinks in Planning Area 3 was

identified as a Landform Site, but as no development is proposed in Planning Area 3, the project will not affect this landform.

Cultural Resource Investigations Related to the Northern Sphere Area

Table 4-26 summarizes recorded and previously unrecorded archaeological sites found within the Northern Sphere Area. Table 4-27 summarizes recorded and previously unrecorded historic sites found on the proposed project. Further descriptions of each of the sites can be found in Appendix F of this document. The following is a description of the investigations that have been conducted within each Planning Area.

Planning Area 3/Implementation District "P"

Planning Area 3 has been offered for permanent dedication as open space. Implementation District "P" will be dedicated as permanent open space with implementation of the Northern Sphere Area project. As a result, these areas were not surveyed for cultural resources since they will not be subject to grading.

Planning Area 5B

Prehistoric Resources

A search of the records on file at the SCCIC, Institute of Archaeology, and California State University, Fullerton, indicated that eleven surveys have been conducted within a one mile radius of this planning area. Although the exact total acreage of Planning Area ("PA") 5B surveyed by past projects is unclear, the records search indicates that approximately half of the entire project area has been formally surveyed by at least four of the eleven prior surveys.

The record search indicated four of the eleven cultural resource surveys, investigations, or assessments that were accomplished immediately adjacent to or on this planning area have encompassed portions of this planning area. A description of the cultural resource studies conducted in this planning area can be found in Appendix F of this document. None of the cultural resource surveys resulted in the identification of any prehistoric sites or artifacts in Planning Area 5B.

Although no archaeological sites are known to be located in this planning area or immediately adjacent to it, research indicates that a number of sites have been discovered nearby, suggesting that prehistoric sites may yet exist in this planning area. Because this planning area is currently occupied by structures, wholesale nursery yards, and row crops, a current site survey and walkover could not be conducted.

Table 4-26 Archaeological Sites

Table 4-27 Historic Sites

Historic Resources

Based upon the records search conducted for this planning area, no historic sites or artifacts have been recorded in Planning Area 5B.

Planning Area 6

Prehistoric Resources

A search of the records on file at SCCIC, Institute of Archaeology, and California State University, Fullerton, indicated that significant research has been conducted on this planning area, and prehistoric archaeological sites have been recorded. There have been forty-two scientific surveys, studies, or excavations conducted within a one-mile radius of this planning area. Of those prior studies, twenty-three were conducted within this planning area. Overall, there have been fifty-seven prehistoric archaeological sites recorded within a one-mile proximity of this planning area, but only fourteen archaeological sites were previously recorded on the property.

The fourteen sites located by SCCIC include: CA-ORA-244, ORA-545, ORA-650, ORA-651, ORA-652, ORA-761, ORA-762, ORA-1246, ORA-1297, ORA-1298, ORA-1311, ORA-1347, ORA-1348, and ORA-1480. A later refinement of the planning area boundaries concluded that ORA-1246, ORA-1298, ORA-1347, and ORA-1348 were not located within this planning area. The refinement of boundaries also concluded that two other sites were included in this planning area, but not listed by the SCCIC. The additional sites are CA-ORA-649 and CA-ORA-1070. Therefore, of the fourteen sites originally listed by SCCIC as being within this planning area, four sites were taken out and two were added. Thus, PA 6 should now reflect that twelve previously-recorded sites are located within its boundaries.

In June, 2001, TKCI conducted a field inventory to confirm the location of these twelve previously-recorded sites. During that field work, TCKI identified and recorded nine additional prehistoric sites. These sites, together with the twelve previously-recorded sites are listed below. A detailed description of the surveys conducted at these sites is provided in Appendix F.

Previously Recorded Prehistoric Sites	New Prehistoric Sites Recorded by TKCI
CA-ORA-244	CA-ORA-1588
CA-ORA-545	CA-ORA-1589
CA-ORA-649	CA-ORA-1590
CA-ORA-650	CA-ORA-1591
CA-ORA-651	CA-ORA-1592
CA-ORA-652	CA-ORA-1593
CA-ORA-761	CA-ORA-1594
CA-ORA-762	CA-ORA-1595
CA-ORA-1070	CA-ORA-1596
CA-ORA-1297	
CA-ORA-1311	
CA-ORA-1480	

A brief description of the twelve previously-recorded sites follows:

CA-ORA-244

The "Tomato Springs Site" is the most important site for this planning area. The name was coined by Herman Strandt who conducted limited excavations at this site in the 1920's and refers to one of the drainages within the Planning Area. Occupation at CA-ORA-244 has been estimated as commencing approximately 5,000 years before present, and ending, it is suggested, possibly as late as the mid-1800's (Cottrell 1985; Cottrell and Del Chario 1984), although no reports of habitation or campsites were mentioned in the diary records of the Portola expedition in 1769-1770.

Many time sensitive artifacts from this site reflect a Late Prehistoric (LP) component. These include coastal Cottonwood projectile points, a three-groove steatite arrow shaft straightener, a steatite pendant, and a shaman's stone-sucking tube. At least one of the Cottonwood type projectile points may be a Sonoran arrow point which was locally manufactured almost exclusively during the second half of the Late Prehistoric period, after about A.D. 1300 (see Koerper et al 1996).

Other projectiles, dart points, reflect earlier than Late Prehistoric period occupation. Atlatl dart points in Orange County do not hold the kind of precise temporal resolution they were once believed to have had (see Koerper et al. 1994). Thus, it is uncertain whether the large points establish people at Tomato Springs as far back as the third millennium BC.

Four discoidals and two cogged stones were found at Tomato Springs. These six artifacts help identify a pre-Late Prehistoric period component at ORA-244, possibly one that extends well back into the Milling Stone period.

CA-ORA-545

This site, consisting of a sparse lithic scatter, is located within a plowed field that has been disturbed extensively by agricultural activities since the 1970s. Artifacts noted at this site include

chert flakes, rhyolite cores, one quartz core, one opaque jasper flake, rhyolite flakes, manos, metate fragments, hammerstones, choppers, and flake tools.

CA-ORA-649

This site was surface collected in 1982, and was tested by Foster Wheeler Environmental Corporation in 1995 as part of a Phase II cultural resources report for construction of the Eastern Transportation Corridor. The artifacts observed at this site include three mano fragments, several pieces of debitage, two cores, and a whole mano. Most of the site was destroyed during the construction of the Eastern Transportation Corridor.

CA-ORA-650

This site is located immediately adjacent to the "Tomato Springs Site," and may be associated with ORA-244. The artifacts noted at this site include manos, metate, hammerstones, quartzite, chert, chert scraper, granitic mano fragment, rhyolite core, opaque jasper flake, chert flakes, one chert core, jasper, and dacite debitage. Groundstone tools, a chopper, scraper planes, chipped stone implements, and chipped stone tools have been recovered from this site. This site was studied in 1978 to mitigate the effects of a pipeline running through the site, and has been impacted by agricultural activities. The site was re-recorded in 1982 as part of the cultural resources investigation conducted for the Foothill Transportation Corridor.

CA-ORA-651

This site is located immediately adjacent to the "Tomato Springs Site," and may be associated with ORA-244. Artifacts observed at this site include manos, hammerstones, and scrapers of chert, jasper, and quartzite. The site was also collected in 1978 to mitigate the effects of a pipeline running through the site, and has been impacted by agricultural activities. The site was re-recorded in 1982 as part of the cultural resources investigation conducted for the Foothill Transportation Corridor.

CA-ORA-652

Site artifacts include a scraper, a hammerstone, cores, manos, a metate fragment, a sandstone tablet, and a dacite core/chopper. Darker midden appeared at the site and stone materials consisted of chert, quartzite, rhyolite, dacite, quartz, basalt, and granite. This site may also be associated with ORA-244. The site was re-recorded in 1982 as part of the cultural resources investigation conducted for the Foothill Transportation Corridor.

CA-ORA-761

Artifacts recorded at this site include one white chert core, three white chert flakes, two brown chert flakes, one rhyolite core, and altered cobblestones. This site has been described as a surface lithic scatter which has been affected by erosion and agricultural activities.

CA-ORA-762

Artifacts observed at this site include a single white chert core, a discoidal, manos, core, mano fragments, quartzite flaked scraper, quartz core, chert core, fire affected rocks, multiple chert flakes, rhyolite cores, hammerstone, rhyolite scrapers, and assorted flakes/debitage. This site was originally

recorded in 1978, and again in 1982 during an assessment of Foothill Transportation Corridor impacts. Artifacts were highly visible in four agricultural access roads that run through the site.

CA-ORA-1070

This site is a lithic scatter, and artifacts observed include four quartzite flakes, two red jasper flakes, five brown chert flakes, six rhyolite flakes, two rhyolite cores, and three amorphous cores.

CA-ORA-1297

Site artifacts included one angular hammer, three cores, twelve burnt rocks, thirteen flakes, one hammer, three manos, and one undifferentiated groundstone. Also noted during a later survey were six fire-affected rocks, one basalt flake, one quartzite core, and two chert flakes. This site was recorded in 1992 and was surface-collected prior to construction of the Foothill Transportation Corridor in 1992.

CA-ORA-1311

Artifacts observed include flakes, groundstone, cores, and other artifacts. A gray quartzite core and two pieces of fire affected rock were found at the hilltop south of the Foothill Transportation Corridor. One red quartzite core, three quartz flakes, two chert flakes, and one opaque jasper flake were found to the south.

CA-ORA-1480

This site was recorded in 1997 as part of the Eastern Transportation Corridor project and was described as being buried with three components. The first component is comprised of small mano, debitage, marine shells including abalone, a bone awl tip, and a small amount of mammal bones. The second component was a small hearth approximately 50 centimeters in diameter located 21 feet below the surface, and consisted of stained sand, small bits of charcoal, and small cobbles. The third component was also a small hearth approximately 60 centimeters in diameter and located 24 feet below the surface. This component consisted of fine layers of charcoal, burnt earth, and clay in a fine sandy matrix. The area in which this site was located is presently a nursery.

A brief description of the nine newly-recorded sites is as follows:

CA-ORA-1588

This site is situated on a relatively level-topped knoll, and on its southeast trending slope. The artifact assemblage observed consisted primarily of groundstone implements and stone-chipping debris (debitage). This site is situated entirely within an avocado grove, except for the hilltop, which is relatively bare. There is evidence of extensive agricultural and residential disturbances to an unknown depth, the result of the grading of the hilltop and terracing of its slopes. The site is contained within an 82,500 square foot area.

Artifacts observed on the hilltop include three rhyolite flakes, two cores, and several truncated cobbles. Lithic materials included cherts, rhyolite, chalcedony, basalt, metavolcanic, and some

fine-grained sedimentary rock. The gently sloping adjacent knoll contained a metate fragment, a stone bowl fragment, two bifacially ground manos, and a lithic scatter of cores and flakes.

CA-ORA-1590

This site is located on a north-facing slope with a moderately steep topography. It was discovered in part due to the presence of an agricultural road cut, where debitage and worked and truncated cobbles were visible. The immediate area in which the site is contained is a marine conglomerate of various sedimentary and metamorphic lithic materials. These have eroded out of the hillside, and are conspicuously scattered, densely in some places, in a somewhat confined area.

The artifact assemblage observed on this site includes one well-defined white chert core, two chalcedony core fragments, three chert flakes, one quartz core, and two rhyolite angular cores. Numerous truncated and broken cobbles were also present, but could not be positively identified as culturally procured materials, given the density of raw materials at the site locus.

CA-ORA-1591

This site is located on a hill with steep topography towards the north, west, and east. Moderately gentle sloping topography trends towards the south. The site encompasses an area that extends from the knoll summit southwards, into an avocado grove. Parts of the site appear to have been impacted. On the north side of the knoll there is a microwave tower surrounded by a chain-linked fence. The lower southern portion of the site has been agriculturally impacted, a result of terracing to accommodate the grove. An access road leading to the tower, and agricultural roads on the southern portion of the site, appear to have displaced some artifacts. The site has well defined midden areas and habitation debris. The artifacts observed during this survey included two bifacially ground manos, one uniface mano, one metate fragment, and flakes of chert, rhyolite, and chalcedony.

CA-ORA-1592

This site is located in relatively flat topography, approximately 1200' west southwest of the Lambert reservoir. It consists primarily of debitage and shellfish remains. Extensive agricultural grading and or plowing may have disrupted this site. Visibility of the surface is low. The cultural assemblage includes one piece *Argopecten* shellfish, one white chert core, and one rhyolite flake.

CA-ORA-1593

This prehistoric site includes a collection of lithic materials including three dark gray chert cores, one quartz core, and three pieces of red rhyolite debitage. A core of rhyolite also lies approximately four meters to the southwest of the main lithic scatter. A group of three quartz cores, which probably came originally from the same piece of material, sits approximately 75 meters (paced) southwest of the main scatter. Boundaries for this site were arbitrarily expanded to include the quartz material, and to account for the possibility that materials extend into the grove, where visibility was poor.

CA-ORA-1594

This prehistoric site is primarily a lithic scatter situated adjacent to an avocado grove in survey section 7, just north of Portola Parkway and immediately to the northwest of a canal running to the southwest from Bee Canyon. This site contains two black rhyolitic cores, one amorphous quartz core, one dark gray chert core, one dark gray chert cortical flake, and one dark gray microflake. Possibly associated with this lithic scatter is a four by four inch angular black chert core with multiple flake scars. The core appears to be spent, with multiple step fractures present. One dark gray chert cortical flake/scrapper was also found. A very dense cover of avocado leaves, grasses, and bark mulch in the avocado grove adjacent to the site may obscure site boundaries. A complete sandstone slab metate was also found in the canal below the site to the south. This may have eroded out of the canal in-situ, or it may have been hydro-transported down the canal from above. The former hypothesis could not be supported in the field, as the eroded slopes of the canal contain materials to a significant depth, which are clearly recent.

CA-ORA-1595

This site lies upon a small hill 150' southeast of N Street. The site is comprised of a lithic scatter of flakes and stone tools. Metavolcanic cobbles were observed on this site, and were noted as containing multiple flake scars and ridges. This site appears to have been a quarry. The site also contains a conglomerate of cobblestones that have not been altered. Artifacts observed include one brown chert crescentic, two basalt secondary flakes, one rhyolite core, eight truncated metavolcanic cores, and two brown chert flakes.

CA-ORA-1596

This lithic scatter site sits just above and to the east of a steep drainage, and at the edge of a nursery growth area. The materials assemblage includes five quartzite cores, one large chert core, numerous broken and truncated cobbles, and one rhyolite flake. Other siliceous flakes and cores were also found just north of the main assemblage, but were scattered amongst an outcropping of unmodified raw lithic materials in a road cut. Provenience of the latter artifacts is therefore questionable.

Historic Resources

Several potentially historic structures, including the Lambert Reservoir and residential buildings, lie within PA 6. The Lambert Reservoir is identified as TS-10 below. One residence, which was constructed prior to 1949, has also been identified as TS-14. Three houses constructed between 1916 and 1917, one of which is of the California Bungalow architectural style, sit adjacent to the planning area outside of the Northern Sphere Project Area, and are not included in the survey discussed below. These all have Lambert Road addresses but are not part of PA 6. Additional structures on N Street with Irvine Blvd. addresses do not appear on the 1949 map, as N Street did not exist in 1949. They do however show up on the 1968 USGS El Toro 7.5' map. Irvine Blvd. addresses considered are as follows: 7987, 7989, and 7993. According to the County Planning Office, these addresses did not appear on 1951 or 1955 parcel books, but did appear in 1963. They are not of any style deemed architecturally significant, and are unlikely to be of historic value. No

further research was conducted into these properties as the documentary evidence indicates that they are less than 50 years old, and are of no historical significance.

Five historic sites are identified in Planning Area 6. TS-10 is the Lambert Reservoir and TS-14 is a residential structure. In addition to these two sites, TKCI identified three other historic sites which consist of historic scatters of glass and ceramic fragments (TS-11), historic trash scatter consisting of glass and ceramic fragments, cans and metal fragments (TS-12), and debris from a former house that was removed approximately 20 years ago (TS-13). Detailed descriptions of TS-11, -12 and -13 are contained in Appendix F.

CA-ORA-244 also has a historic component in that it was thought to be one of Gaspar de Portola's campsites during the Portola expedition of 1769-1770. The link to the Portola expedition is primarily through research that has been conducted of the written accounts by members of the expedition (Meadows 1965:25). No physical evidence of the campsite, however, has been recorded in prior investigations or was apparent during the site survey conducted by TKCI. In 1969, a bronze commemorative plaque was erected near Tomato Springs by a local equestrian group, El Viaje de Portola. It reads:

SAN PANTALEÓN
or
AGUAGE DEL PADRE GÓMEZ
(THE SPRINGS OF FATHER GÓMEZ)
ON JULY 26, 1769 THE PORTOLÁ
EXPEDITION CAMPED AT THE
BASE OF THIS HILL AND USED
THE SPRINGS TO THE NORTHEAST.
COMMEMORATED BY EL VIAJE DE PORTOLÁ
APRIL 12, 1969

As shown on the City of Irvine General Plan, Cultural Resources Element Historical/Archaeological Landmarks map (Figure E-1), Planning Area 6 also includes the route of the Portola Expedition which generally follows along the alignment of Portola Parkway. The precise location of the expedition route is not known, and no vestiges of this route were apparent during the most recent site survey of this Planning Area. (Personal Communication, David Smith, TKCI.)

TS-10 (Lambert Reservoir)

The Lambert Reservoir was originally constructed in the early 1930's as an irrigation and water storage facility for the Irvine Ranch. The primary water source for the Lambert Reservoir was the Highline Canal, built in the 1930's to supply water from Irvine Lake to Irvine Ranch agricultural lands. Historically, the Lambert Reservoir irrigated several hundred acres of farmland owned by the Irvine Ranch. Some of these lands were sold to the federal government in the 1940's for what became the El Toro Marine Corps Air Station. More lands were sold in the 1960's to the University

of California Regents for agricultural research, and to the Marine base in the 1970's for expansion purposes.

TS-14 (Single Family Residence)

This residence stands unoccupied in a dilapidated state. The house has a raised foundation, an originally detached garage of similar construction, and an addition of later date with a cinder block foundation that bridges the house and garage. The shingles appear to be of an asbestos type that was popular in the 1930's. The residence is at least 52 years old.

Planning Area 8A

Prehistoric Resources

The records search indicated that nine cultural resource surveys, investigations, or assessments have been accomplished immediately adjacent to or on this planning area. Of those, one encompassed a portion of this planning area.

The records search of the 73 gross acre planning area reveals that eight surveys have been conducted immediately adjacent to this planning area. No prehistoric sites were located during any of those projects. A ninth survey, conducted in 1988 by LSA, included the approximate southern half of PA 8A and resulted in the discovery of a single fragment of a battered pestle. No other prehistoric artifacts were found in the vicinity (Padon and Jertberg 1988). This survey was part of an impact analysis for the San Diego Creek Drainage Basin improvements, including flood control along the Santa Ana (I-5) Freeway and upstream retarding basins, and associated channel improvements in Orange County (Padon and Jertberg 1988). The actual parcel surveyed that included part of PA 8A for this project was a plowed agricultural field (approximately 40 acres) located immediately north of the intersection of Jeffrey and Trabuco Road.

Isolates are single artifacts located on the terrain with no obvious connection to a larger assemblage of artifacts, or site. While such artifacts may represent a lost or intentionally placed item on the landscape, they could also represent the only observable artifact from a buried site or a site that has been mostly destroyed through natural or manmade causes. An isolated pestle fragment was located on PA 8A in 1988 by LSA (Padon and Jertberg 1988). Pestles are linked to acorn processing and typically associated with seasonal or semi-seasonal encampments. Pestles are linked to acorn processing and typically associated with seasonal or semi-seasonal encampments. However, no site was ever located in the vicinity of the isolate.

Historic Resources

A record search of the 73 gross acre planning area reveals that eight surveys have been conducted immediately adjacent to this planning area. No historic sites were located or recorded during any of those surveys.

Planning Area 9

Prehistoric Resources

A records search of the 1,277-acre planning area indicated that fifteen surveys have been conducted immediately adjacent to or on this planning area. Of those, thirteen encompassed a portion of the subject planning area. None of the prior investigations that were entirely within or included portions of Planning Area 9 resulted in the recordation of any prehistoric sites on Planning Area 9. Similar to existing conditions on Planning Area 5B, extensive commercial agricultural activities, including associated structures and row cops, almost completely obscure the ground surface thereby preventing a comprehensive site survey and walkover of this Planning Area to determine the presence of prehistoric sites.

A site was recorded due south of PA 9, outside of the Project Area, overlooking Interstate 5 in 1972 by the Pacific Coast Archaeological Society (PCAS). The site was given the trinomial CA-ORA-341 and identified as a Millingstone site containing fire affected rocks, manos, hammerstones, choppers, and a dart point. A surface collection was accomplished by the PCAS in 1972 and the site was re-recorded in 1973 also by the PCAS. In 1980, Archaeological Planning Collaborative revisited the area but could not relocate the site (Douglas 1980). As this site is outside of the Project Area, however, even if it or portions of it are still present, the project will have no impact on it.

In 1997, the Foster Wheeler Corporation discovered a buried site near the intersection of Irvine Boulevard and Sand Canyon Avenue while monitoring the construction of the Eastern (SR-133) Transportation Corridor. The site was buried at a depth of 21 feet below the natural ground surface and consisted of two cobble hearth features. At depths of 10 to 12 feet near the same area an artifact scatter was found from which two radiocarbon dates were derived. The dates were about 6,900 years before present and it was presumed the hearth features would have dated to an even earlier age (Davy 1997). The discovery of this unrecorded site during the SR-133 construction could indicate the potential for other unrecorded buried sites to exist either in the vicinity of or within the planning area.

Historic Resources

A records search of Planning Area 9 completed at SCCIC did not find any historic resources that have been recorded within this planning area. As a result of site survey work conducted by TKCI on April 4, 2001, however, an examination was made of the Irvine Valencia Growers Packing House that is located in Planning Area 9. The packing house is located along the east side of Jeffrey Road north of Trabuco Road and south of Irvine Blvd at 13256 Jeffrey Road.

Irvine Valencia Growers Packing House

The Irvine Valencia Growers was founded as a response to the burgeoning citrus industry that developed in southern California in the late nineteenth century. The first commercial Valencia grove was planted in 1875 in Fullerton. By the 1880's oranges became a two million dollar per year crop in Orange County. With the completion of the transcontinental railroad system in the 1880's, citrus growers who had been primarily supplying a local demand had the potential to become national suppliers (McClelland and Last 1995:2).

In 1931, ten orange and two lemon packing houses were operating in Orange County. Five of the operations boasted new pre-cooling and cold storage facilities (Pleasants 1931:235). At their peak in the 1940s and 1950s, some fifty packing houses were operating in Orange County. These were usually located along railroad lines or spurs to permit more efficient shipping. By the mid-1960s, the last cooperative in Orange County had closed and only three packing houses were still in operation (Walker 1989:91). By 1989, the Valencia orange industry was virtually gone (Walker 1989:97).

Site Visit And Inspection

A site visit was arranged with Mr. Dominic Etcheberria, General Manager for the Irvine Valencia Growers for the morning of April 4, 2001. According to Mr. Etcheberria (personal communication 2001), the packinghouse was built in 1927. The building is roughly rectangular in shape and is oriented Northwest/Southeast, with the front of the structure facing northwest towards Jeffrey Road. It was constructed of poured concrete and currently has a composition tile roof.

The packinghouse complex consists of two main elements: the main packing plant, closest to Jeffrey Road, and the refrigeration/cooling room, behind the packinghouse. The structures share a common foundation, also manufactured of poured concrete. The packing plant structure is three levels in height including a full basement. Driveway access to the basement floor permitted trucks to unload their oranges within the building. The oranges were then transported by conveyor belts to the ground floor where they were sorted and packed. Sliding wooden doors on the east side of the structure gave access to railroad cars where the fruit crates were loaded directly from the packing room. The upper floor, consisting of a wood frame penthouse, may have served as an office facility. It was assessed from the outside only, and appears to extend over a small portion of the packinghouse structure.

The packing house is divided into four rooms: the main packing plant which encompasses at least ninety-five percent of the floor space, a small room, now used for a kitchen, and two bathrooms. The three smaller rooms are located at the north end of the building immediately right of the front door when entering. The original tongue and groove hardwood floor, installed over twelve inch wide pine board subflooring, remains in good condition. It is covered by plywood sheets as reinforcement for the forklifts that are used for moving pallets of cardboard boxes inside the main structure. All major interior construction appears to date to the original construction period. Functioning sliding

wooden doors are still attached at the entrance and exit to the basement unloading docks and on the main floor of the building.

A railroad spur once lay along the eastern side of the packinghouse. Box cars were loaded directly from the packing plant through doors on the east side. The railroad line, which no longer exists, was a spur line that terminated at the packinghouse and was called "Kathryn" by the AT & SF railroad. The spur extended northwest to the next stop at Frances, before looping south to connect with the main line. The spur line did not extend beyond the Kathryn stop.

4.5.1.2 Paleontological Resources

The information provided below is summarized from the paleontological resources reports prepared by Stewart Paleontological Consulting, attached in Appendix G.

Planning Area 3/Implementation District "P"

Planning Area 3 has been offered for permanent dedication as open space. Implementation District "P" will be dedicated as permanent open space with implementation of the Northern Sphere Area project. As a result, these areas were not surveyed for paleontological resources since they will not be subject to grading.

Planning Areas 5B, 8A and 9

Planning Areas 5B, 8A and 9 were mapped geologically by Jefferson (1991a, b). This study did not reveal any records of paleontological resources having been found from the Pleistocene Older Alluvium within or immediately adjacent to Planning Areas 5B, 8A, and 9. Complete records of three institutions indicate no additional records of paleontological discoveries within or immediately adjacent to these planning areas.

Planning Area 6

The various fossil-producing sedimentary rock units that are encountered within Planning Area 6 are typical of those that comprise much of the Santa Ana Mountains and their outlying foothills in the general vicinity of PA 6 (Morton et al., 1976; Raschke, 1984a, 1984b; Raschke et al., 1988; Howard and Barnes, 1987; Lander and Whistler, 1999). Nine distinct sedimentary rock units are present throughout PA 6, including Williams Formation, Topanga Formation, Monterey Formation, Puente Formation, Oso Sand Member of the Capistrano Formation, Niguel Formation, Quaternary Terrace Deposits, a possible outcrop of the Eocene to early Middle Miocene Sespe Formation, and the Late Pleistocene stream and pond deposits.

Field reconnaissance reveal that the Williams Formation (Late Cretaceous in age), Monterey Formation (Middle to Late Miocene), and Puente Formation (Late Miocene) are fossiliferous. In addition, the Topanga Formation (Middle Miocene) is very fossil-rich. The Sespe Formation has

produced well-preserved fossils of terrestrial mammals and a few rare reptiles that occur randomly as either isolated bones or associated bones. The Oso Sand Member of the Capistrano Formation (Latest Miocene) has consistently produced abundant vertebrate fossils wherever it has been excavated in the vicinity of PA 6. The Niguel Formation (Pliocene) is not extremely rich in fossils, although fossil mollusks and isolated vertebrate remains have been found. The Younger Quaternary channel fills (Late Pleistocene) produce Late Pleistocene land vertebrates and plants. The variety of different rock units and the relatively high numbers of faults that are present in PA 6 make this planning area a very complex area from a geologic standpoint.

The general location of these formations within PA 6 are described as follows. The northwest part of PA 6, including the hills and slopes immediately south of the Eastern Transportation Corridor (SR-133), is underlain by the Williams Formation according to Morton et al. (1976), and their mapped distribution is accurate based on our field investigations. In PA 6, the Williams Formation is comprised of laminated to massive, fine- to coarse-grained sandstone, with localized concretions and other hard-bedded sections, generally light to dark brown in color.

Within PA 6, there is a relatively small outcrop of alternating red to purplish-red sandstone beds and gray to greenish siltstone beds within the Sespe Formation that has been exposed along a road cut that descends along the east side of the hill with antennas on top (locality LGB 3836).

The eastern central part of PA 6, occupied largely by the north-south aligned hill that is southeast of the elongate valley which has a flood-control basin in it, is underlain by the Monterey Formation (Morton et al., 1976). Field reconnaissance found that the outcrop of the northeastern margin of the Monterey Formation does not extend so far to the northeast as mapped by Morton et al. (1976). This area is instead underlain by the Oso Sand Member of the Capistrano Formation (see below). The result is that the area of PA 6 occupied by the Monterey Shale is less than was shown on the maps, but the area occupied by the Oso Sand Member of the Capistrano Formation is greater.

The areas mapped as Puente Formation within PA 6 are near the extreme northern edge of the property (Morton et al., 1976), and these are referred to the Soquel Member. This is the second oldest of the four recognized members of the Puente Formation that are known in the Santa Ana Mountains area, and thus it is Late Miocene in age, approximately 11 or 12 million years old.

Within PA 6, the Oso Sand Member of the Capistrano Formation, representing a nearshore marine environment, has been mapped in the central and northeastern areas (Morton et al., 1976), between the outcrops of the Puente and Monterey formations. It is predominantly a coarse sand with a few scattered pebbles and pebble beds. All of the fossils found in the field survey and all of the previously-recorded fossil sites in PA 6 are in the Oso Sand Member of the Capistrano Formation.

In PA 6, the Niguel Formation is mapped in the southern-central areas (Morton et al., 1976). The borrow pits (LGB locality 3847) north of Irvine Boulevard were dug into this formation. There is also a patch of Niguel Formation on top of the highest hill in the nursery area. In PA 6, the Niguel

Formation is characteristically very cobbly, being comprised predominantly of rounded clasts of very hard metamorphic rocks, the clasts ranging in color from white to very dark.

Quaternary Terrace deposits cap the hills and slopes in the central and southern areas of the project (Morton et al., 1976). Younger Quaternary (Pleistocene) channel fills may be encountered in PA 6 below the topsoil.

4.5.2 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on cultural resources if it results in any of the following:

- Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- Disturb any human remains, including those interred outside of formal cemeteries.

When a project will impact an archaeological site, the lead agency shall first determine if the site is a historical resource as defined in CEQA Guidelines Section 15064.5(a). If the site meets the definition of a historical resource, it shall be treated in accordance with the provisions of CEQA Section 21084.1 and CEQA Guidelines Section 15064.5. If an archaeological site does not meet the criteria for a historical resource, but does meet the definition of an unique archaeological resource as defined in CEQA Section 21083.2, the site shall be treated in accordance with the provisions of Section 21083.2. If an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. Furthermore, a known cultural resource that has not been evaluated for importance must be treated as important until an evaluation of the resource is completed.

Archaeological Project Impacts

Planning Area 5B

A records search has been conducted for this Planning Area which indicates that no historic or prehistoric sites have been recorded on Planning Area 5B as a result of prior investigations.

However, the existence of buildings, streets, retail and wholesale nursery yards, and row crops, completely obscure the ground in every portion of Planning Area 5B, and only portions of the planning area have been studied under prior investigations. Therefore, the planning area may contain unrecorded prehistoric sites which may be impacted by site disturbance activities. If any sites are determined to be unique archaeological sites or historical resources, the project would have a significant effect on those resources. Mitigation measures have been identified that would require a qualified archaeologist to conduct a site survey of the entire planning area when all ground surfaces are visible after current uses are removed. If any sites are discovered during the site survey, the archaeologist shall conduct additional surveys and/or test level investigations to determine if they are unique archaeological sites or historical resources. Any sites determined to be unique archaeological sites or historical resources which may be impacted by development, shall be mitigated by the archaeologist prior to development. Additionally, a mitigation measure has been identified to require a qualified archaeologist to monitor all site disturbance activities. Implementation of these measures will reduce the project's potential impact on cultural resources to less than significant.

Planning Area 6

This investigation resulted in the identification of twelve previously recorded prehistoric sites, nine previously unrecorded prehistoric sites, and five previously unrecorded historic sites. Although based upon prior investigations, it appears that the integrity of some sites have been impacted by development activities, such as pipeline construction, agricultural activities, and transportation corridor construction, none of these sites has been evaluated in its entirety pursuant to Section 15064.5 of the State CEQA Guidelines to determine if they are "historical resources" or unique archaeological resources. Therefore, all sites must be evaluated to determine if they are historical resources, or unique archaeological resources prior to development. Development activities that would result in a substantial adverse change, as defined by Section 15064.5(b) of the CEQA Guidelines, to these resources would be considered significant. Mitigation measures that would require testing and evaluation of each of the sites recorded on PA 6 before site development occurs have been identified to mitigate this significant impact to a level of less than significant.

Although previously-unrecorded sites were identified during the fieldwork conducted by TKCI, the investigators noted the presence of other physical constraints such as natural or manmade obstacles that either hindered or prevented unobscured views of portions of PA 6 resulting in areas that could not be adequately surveyed. The density of archaeological sites currently recorded on PA 6 suggests a strong likelihood that additional sites may exist in the unsurveyed sections. As a portion of PA 6, however, will be dedicated for open space purposes, some of these areas may be contained in future open space and would not be subject to site disturbance activities. Nevertheless, those portions of the planning area that are proposed for development may contain additional prehistoric sites which have not been recorded or identified and which may be impacted by site disturbance activities. If any of these sites are determined to be unique archaeological sites or historical resources, the project would have a significant effect on those resources. Mitigation measures have been identified that would require a qualified archaeologist to conduct a site survey of those sections of the planning

area that were not accessible during the prior site survey and which are proposed for development. If any sites are discovered, the measure requires the archaeologist to conduct additional surveys to determine if they are unique archaeological site or historical resources, and to conduct appropriate site mitigation work prior to development. Additionally, a mitigation measure has been identified to require a qualified archaeologist to monitor all site disturbance activities. Implementation of these measures will reduce the project's potential impact on cultural resources to less than significant.

Planning Area 8A

A records search has been conducted for this Planning Area which indicates that no historic or prehistoric sites have been recorded as a result of prior investigations either on or adjacent to PA 8A. An isolated fragment of a pestle was found on a survey within the southern half of PA 8A. While no sites are known to be located on the subject property or immediately adjacent to it, research indicates that a number of sites have been discovered nearby suggesting that prehistoric sites may yet exist on the subject property. Inadvertent disturbance of unrecorded sites during site grading activities would be a potentially significant impact which can be minimized to a level of less than significant through implementation of the identified mitigation measure that requires a qualified archaeologist to monitor all site disturbance activities.

Planning Area 9

A records search was conducted for this Planning Area which indicated that no historic or prehistoric sites have been recorded on Planning Area 9 as a result of prior investigation. Similar to Planning Area 5B, extensive commercial agricultural activities, consisting of various buildings, structures, roads, and crop rows, almost completely obscure the ground surface. These obstacles effectively hindered an adequate visual assessment of the ground on the property during the TKCI site survey. Therefore, the planning area may contain unrecorded prehistoric sites which may be impacted by site disturbance activities. If any sites are determined to be unique archaeological sites or historical resources, the project would have a significant effect on those resources. Mitigation measures have been identified that would require a qualified archaeologist to conduct a site survey of the entire planning area when all ground surfaces are visible after current uses are removed. If any sites are discovered during the site survey, the archaeologist shall conduct additional surveys and/or test level investigations to determine if they are unique archaeological sites or historical resources. Any sites determined to be unique archaeological sites or historical resources which may be impacted by development shall be mitigated by the archaeologist prior to development. Additionally, a mitigation measure has been identified to require a qualified archaeologist to monitor all site disturbance activities. Implementation of these measures will reduce the project's potential impact on cultural resources to less than significant.

The Valencia Growers Packing House was identified on this property and recorded with the Office of Historic Preservation. The Valencia Growers Packing House is a potentially significant cultural resource, and the proposed project may have a significant impact on this resource. Mitigation

measures have been identified which require that the property be assessed in a Phase II evaluation prior to commencement of activities that may result in an adverse effect on this cultural resource.

Potential Impacts to Human Remains

None of the prior surveys, investigations and studies conducted in the Project Area have resulted in the discovery of prehistoric (or historic) human remains. Although none have been discovered to date, site grading and disturbance activities may result in the discovery of human remains. This would be a potentially significant effect. In order to ensure that the project will not have a significant effect as a result of the inadvertent disturbance of human remains, a mitigation measure has been identified that requires compliance with the requirements of Public Resources Code Section 5097.98 and appropriate notification of the County Coroner and Native American Heritage Commission. Compliance with this measure will reduce this potential impact to less than significant.

Paleontological Project Impacts

Planning Area 5B, 8A, 9

Prior studies have not revealed any recorded discoveries of paleontological resources within Pleistocene Older Alluvium within or immediately adjacent to Planning Areas 5B, 8A, and 9. Therefore, the likelihood of fossils in their original context being recovered from these planning areas is low because Holocene alluvium in the area is relatively thick, and most grading activity does not penetrate to the potentially fossiliferous sedimentary deposits that occur in the region. If the Older Alluvium is encountered during grading activity on the property, Pleistocene fossils could be recovered and these could potentially provide valuable information about regional prehistory and paleoecology. Some of the clasts in the alluvium encountered during grading could be fossiliferous, but their paleontological significance would probably be minimal because they have been transported far from their sites of origin and the formations that produced them might be uncertain. Therefore, the implementation of the project in Planning Areas 5B, 8A and 9 is considered to have a less than significant impact on paleontological resources.

Planning Area 6

The likelihood of finding fossils and/or artifacts within each of the known sedimentary rock units within PA 6 is discussed below, in geochronologic sequence from the oldest to the youngest:

Williams Formation

If the Williams Formation is excavated in PA 6, there is the possibility that occasional mollusk fossils and bones of dinosaurs or turtles may be encountered. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Sespe Formation

The newly discovered small outcropping in this planning area is suspected to be of the Sespe Formation. No fossils were observed in this outcropping but, based on past discoveries in the Sespe Formation, fossils may potentially be present in this formation. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Topanga Formation

Based on past discoveries, the Topanga Formation should be considered to be a very rich fossil-producing rock unit. Scattered specimens and skeletons should be expected, and laterally-extensive bone beds are typical. These types of deposits usually require complex collecting efforts when found. If the Topanga Formation is disturbed, it can be expected to be moderately to richly fossiliferous. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Monterey Formation

The Monterey Formation in PA 6 can be expected to produce moderate to abundant fish skeletons and occasional turtle, bird, and mammal skeletons and isolated bones. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Puente Formation

Field search yielded no fossils in this deposit in PA 6, and there are no previously recorded fossil sites. Where the Puente Formation contains shales, there is the possibility of encountering fish skeletons, which are very common in some parts of this formation in other areas. When the formation is graded, possible such discovery may be encountered. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Capistrano Formation, Oso Sand Member

These localities around Lambert Reservoir, the two from Tomato Springs, and the ones to the northeast represent all of the documented vertebrate fossils from PA 6. The Oso Sand in PA 6 should therefore be expected to yield a variety of fossil vertebrates: sharks, fishes, and mammals, and these can include large bones and associated and articulated skeletons. Among the known specimens, there is a preponderance of sea cow and baleen whale fossils. The Oso Sand within PA 6 will likely produce abundant vertebrate fossils where ever it is excavated. One should expect to encounter isolated bones and teeth of fishes, reptiles, birds, land mammals and marine mammals,

occurring as densely as possibly several hundred items per acre or as occasional articulated skeletons or parts thereof. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Niguel Formation

Because it is comprised of mostly massive conglomerates (semi-cemented beds of cobbles), the Niguel Formation within PA 6 is probably likely to have relatively few fossils. It should be inspected wherever it is disturbed, however, because it is a marine deposit, and because it has yielded fossils in other parts of the Capistrano Embayment. Any fine-grained beds that may be encountered within the Niguel Formation should be screened for small fossils such as fish bones, shark teeth, and land mammal specimens. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Quaternary Terrace Deposits

Because this deposit is Pleistocene in age and was laid down in streams, it can possibly contain "Ice Age" mega-fauna (large animals). The likelihood of discovering significant numbers of small fossils in such deposits is low, but any excavations should be inspected for the possibility of discovering larger mammal bones. The likelihood of finding articulated skeletons in this deposit is relatively remote. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Younger Quaternary (Pleistocene) Channel Fills

Within PA 6, any excavations in the bottoms of canyons and valleys and beneath the present topsoil (below approximately 5 or 6 feet) might yield "Ice Age" fossils. Because these sediments are fine-grained, the possibility exists of encountering both isolated bones and articulated or associated bones of both small and larger animals, as well as plants and invertebrates. The indirect or direct destruction of paleontological resources would be a significant impact. Implementation of the mitigation measures below would reduce the impact to a level of less than significant.

Cumulative Impacts

Future construction projects in the area that increase local population will lead to accelerated degradation of the cultural and paleontological resources. However, each development proposal received by the City undergoes environmental review. If there is a potential for significant impacts on cultural or paleontological resources, an investigation will be required to determine the nature and extent of the resources and identify appropriate mitigation measures. Neither the proposed project, nor other cumulative development in accordance with the General Plan are expected to result in significant impacts to cultural or paleontological resources provided site-specific surveys are completed prior to grading. Historic resources located on the project site include the Valencia Growers Packing House, the Portola campsite, Lambert Reservoir, and Tomato Springs. The loss of these resources would contribute to cumulative impacts on the number of historical resources in the region. Implementation of the appropriate mitigation measures prior to site disturbance activities would reduce such cumulative impacts to a level of less than significant.

4.5.3 MITIGATION MEASURES

Existing Regulations and Standard Conditions

No existing regulations or standard conditions of approval related to cultural resources that apply to the development of the Northern Sphere Area.

Project Design Features/Special Development Requirements

- 5.1 Although not a significant cultural resource, if development will adversely impact the small stone monument and plaque commemorating the Portola camp at Tomato Springs, the landowner or subsequent project applicant shall relocate the plaque to an open space area or park in the vicinity of the site.

Additional Mitigation Measures

- 5.2 Prior to issuance of the first preliminary or precise grading permit, and for any subsequent permit involving excavation to a greater depth, the landowner or subsequent project applicant shall provide letters from an archaeologist and/or paleontologist stating that these individuals have been retained by the landowner or subsequent project applicant, and that the consultant(s) will be present during all grading and other significant ground disturbing activities. These consultants shall be selected from the roll of qualified archaeologist and paleontologists maintained by the County of Orange Environmental Management Agency. Should any cultural/paleontological resources be discovered, no further grading shall occur in the area of the discovery until the Director of Community Development is satisfied that adequate provisions are in place to protect these resources. Any cultural/paleontological resources identified from either the reexamination of the property prior to general development, or during monitoring of grading must be evaluated pursuant to Section

15064.5 of the State CEQA Guidelines. Evaluations may include additional archival review and limited excavations the results of which are to be compiled in a report indicating the cultural significance of the find and any mitigation measures that may be necessary to satisfy statutory requirements. (Replaces Standard Condition 2.1)

- 5.3 Prior to issuance of the first preliminary or precise grading permit for development within Planning Areas 5B, 6 and 9, the applicant shall provide evidence that an archaeologist and/or paleontologist have been retained by the applicant, and has conducted a site survey of the planning area at such time as all ground surfaces are visible after current uses are removed. If any sites are discovered, the archaeologist shall conduct surveys and/or test level investigations to determine if they are unique archaeological site or historical resources. If they are unique archaeological sites or historical resources, the archaeologist shall conduct appropriate site mitigation work prior to development.

- 5.4 Prior to the issuance of any grading permit, the following note shall be placed on the cover sheet, and discussed at the pre-grade meeting:

Fossils found by the owners of the property, their agents, contractors, or subcontractors during the development of the property, shall be reported immediately to the qualified paleontologic monitor. If significant fossils (those having potential to increase scientific knowledge; including all identifiable vertebrate remains) are encountered on the property during development the following mitigation procedures shall be implemented:

- a. The paleontologist retained for the project shall immediately evaluate the fossils which have been discovered to determine if they are significant and, if so, to develop a plan to collect and study them for the purpose of mitigation.
- b. The paleontologic monitor must be empowered to temporarily halt or redirect excavation equipment if fossils are found to allow evaluation and removal of them if necessary. The monitor should be equipped to speedily collect specimens if they are encountered.
- c. The monitor, with assistance if necessary, shall collect individual fossils and/or samples of fossil bearing sediments. If specimens of small animal species are encountered, the most time and cost efficient method of recovery is to remove a selected volume of fossil bearing earth from the grading area and screen wash it off-site.
- d. Fossils recovered during earthmoving or as a result of screen-washing of sediment samples shall be cleaned and prepared sufficiently to allow identification. This allows the fossils to be described in a report of findings and reduces the volume of matrix around specimens prior to storage, thus reducing storage costs.

-
- e. A report of findings shall be prepared and submitted to the public agency responsible for overseeing developments and mitigation of environmental impacts upon completion of mitigation. This report would minimally include a statement of the type of paleontologic resources found, the methods and procedures used to recover them, an inventory of the specimens recovered, and a statement of their scientific significance.
 - f. The paleontological or archaeological specimens recovered as a result of mitigation shall be donated to a qualified scientific institution approved by the Director of Community Services where they would be afforded long term preservation to allow future scientific study.
- 5.5 Prior to issuance of the first preliminary or precise grading permit for development in Planning Area 6, each prehistoric site identified in Table 4-26 and located within the project grading footprint must be tested and evaluated, following clearing and scraping activities, to determine if it is a "historical resource" in accordance with Section 15064.5 of the CEQA Guidelines, or an unique archaeological resource. Testing and evaluation may consist of surface collection and mapping, limited subsurface excavations, and the appropriate analyses and research necessary to characterize the artifacts and deposit from which they originated. The evaluation report should provide recommendations for further excavation and analyses where warranted and specify recommendations for the final disposition of the site, including, but not limited to preservation, partial or complete data recovery, and grading monitoring at and nearby the site during all phases of grading. These recommendations shall have been reviewed and approved by the Director of Community Development prior to issuance of the grading permit and prior to any surface disturbance on the project site.
- 5.6 Prior to issuance of the first preliminary or precise grading permit for development in Planning Area 6, each historic site listed in Table 4-27 must be evaluated to determine if the site is a "historical resource" as defined under Section 15064.5 of the CEQA Guidelines. Evaluations may include but are not limited to archival research, mapping and surface collection as warranted, photo-documentation, and subsurface excavation. The report should provide recommendations for further excavation and analyses where warranted and specify recommendations for the final disposition of the site, including, but not limited to preservation, partial or complete data recovery, and grading monitoring at and nearby the site during all phases of grading. These recommendations shall have been reviewed and approved by the Director of Community Development prior to issuance of the grading permit and prior to any surface disturbance on the project site.
- 5.7 In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps shall be taken:
- a. There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the Orange County

Coroner is contacted to determine if the remains are prehistoric and that no investigation of the cause of death is required. If the coroner determines the remains to be Native American, then the coroner shall contact the Native American Heritage Commission within 24 hours, and the Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or

b. Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity either in accordance with the recommendations of the most likely descendant or on the property in a location not subject to further subsurface disturbance:

- The Native American Heritage Commission is unable to identify a most likely descendant or the most likely descendant failed to make a recommendation within 24 hours after being notified by the commission.
- The descendant identified fails to make a recommendation; or
- The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

5.8 Prior to the issuance of grading permits for development in Planning Area 9, a Phase II evaluation of the Valencia Growers Packing House must be accomplished to determine if the site is a "historical resource" as defined by Section 15064.5 of the CEQA Guidelines. If the site is determined to be a "historical resource" as defined by Section 15064.5, the evaluation shall provide recommendations for further evaluation and analyses where warranted and specify recommendations for the final disposition of the resource, including, but not limited to preservation, relocation, or partial or complete mitigation. These recommendations shall have been reviewed and approved by the Director of Community Development prior to issuance of the grading permit that may cause a substantial adverse change in the significant of the resource.

5.9 Prior to the opening of the Implementation Districts "P," "Q," and "R" open space area for public use, a cultural resources reconnaissance shall be prepared for the City, by a qualified archaeologist, for the area within Implementation Districts "P," "Q," and "R." The archaeologist will identify and record all visible cultural resources, and will develop appropriate management measures for them.

-
- 5.10 If cultural remains are discovered within Caltrans Right of Way during excavation and/or construction activities, all earth moving activity within and around the site area must be diverted until a qualified Caltrans Archaeologist can assess the find. If human remains are discovered, State Health and Safety Code Section 7050.5 states that disturbances and activities shall cease. The County Coroner must be notified of the find immediately and the project proponent must comply with the requirements of Public Resources Code Section 5097.98.

4.5.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Adherence to the standard conditions and mitigation measures listed above will reduce any potential impacts on cultural resources to a level of insignificance.

4.6 Geology/Soils

The geotechnical study for Planning Areas 8A and 9 was prepared by Leighton and Associates in August 2001. The geotechnical study for Planning Areas 5B and 6 was conducted by NMG Geotechnical, Inc. in August 2001. These studies are summarized in the following section and included in their entirety in Appendix H of this document.

4.6.1 ENVIRONMENTAL SETTING

The Northern Sphere Area lies along the southeastern margin of the middle-to-late Miocene-age Los Angeles Basin, a large structural depression, and extends into the Peninsular Ranges geomorphic province of California. The Peninsular Range province is bounded by the Whittier-Elsinore fault to the north (located approximately 10 miles north of the site), and by the Newport-Inglewood fault zone to the south (located approximately 13 miles south of the site). Planning Areas 5B, 8 and 9 are located on the northeast Tustin Plain, the easternmost subbasin of the Los Angeles Basin. Planning Area 6 extends from the Tustin Plain into the southwestern foothills of the Santa Ana Mountains.

Geologic Structure

Planning Area 5B

As shown on Exhibit 4-28, Planning Area 5B is underlain by Quaternary-age alluvial deposits. Alluvium at the site is composed of massive to crudely layered sediments that are generally flat lying, with a gentle dip toward the southwest. The alluvial deposits at the site vary from 5 to 100 feet in thickness.

Planning Area 6

As shown on Exhibit 4-29, the geologic structure within Planning Area 6 consists of complex faulted and folded blocks. In the northwestern portion of the site, the general overall structure includes an east-west trending syncline within the Williams Formation. Morton and Miller (1976 and 1981) and Schoellhamer, et.al. (1954 and 1981) mapped this section of the Williams Formation as an uplifted block bounded on the north (mostly offsite) by a curved fault system. The major eastern north-south trending faults of this system are located west of the FTC toll plaza (east of Bee Canyon) and places the Williams formation in fault contact with the younger Puente and Capistrano Formations.

In the northeastern portion of Planning Area 6, north of Portola Parkway, there is an east-west trending syncline in the Oso Member of the Capistrano Formation. In the southern portion of the site, south of Portola Parkway, the structure is dominated by the through-going fault, sometimes referred to as the Agua Chinon Fault, that separates the Oso Member on the north from the Monterey Formation on the south. This fault is also a curved fault system that strikes north-northwest with dips of 45 to 50 degrees east-northeast near Agua Chinon Canyon, and extends from the retarding basin to the western edge of Round Canyon, where it strikes more southwesterly. The alluvium in

Exhibit 4-28 EXISTING GEOLOGIC FEATURES MAP (PA 5B)

Exhibit 4-29 EXISTING GEOLOGIC FEATURES MAP (PA 6)

the canyons was composed of massive to crudely layered sediments that were generally flat lying, with a gentle dip toward the southwest (down-gradient).

Planning Area 8A and 9

Planning Areas 8A and 9 are located within an area called the Tustin Plain. Generally speaking, the Tustin Plain is comprised of approximately 1,400 feet of unconsolidated to semi-consolidated Holocene to Quaternary-age alluvial sediments, as shown on Exhibit 4-30. Underlying the Holocene to Quaternary deposits, at depth, are Tertiary bedrock units comprised of sandstone, siltstone, shale, and conglomerate that are several thousands of feet thick.

Earth Units

Planning Area 5B

With the exception of minor amounts of artificial fill, the entire site is underlain by alluvial sediments. The alluvium consists of a heterogeneous mixture of clays, silts and sands. The upper few feet of material at the site tend to be primarily silty sand, and fine to medium sand. At depth, there are layers of clayey sand, silt, and clayey silt. The soils are generally moist, and medium stiff to stiff/medium dense, except for the upper 3 feet, which are typically damp to moist, and disturbed from farming activities. The alluvium is slightly porous, with generally less porosity at depth. Layer thickness ranges from less than an inch to 8 feet. The thickness of the alluvium generally increases to the west.

At the intersection of Jeffery Road and Portola Parkway, there is an outcrop of the Vaqueros Formation on the north corner (Tan and others, 1984). A hollow-stem-auger boring drilled at the southwest street corner encountered bedrock at 5 feet below ground surface. Near the northeast corner of the site, the Vaqueros formation bedrock was encountered at 26 feet below existing ground surface. In both borings, the bedrock was medium dense silty fine sandstone to fine sandy siltstone.

Planning Area 6

The subject site is underlain by several bedrock formations ranging in age from the Cretaceous Period to the Pliocene. These formations include, from oldest to youngest, the Williams (Pleasant Sandstone Member), Topanga Formation, Monterey, Puente (Soquel Member), Capistrano (Oso Member), and Niguel. The Williams, Capistrano, and Niguel formations are generally coarser grained sandstone units, while the Monterey and Puente formations include abundant siltstone interbedded with sandstone. The Williams, Puente, and Monterey formations are typically more dense and cemented, while the younger Capistrano and Niguel formations are less dense, more friable, and subject to erosion. Overlying the bedrock are surficial units including topsoil, alluvium, slope wash, stream terrace deposits, pond deposits, landslide material and artificial fill. These surficial units vary in composition, but are generally more weathered and subject to deeper removals.

Exhibit 4-30 EXISTING GEOLOGIC FEATURES MAP (PA 8A and 9)

Planning Area 8A and 9

Alluvial soils within the Tustin Plain consist predominantly of interbedded discontinuous lenses of clays, silts, sands and gravel. For the site, the upper 20 to 30 feet is comprised of fine-grained soils that are unconsolidated with a wide range of consistency. The soils below approximately 20 to 30 feet are comprised of coarse-grained materials that are locally loose or friable, but generally dense.

Faulting and Seismicity

The two principal seismic considerations for most properties in Southern California are surface rupture along fault traces, and damage to structures due to seismically induced ground shaking. The fault classification system adopted by the California Division of Mines and Geology (CDMG), relative to the State legislation, delineates Earthquake Fault Zones along active or potentially active faults (Alquist-Priolo Act), and is used for setback of structures from active fault zones. An active fault is one that is known to have moved in Holocene time (the last 11,000 years). A fault that is known to have moved during the last 1.6 million years (Pleistocene time), but has not been proven by direct evidence to have either moved, or not moved within the last 11,000 years, is considered to be potentially active. Any fault proven to not have movement within the last 11,000 years is considered inactive. The Northern Sphere Area lies within Seismic Zone 4 of the UBC. As shown on Exhibit 4-31, active and major faults noted on regional geologic maps do not cross the subject site; therefore, fault rupture hazard is low. Regional active faults are typical of Southern California, therefore, it is reasonable, to expect a moderately strong ground motion seismic event to occur during the lifetime of the proposed development.

Planning Area 5B

There is one published geologic map for Orange County (Morton, 1981) that has mapped a northwest-trending unnamed fault located on Planning Area 5B, buried beneath the alluvium. The actual location and existence of this fault is highly questionable. In a more recent report for the El Toro Quadrangle, Tan and others (1984) have deleted this fault from their map. In the most recent background review, aerial photograph review and field mapping conducted by NMG Geotechnical, Inc., no evidence of faulting was found at the subject site.

There are no known major or seismically active faults mapped at the site. The closest major active faults are the Whittier-Elsinore Fault to the north and Newport-Inglewood Fault (offshore) to the south. Based on the computer program EQFAULT Version 3.0, and utilizing the site location with coordinates of 33.7202 latitude and 117.7436 longitude, the closest active fault is the Elsinore Fault (Chino Central Avenue Branch). This fault is located approximately 8 miles north of the northern Planning Area boundary. The Peralta Hills thrust fault and the El Modeno fault are located approximately 8.2 northwest and 6.4 miles north of this Planning Area, respectively. These latter faults are also thought to be seismically active to potentially active by some geologists; however, they have not been zoned as Fault Rupture Hazard Zones by the State (CDMG, 1999). The site is not located in a seismic hazard zone by the recent mapping of the State (CDMG, 2001).

Exhibit 4-31 Regional Fault Map

Planning Area 6

There are numerous major and minor faults mapped within Planning Area 6, though they are seismically inactive. The majority of the mapped faults onsite trend in a west-northwest direction, though there are a few north-northeast trending faults mapped in the northeastern portion of the site, near the intersection of Portola Parkway and the FTC. The fault locations are based on field mapping (both from prior published mapping and/or mapping by NMG), aerial photo interpretation and/or subsurface investigation. Many of the bucket-auger borings drilled during this investigation encountered faulting of some magnitude. No evidence of active faulting was observed during this investigation, or by prior work at the site. The site is not located within a Fault-Rupture Hazard Zone mapped by the State of California, Alquist Priolo Act (Hart, 1999). There are seismic hazard zones based on recent mapping of the State (CDMG, 2001) for potential liquefaction and potential earthquake induced landslide areas.

The closest major active faults are the Whittier-Elsinore Fault to the north and Newport-Inglewood Fault (offshore) to the south. Based on the computer program EQFAULT Version 3.0, and utilizing the site location with coordinates of 33.6998 latitude and 117.6903 longitude (a location east of Round Canyon), the closest active fault is the Elsinore Fault (Chino Central Avenue branch). This fault is located approximately 7 miles north of the northern Planning Area boundary. Based on regional mapping by the State, the mapped surface trace of the Elsinore Fault is located approximately 11 miles north of the Planning Area. The Peralta Hills thrust fault and the El Modeno fault are located approximately 10 northwest and 8 miles north of the site, respectively. These latter faults are also thought to be seismically active to potentially active by some geologists; however, they have not been zoned as active by the State (CDMG, 1999).

Planning Area 8A and 9

No active faults are known or mapped as crossing the subject site. The site is not located within an Alquist-Priolo Fault Rupture Hazard Zone (Hart, 1999), nor within a seismic hazard zone (CDMG, 2001). The closest regionally active faults to the site are the Newport Inglewood fault (offshore), which is located approximately 12 miles to the south of the Planning Area, the Elsinore fault (Glenn Ivy Branch) which is located at about the same distance to the northeast.

The Peralta Hills thrust fault and the El Modeno fault are located approximately 9.6 northwest and 7.6 miles north of the site, respectively. These latter faults are also thought to be seismically active to potentially active by some geologists; however, they have not been zoned as active by the State (CDMG, 1999).

Landslides

Planning Area 5B

No landslides are known to be located at the site, nor were any observed during the field investigation.

Planning Area 6

There are several landslides and surficial failures mapped in the hillsides of Planning Area 6. The majority of the large landslides occur in the northern and eastern hillside areas, in the steeper portions of the site. The majority of the mapped slides occur in the Monterey Formations with few in the Williams Formation. These large landslides involve sandstone and siltstone bedrock and are estimated to be on the order of 30 to 50 feet in depth. There are also several areas of surficial failure, erosion and creep in the steeper terrain at the heads of swales.

Based on mapping by the State, there are a few areas of potential "earthquake induced landslides" within Planning Area 6. These areas will require additional investigation and evaluation on a site-by-site basis.

Planning Area 8A and 9

No landslides are known to be located at the site, nor were any observed during the field review.

Surface Water and Groundwater

Planning Area 5B

Surface water on this site is directly related to irrigation and rainfall. There is some local ponding in the ditches onsite, but the majority of the surface water drains toward the southwest into a concrete reservoir. Some of the surface water probably percolates into the subsurface and may create locally perched groundwater in the alluvium as it migrates deeper to recharge the groundwater table.

Perched groundwater was not observed in the trenches or borings excavated onsite. The only exception is one trench excavated by Zeiser Kling Consultants in 1995 in the former channel of Hicks Canyon. This trench did encounter some perched water in the creek channel, which probably originated from runoff upstream. The more recent investigations near the creek (NMG, 2001) did not encounter groundwater. A buried concrete pipe/box was installed in the late 1990s, so the original runoff flow in the creek now passes through a concrete box and is not allowed to percolate down into the alluvium. Shallow soils logged in the trenches were commonly moist to wet due to irrigation. Groundwater was not encountered in borings to a maximum depth of 71 feet. Based on this information, the depth to the groundwater table below the site is believed to be relatively deep (more than 75 feet).

Planning Area 6

Surface water was observed flowing in a few of the stream channels at the time of investigation. The stream flows were intermittent and controlled primarily by irrigation upstream. The stream flow is from the northeast to southwest and continues south of the subject site.

Prior to the investigation, the old diversion berms that drained into the Lambert Reservoir had been filled and the reservoir had been silted in. The reservoir did not have any water in it when the investigation in the reservoir was performed. Subsequent to the field work, a break in the large water line along Portola Parkway to the northeast of the reservoir filled the reservoir with water for a short period of time. The reservoir has since been empty of water.

The groundwater table was encountered in several of the borings during this and previous investigations in the northern portion of the site. During this investigation, the groundwater table was encountered in the alluvium between 10 and 60 feet below the existing ground surface. The groundwater table is generally shallow in the Agua Chinon area above the dam, between 10 and 20 feet below the existing ground surface. At the southern end of the canyons, where they empty out onto the Tustin Plain, the depth to groundwater increases significantly, down to depths of 40 feet and deeper. Several borings drilled from Portola Parkway south to Irvine Boulevard to depths of 50 to 80 feet did not encounter groundwater.

Along the hilltops, several bucket-auger borings excavated into bedrock encountered minor to heavy seepage at depths from 29 to 73 feet below the ground surface. It is likely that the seepage encountered in these borings is directly influenced by the irrigation of the surrounding orchards and has infiltrated through fractures and joints. Standing water was also encountered in a few of these borings at depths of 46 to 67.5 feet.

During grading of Portola Parkway, seepage was encountered in the area of "Tomato Springs" (County of Orange, 1993). This seepage was encountered in two cut slopes along the north and south sides of the road, just east of the water-line easement. Hydraugers (horizontal wells) were installed near the bottom of the cut slopes back into the slope a distance of 50 to 75 feet for drainage purposes.

Planning Area 8A and 9

Groundwater beneath Planning Areas 8A and 9 is generally deep. Borings drilled to depths of 50 to 70 feet in Planning Area 9 did not encounter groundwater. The review of the Orange County Water District 1989-1999 Engineer's Report (2000) indicates that groundwater elevations within this portion of Orange County are approximately 60 to 100 feet below the present ground surface. In addition, research of the California Department of Water Resources Website (www.dwr.water.ca.gov) revealed data on three active groundwater wells located in the immediate vicinity of the Planning Area, with recorded groundwater depths between 75 to 120 feet below the ground surface (well numbers 05S08W29P01S, 06S08W06Q01S, and 05S08W31K01S).

Groundwater was encountered at a depth of approximately 48.5 feet below existing ground surface in only one boring (Boring B-15), located in Planning Area 8A near the southwestern edge of the subject site. This depth is consistent with the groundwater levels encountered in borings drilled just south of Trabuco Road and a local Irvine Company irrigation well near the intersection of Trabuco Road and Remington.

4.6.2 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on geology and soils if it will:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.
 - Strong seismic ground shaking.
 - Seismic-related ground failure, including liquefaction.
 - Landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

Grading and General Soil Conditions

Project implementation will require a substantial amount of grading in order to construct project related infrastructure and establish building pad and recreation sites. As noted in Appendix H to this

DEIR, various cuts and fills will be required to facilitate proposed development. Mass grading is expected to occur in one phase per planning area.

During this grading process, development specific engineered grading plans will be prepared in accordance with City standards and will address: disposition of deleterious materials; removal or abandonment in place of existing irrigation lines or other underground infrastructure; and, the manner in which final building sites will be stabilized relative to soils compaction.

Grading and excavations should be performed in accordance with the County of Orange Grading Code and the City of Irvine Grading Manual. Prior to grading, deleterious material should be cleared from the site and disposed of offsite. Prior to placement of fill, removal bottoms should be scarified moisture-conditioned as needed, and compacted to minimum 90 percent relative compaction. Relative compaction of new fill should be based upon ASTM Test Method D1557. Fill material should be placed in loose lifts no greater than 8 inches in thickness and compacted prior to placement of the next lift. Ground sloping greater than 5:1 (horizontal to vertical) should be prepared by benching into firm, competent material as fill is placed. Moisture content of fill soil should be at or slightly over optimum moisture content. However, consideration should be given to placing fill at higher moisture contents to facilitate the subgrade presoaking process under slabs-on-grade in areas of expansive soils.

Regional Seismicity: Fault Rupture and Groundshaking

Based on prior studies, there are no known active faults within the Northern Sphere Area, and therefore, there is no fault rupture hazard at the site. The site is subject to moderate seismic shaking as a result of a large earthquake on a regionally active fault and could expose people and structures to groundshaking. Anticipated ground accelerations at the site reportedly vary from 0.26 to 0.35g, depending upon the earth materials underlying the site, the magnitude of the event and the distance from the site to the earthquake epicenter. This is a potentially significant impact the mitigation for which is typically met by design of structures in accordance with the most recent Uniform Building Code (UBC). The site is located in Seismic Zone 4 of the 1997 UBC. For critical structures, the upper bound earthquake (10 percent exceedence in 100 years) ground acceleration should be utilized for design.

Liquefaction

Liquefaction occurs in areas with a high groundwater table and loose, non-consolidated alluvial soils. The lowlands of the Northern Sphere Area typically have deep groundwater and as a result, the potential for liquefaction is very low to nil. Based on existing investigation at Planning Area 6 there are three thin liquefiable layers in two borings, at depths of 50 to 60 feet below existing ground which may be potential significant. The current evaluations were done for a General Plan level of analysis and a more development specific assessment of liquefaction potential, including lateral spread, will be necessary when site development plans and grading plans are prepared for the areas of these borings.

Based on mapping by the State, there are four large areas of potential liquefaction in the upper reaches of the main canyons at Planning Area 6, as shown on Exhibit 4-32. As part of the Seismic Hazard Mapping Act, these areas will require more extensive field exploration and laboratory testing as part of future geotechnical studies at the site. Planning Areas 5B, 8A, and 9 are not located in potential liquefaction hazard zones as delineated by the State.

If liquefiable layers are found in the future investigations, implementation of mitigation measures should be incorporated into the design to either eliminate the liquefaction potential or to allow partial improvement of the soils and provide structures that can accommodate the liquefaction induced vertical and horizontal deformations. Alternative remedial measures that may be considered for zones of higher liquefaction potential include:

- Structural options/special foundation design (mat foundation, stiffened post-tensioned slabs),
- Soil/ground improvement (e.g. stone columns, compaction grouting), and
- Avoidance or setback from liquefaction areas.

These measures will be achieved through compliance with Mitigation Measure 6.1 which requires compliance with the recommendations included in the geotechnical studies prepared for the proposed project.

Slope Stability

Because several landslides and surficial failures have been mapped in Planning Area 6, slope stability is a potentially significant impact. The conditions of the hillsides within Planning Area 6 will have to be evaluated on a site-by-site basis to assess the gross and surficial stability and the potential impacts to the development. Mitigation Measure 6.2 has been identified to mitigate this impact. Depending upon the proposed design of the development, excavation of buttress keyways may extend into the hillside areas with compacted fill slopes. Slopes in excess of 30 feet in height will require terrace drains.

Landslides will require additional investigation and will likely result in the design of shear keys or gravity buttresses for stabilization or entire landslide removal. These remedial grading measures will likely have the largest impact to the natural hillsides, since the keys will typically be larger and extend further into the natural hillside areas.

In addition, all proposed cut and fill slopes should be evaluated for stability. If cut slopes are anticipated to expose adverse geologic conditions, then buttresses will be constructed. If cut slopes expose fractured/faulted bedrock and are subject to surficial instability, stabilization fills will be constructed. In accordance with standard grading code, all graded and natural slopes adjacent to proposed development must have a minimum static factor of safety of 1.5 and a minimum pseudostatic factor of safety of 1.1.

Exhibit 4-32 Seismic Hazard Zones

Based on mapping by the State, there are a few areas of potential "earthquake induced landslides" within Planning Area 6. These areas will require additional investigation and evaluation on a site-by-site basis. Pseudostatic stability analysis is also required and stabilization measures will need to be designed accordingly.

The remaining planning areas within the project site, including Planning Areas 5B, 8A, and 9, are relatively flat and no landslide potential exists in these areas.

Settlement

The potential for settlement varies over the Northern Sphere Area due to variations in subsurface conditions and depths of planned cuts and fills. Potential settlement is anticipated to be of concern within portions of the site, and may be separated into three types:

- hydroconsolidation (collapse upon wetting) of alluvium left in place above the water table,
- time-dependent consolidation settlement of compressible alluvium left in place below the water table, and
- possible liquefaction-induced settlement of a few loose, granular layers below the water table.

Remedial removals will be needed to remove the potentially collapsible and/or very compressible near-surface soils (unsuitable materials) where appropriate. Settlement should not be of special concern for the majority of the flatlands after the recommended removals are made since the grading will generally consist of fills less than 5 feet in thickness and buildings will be wood framed, one and two-story structures. Settlement is also not of special concern in planned cuts and shallow fill areas in bedrock.

In areas where significant loading is planned (deep fills or heavy buildings) settlement is a potentially significant impact and will be further evaluated as required by Mitigation Measures 6.2 and 6.4. Alluvium will compress when loaded with the thick fill. The amount of settlement will depend on the thickness of design fills and loading conditions. In areas where deep fills are planned, settlement monitoring may be recommended to verify the required waiting periods prior to construction of improvements. Typically, the monitoring period lasts 3 to 6 months, and may be supplemented by an increase in the stiffness of the foundation/slab to mitigate some remaining longer-term settlement.

In areas of potential liquefaction, where seismic settlement is of concern, foundations/structures can often be strengthened and stiffened enough to withstand such movement without major structural damage.

Expansive Soils

The expansion potential of soils within the Northern Sphere Area, similar to the surrounding developed areas, generally ranges from low to high. Where expansive soils are present, this potential impact can be mitigated thru compliance with the Uniform Building Code which specifies special foundation/slab design for residential construction on soils having an expansion potential of "low" or greater. Principally, the design must be post-tensioned slabs per the Post-Tensioning Institute (PTI) method or slab-on-grad per the Wire Reinforcement Institute (WRI) method. Any other foundation and slab designs must be specifically submitted by the geotechnical and structural engineers and approved by the building official.

Corrosion Potential

The site soils ranged from moderately to severely corrosive to ferrous metals and copper. This is a very common range of corrosivity within Orange County. Where metals will be in contact with onsite soils for long periods of time (such as buried iron or steel pipe), corrosion control measures should be taken to prolong the life of the material. These types of protection recommendations are typically provided by the corrosion engineer and include measures, such as coating of the pipe with non-corrosive material or utilizing alternative non-metallic pipe materials. Based on current studies, the onsite soils have a "negligible sulfate exposure" for concrete.

Rippability

It is anticipated that the flatlands in the Northern Sphere Area will be easily excavated with heavy equipment. The majority of the bedrock in Planning Area 6 is anticipated to be moderately difficult to rip with D-9 Dozers. Some of the deeper planned cuts in the more cemented bedrock formations in PA 6 may be very difficult to rip and will take larger heavy equipment (D-10 and D-11 Dozers). Excavation into this hard bedrock will produce oversize rock and Mitigation Measure 6.5 has been identified to address the potential impacts associated with oversized rock. The oversized rock may be placed in deeper fill areas in accordance with the grading and earthwork specifications presented in the geotechnical reports and the City of Irvine and County of Orange Grading Specifications.

Groundwater/Surface Drainage

Groundwater is typically deep in the flatland areas and is not anticipated to be encountered during grading, except possibly some wet soils in the drainage channels onsite. Shallow groundwater does occur locally in the upper canyon and hillside areas of Planning Area 6, and may be encountered during grading. Mitigation for shallow groundwater includes design and placement of subdrain systems during rough grading of the site. Subdrains should be placed in accordance with the grading and earthwork specifications in the geotechnical reports and with the City of Irvine and County of Orange Grading Specifications.

Run-off water and/or heavy irrigation after development of the site may result in nuisance water conditions where previously none existed. Maintaining adequate surface drainage, proper disposal of run-off water, and control of irrigation will help reduce the potential for future moisture-related problems and differential movements from soil heave/settlement. In areas of expansive soils, it is also important to maintain a consistent level of soil moisture, not allowing the subgrade soils to become overly dry or overly wet. Properly designed landscaping and irrigation systems can help in that regard.

Surface drainage should be carefully taken into consideration during grading, landscaping, and building construction. Positive surface drainage should be provided to direct surface water away from structures and slopes and toward the street or suitable drainage devices. Ponding of water adjacent to the structures should not be allowed.

Erosion

The majority of the flatland and hillsides contain soils that will have a low to moderate erosion potential. In Planning Area 6, the Oso member of the Capistrano formation consists of fine-grained sandstone that is highly susceptible to erosion, and the Niguel formation has a moderate to high erosion potential. This is a potentially significant impact. Mitigation for moderate to high erosion potential would include capping areas with a more cohesive fill material, providing replacement fills with more cohesive materials on planned cut slopes, and/or by placing erosion protection on the surface of the soils (such as polymer coatings, jute matting, geotextiles, or gunite V-ditches). Proper control of surface drainage also helps to mitigate against erosion.

Septic Tanks and Waste Water

The abandonment of the septic tanks, leech field, and seepage pits, if encountered during grading, should be performed in accordance with the Orange County Health Care Agency requirements. These structures should be removed from the upper 10 feet from finish grade and disposed of offsite. The structures should be properly abandoned below this depth.

The site will be serviced by municipal sewer systems, and therefore, new septic tanks will not be necessary and waste water will be handled by outlet directly into the sewer.

Cumulative Impacts

As cumulative projects are constructed in accordance with the adopted City of Irvine General Plan, more people and structures will be exposed to seismic hazards due to earthquakes. Other geotechnical constraints, such as expansive soils and landslides may present hazards to cumulative development. However, adherence to mitigation measures contained in site-specific geotechnical reports, building codes, and grading ordinances will reduce cumulative geotechnical impacts to a level of insignificance.

4.6.3 MITIGATION MEASURES

Existing Regulations and Standard Conditions

- 6.1 The City of Irvine has a number of existing codes and policies, which are implemented through the regular subdivision process that will serve to mitigate the impacts of the proposed project. Current codes and policies relating to geology and soils are as follows:
- a. Revegetation of cut and fill slopes shall be required in accordance with the City of Irvine Grading and Excavation Code.
 - b. All grading operations will be conducted in conformance with the applicable City of Irvine Grading Ordinance, the most recent version of the Uniform Building Code for Seismic Zone 4, and consistent with the recommendations included in the Northern Sphere's geologic reports entitled "Revised Preliminary Geotechnical Investigation for Planning Purposes, Planning Area I-5, City of Irvine, County of Orange, California," "Preliminary Geotechnical Investigation and Planning Study for Conceptual Design, Planning Area I-6, City of Irvine Sphere of Influence County of Orange, California" and "Report of Geotechnical Feasibility Study for Planning Areas I-08A and I-09A, City of Irvine, California." (Appendix H).

Project Design Features/Special Development Requirements

No project design features or special development requirements related to geology and soils are proposed.

Additional Mitigation Measures

- 6.2 Detailed geotechnical investigations for each Tentative Tract Map ("B" Map) shall be submitted with engineered grading plans to further evaluate faults, subsidence, slope stability, settlement, foundations, grading constraints, potential for liquefaction and other soil engineering design conditions.
- 6.3 All grading and earthwork shall be performed under the observation of a registered Geotechnical Engineer in order to achieve proper sub-grade preparation, selection of satisfactory materials, and placement and compaction of all structural fill.
- 6.4 Prior to the issuance of grading permits for individual Planning Areas, proposed cut and fill slopes shall be evaluated for stability. The hillside areas shall be evaluated on a site-by-site basis to assess the gross and surficial stability and the potential impacts to the development. If these hillsides have adverse bedding conditions, shear keys or buttresses will be constructed to stabilize the hillside.

-
- 6.5 The oversize rock produced from the excavation of hard bedrock shall be placed in deeper fill areas in accordance with the grading and earthwork specifications presented in the geotechnical reports and the City of Irvine and County of Orange Grading Specifications.
- 6.6 The abandonment of the septic tanks, leech field, and seepage pits, if encountered during grading, shall be performed in accordance with the Orange County Health Care Agency requirements. These structures shall be removed from the upper 10 feet from finish grade and disposed of offsite. The structures shall be properly abandoned below this depth.

4.6.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Compliance with existing City and County codes, policies, and standard conditions will reduce all anticipated geotechnical impacts to a level of insignificance. Cumulative impacts are not considered significant.

4.7 Hazards and Hazardous Materials

The Hazardous Materials Assessment for Planning Areas 5B, 6, 8A, and 9 was prepared by Advanced Environmental Concepts (AEC) Inc. in September 2001 and reviewed by Global Geo-Engineering. These studies are summarized in the following section and included in their entirety in Appendix I of this document. Please note that Phase I Site Assessments were not completed for the project area due to the on-going nature of the agricultural operations over the 15 to 20-year buildout of the project site.

4.7.1 ENVIRONMENTAL SETTING

Current Uses of the Property

The following discussion refers to various field numbers and nurseries. The locations of these existing agricultural fields and nurseries are located on Exhibit 4-32A.

Planning Area 5B - The majority of the 319-acre subject property is currently used as agricultural farmland planted with strawberries (Field 301) and nursery plants (Hines Nursery). The remaining acreage is used for building space and agricultural yards.

Planning Area 6 - The majority of the subject property is currently undeveloped native chaparral. Other smaller portions are identified as fields and are in row crop and permanent planting (avocado) production. Five nurseries lease different fields for production of ornamental trees, shrubs, and plants for residential and commercial use. The remaining leased properties are used as an energy research facility, greenwaste reduction, compost manufacturing, labor camp, asphalt and cement recycling, sand bag production, construction storage yards, and wood yard.

Planning Area 8A - The subject property is currently agricultural and planted with tomatoes.

Planning Area 9 - The majority of the subject property is currently used as agricultural farmland used for aboveground cultivation of nursery plants or planted with rotational crops of strawberries, tomatoes, and beans. The Irvine Company's Packing House Facility occupies approximately 24-acres and provides office space, shop services, and packing and cooling facilities for the farm property. The Northwood Golf Center/Orange County Flood Control Basin occupies approximately 45-acres and is used as a golf practice range.

Past Uses of the Property

Based on reviews of historical USGS maps, historical topographic maps beginning in 1901, and aerial photographs beginning in 1946, the Northern Sphere Area has been used for agricultural, and agricultural related services since the subject property was first developed. Agricultural uses specific to each planning area are presented below:

Exhibit 4-32A Agricultural Field Map

Planning Area 5B - The majority of the properties were in row crop development by The Irvine Company, and nursery development by Hines beginning in the late 1950's. Citrus development was evident in Field 301 from the late 1960's to 1994. The citrus trees were removed from production and the land was converted from permanent plantings to row crop use.

Planning Area 6 - The majority of the properties were in citrus and avocado development from 1946 to 1994. The citrus trees were removed from production and the land was converted from permanent plantings to row crop usage.

The leased properties on both sides of "N" Street were historically used as chicken ranches for poultry and egg production. It has been reported that the chicken population was decimated during the early 1970's by "Newcastle Disease" and may have been the contributing factor for the land use changing from chicken ranches to alternative land use businesses. The divided storage yards at the northern extension of Jeffrey Road, currently occupied by Griffith Company, Southern California Sandbags, Stice Construction, Nakae and Associates, and Suchy Trenching was the former location of the Orange County Shooting and Training Center. Field 352 was a former rifle range used by the servicemen at the El Toro Marine Corp Air Station. At the intersection of Agua Chinon Wash and the Foothill Transportation Corridor is a former sand and gravel quarry that the floor area has been graded level and the hillside slopes stabilized to prevent future erosion.

Planning Area 8A - Initially the property was used for native rangeland, followed by row crops planted in the mid 1940's. The citrus were planted during the mid 1960's. The flood and micro-sprinkler irrigated citrus were cultivated until encroaching urban development began to affect crop size and quality. The orchards in the general area were removed between 1994 and 1997 and the land was converted to drip system irrigated row crops primarily consisting of strawberries, beans, peppers, and tomatoes.

Planning Area 9 - The majority of the properties were in citrus development from 1946 to 1994. The citrus trees were removed from production and the land was converted from permanent plantings to row crop usage.

Current and Past Uses of Adjoining Properties

Prior to the recent urban development of the area beginning in the late 1970's, the site and surrounding areas were principally agricultural lands, grazing lands and undeveloped lands. The Northern Sphere Area is bordered on the north by undeveloped native chaparral, to the south and east by the former El Toro Marine Corps Air Station (MCAS) and the Bordier's Nursery property leased from the Navy and the El Toro Marine Corp Air Station, to the west by a mobile home park, a residential development constructed in the early 1980's and the site was bordered on all sides by agriculturally developed properties until the late 1970's when the western border to Field 219 and Field 225 were developed with a residential tract. Recently, the City of Irvine installed a 102-inch reinforced concrete pipeline in Hicks Canyon Wash to control natural surface water drainage.

The former El Toro MCAS was established in 1943 and served as the center for marine aviation operations on the Pacific Coast. The facility occupies 4,700-acres comprising hangars, flight lines, maintenance areas, housing, and recreation including a golf course. Open land is also leased to local farmers for nursery and row crop use. The former MCAS was listed on the National Priorities List (NPL) in 1990 because of past disposal practices that have contaminated soil and groundwater.

The Federal Government has identified at least 22 on-station sites that are undergoing investigation and remediation. The contaminants are varied and consist of heavy metals, solvents, incinerator ash, paint residues, refined hydrocarbons, PCBs, battery acids, and effluent sludge. The majority of the contaminated sites are in the southeast and southwest portion of the airbase, therefore, are the greatest distance from the subject property under review. A few of the landfill sites of solvent and fuel waste are adjacent to the Borrego Canyon Wash and Agua Chino Wash, however, the topographic and hydraulic gradient are southwest thus minimizing offsite impact to the subject property under review. The MCAS has been under regulatory scrutiny since 1985 and has been undergoing subsurface investigations and remediation to control the offsite migration of contaminants.

Description of Structures, Roads, & Other Site Improvements

Planning Area 3

Located north of the Foothill Transportation Corridor is the Bee Canyon Landfill. The Landfill's southern boundary extends to the northern boundary of Planning Area 6 under review. The landfill, which is lined with an impermeable membrane, accepts household waste from the Irvine area, however, is not permitted to accept any "hazardous" classified waste. The landfill has been cited in recent years, however, for leaks of potentially toxic leachate (by-product of degrading waste) that accumulates on the liner. The releases have occurred during periods of excessive precipitation and subsequent runoff. The leachate can reach drainage channels that empty into Newport Bay, San Diego Creek, and Bee Canyon Wash. The landfill, which is under constant review by regulatory agencies, forms borders on the subject property under review that is slated to remain undeveloped as chaparral.

Planning Area 5B

The Hines Nursery Agricultural and Growing Headquarters is located at 12621 Jeffrey Road, Irvine, California and was originally developed in the late 1950's. The approximate 230-acre parcel is north of Field 301, and south of Portola Parkway and Hicks Canyon Wash. A residential tract forms the western border and Jeffrey Road forms the eastern border.

The approximate 230-acre parcel on the west side of Jeffrey Road consists of a main east-west entrance drive to a guardhouse. Beyond, and west of the guardhouse is an employee parking lot, and due south of the guardhouse are aboveground fertilizer and acid storage tanks. Four of the aboveground storage tanks (ASTs) have capacities of 10,000-gallons each, and the fifth AST has

a capacity of 6,600-gallons. Two of the 10,000-gallon ASTs contain ammonium nitrate, one 10,000-gallon AST contains potassium chloride, and one 10,000-gallon AST contains potassium nitrate. The 6,600-gallon AST contains phosphoric acid and is secondarily contained. Continuing west along the access road leads to the central operating hub consisting of the main office structure, the automotive and rolling stock maintenance and repair shop, wash rack, tire repair shop, paint shop, welding shop, fueling depot, loading docks, greenhouse office, and equipment and material storage areas. Northwest of these structures are the propagation building, electrical storage building, and various storage sheds. The majority of open land on both sides of this east-west access road has been developed with greenhouse covered plants, sun and wind netting protected plants, and open air potted plants. The majority of the surface area consists of gravel and crushed rock over hard-packed dirt, while concrete foundations and concrete or asphalt aprons are identified around the buildings.

A 1.5-million gallon water collection reservoir has been installed in the southwest corner of the site to collect and recycle irrigation water. The irrigation water runs off the plants onto the hard-packed dirt/gravel surface, follows the topographic gradient into collection ditches, then directed to the reservoir. The reservoir is lined with bentonite to control subsurface vertical leaching.

B & E Farms (Field 301): Planning Area 5B also consists of land solely under agricultural use and cultivation and is identified as Field 301 leased to B & E Farms. The property is currently under strawberry cultivation. B & E Farms has also converted a small portion of their leased ground at the eastern property edge adjacent to Jeffrey Road into an agricultural storage and maintenance yard. Field 301 was initially in cover crop production, then planted with citrus in the late 1960's, then converted back to row crop production by 1994. Since Field 301 was planted with citrus it required windmachines for frost protection. The windmachine underground storage tanks (USTs) were removed by AEC in July 1998 and the confirmation soil samples exhibited non-detectable concentrations of gasoline range hydrocarbons. Orange County Health and Orange County Fire supervised the removal and sampling of these tanks.

Surface soils in several small areas at the B & E Farms Jeffrey Road Yard (Field 301) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with the trapwagon diesel and gasoline ASTs that are located onsite and the storage of waste oil in 5-gallon buckets and 55-gallon drums. The storage of the agricultural chemicals are in steel containers equipped with a solid floor. Mixing of the chemicals is performed onsite using the hose bib connected to a water storage AST located on a trailer. The effluent water is allowed to migrate into the concrete-lined drainage culvert paralleling Jeffrey Road. B & E Farms also performs rolling stock maintenance in their open sided shed that has a concrete floor. B & E Farms has regular pickups of waste oil by Starlite Reclamation Company.

Planning Area 6

The property reviewed in Planning Area 6 consists of agricultural land under permanent planting and row crop cultivation approximating 500-acres, properties leased for nursery plant production

approximating 250 acres, native rangeland of approximately 900 acres, and industrially developed parcels of approximately 70 acres.

The industrially developed parcels include businesses located in two main areas, contractors and landscape architects are at the northern extension of Jeffrey Road; “green waste” and fertilizer companies are along the east and west sides of “N” Street (Irvine Boulevard addresses).

The Irvine Company Fields are farmed either by The Irvine Company as avocado orchards, or leased to tenants including Gargiulo Farms, D & D Farms, Custom Country Landscaping, and various nurseries.

Planning Area 6 also includes approximately 900-acres of native chaparral that has not been previously developed. This property is in the rugged foothills north of Portola Parkway and bisected by the Eastern Transportation Corridor.

Description of the Tenants and Property Use

El Modena Gardens nursery is located north of Portola Parkway and parallels Jeffrey Road. The El Modena Gardens parcel is in an east-west orientation and is elongated north-south. The property winds through the foothills adjacent to Jeffrey Road. Their main headquarters are central to the property on the east side of Jeffrey Road and consists of a series of modular wooden constructed office units. The entire area is unpaved and consists of hard-packed dirt overlain by crushed rock and gravel. South of the office units, across the hard-packed dirt and gravel access road is the former location of two USTs. These tanks were removed by AEC in 1999 and have been given a “no further action” designation by Orange County Health Care Agency (OCHCA). This fueling area has been replaced by a secondarily contained AST, also permitted and installed by AEC. Further south of the main office facilities are the storage warehouses for equipment and materials used in the nursery operation and the automotive and rolling stock maintenance shop. Adjacent to the north side of the maintenance shop is another secondarily contained AST permitted and installed by AEC. The relatively level quadrangular area formed by the main office complex to the north and warehouses and shops to the south is used as a staging, loading, and shipping area for the wide variety of plants cultivated at the facility.

El Modena Gardens wastewater treatment is approved by the Regional Water Quality Control Board (RWQCB), however, they have taken a less conventional treatment approach. Instead of the overhead sprinkler application of water to the ornamental plants, El Modena has retrofitted the irrigation system with micro-jet and microfan sprinklers connected to timers which regulate the volume of water use per plant. This method serves two purposes; first it decreases overall water consumption; second it allows implementation of an eclectic irrigation water treatment system. El Modena Gardens has installed a series of water collection ditches, and inside these ditches they have constructed screens that have the Canna plant attached. The Canna plant scrubs the elevated nutrient concentrations from the water and adequately cleans it for re-use, or makes it acceptable for disposal in the stormwater drainage system.

At the north boundary of El Modena Gardens, on Jeffrey Road, is the California Labor Camp. This camp is part of the Statewide Labor Corporation, a business that provides housing to farm labor. The labor camp consists of trailer type living units, a group kitchen, and recreational/church facility. The gate was locked during the time of AECs visit, therefore, the inspection was conducted from the outside. The camp is on a septic system, and also has many portable toilets for use. Amenities are limited and the living conditions are rural.

Continuing north on Jeffrey Road is the Griffith Company sand and gravel plant. This area is used for recycling concrete and asphalt into re-usable base material. The facility maintains a portable office unit and the majority of the area is used for storage of import and export material.

To the northeast of the Griffith Company site is the Southern California Sandbag Company. This small lot houses another portable office trailer and yard space for filling sand bags.

At the terminus of Jeffrey Road, and bounded to the north and east by the Transportation Corridor are three businesses that have common borders. The Stice Construction yard consists of a chain-link fenced perimeter and a modular office unit, and storage yard for various “heavy” equipment used in the earthmoving construction industry. East of Stice Construction is the Nakae and Associates landscape business that consists of a chain-link fenced perimeter, modular office units, and storage yard for equipment and materials used in the landscape industry. Nakae also operates a diesel “trapwagon” fueling system. East of Nakae and Associates is Suchy Trenching Company. Suchy Trenching also has a chain-link fenced perimeter, and a newly constructed metal-roofed and sided building and storage yard for equipment and materials.

Griffith Company, Southern California Sandbags, Stice Construction, Nakae and Associates, and Suchy Trenching all have hard-packed dirt and crushed rock and gravel surfaces. They also occupy a portion of the former Orange County Shooting and Training Center (OCSTC).

East of the East Leg of the Eastern (SR-133) Transportation Corridor are agricultural grounds farmed by either The Irvine Company or tenants. Bordier’s Nursery leases from the Navy an approximate 150-acre contiguous piece of property bounded by Irvine Boulevard to the south and Portola Parkway to the north and is not a part of this assessment. In addition, Bordier’s Nursery also leases Field 311 and Field 352 from the Irvine Company. The nursery operation in Field 311 includes greenhouses, wind and sun netting growing areas, and open-air growing areas for many ornamental varieties of plants and shrubs. Field 352 is primarily used as a stockpiling area for soil mixing of material used in the potting of the plants, and during the mid 1960's to mid 1970's used as a rifle range for servicemen at the El Toro Marine Corp Air Station. The nursery primarily waters the plants by overhead sprinklers and also incorporates drip and micro-jet irrigation. Excess irrigation water is collected at a topographic low at the southern portion of the property, pumped into a collection reservoir, filtered, then re-cycled as irrigation water.

North and east of the Bordier’s Nursery Navy-leased property are relatively contiguous fields owned and farmed by The Irvine Company, or owned by The Irvine Company and leased to various tenants.

Gargiulo leases Field 302 and is currently farming tomatoes. Field 303 is planted with strawberries, Field 304 is leased by Sunny Slope Nursery, Field 308 is planted with avocados and a portion of Field 308 is leased to Custom Country for composting, sand bag construction, and wood splitting. The Irvine Company farms avocados in Fields 301, and portions of Fields 304, 305, 306, 307A-B, 308, and 310. Village Nursery leases Field 312A-B and Pacific Coast Nursery leases property on the northeast side of “N” Street and east of the Lambert Reservoir (dry and out of service) identified as Field 313. They cultivate primarily large shrubs and ornamental trees and the irrigation is primarily done on a drip irrigation system connected to each box. Sunny Slope Trees operate a nursery north of Portola Parkway and south of the Corridor Toll Road identified as Field 304.

Tierra Verde Industries operate a large scale composting and greenwaste acceptance facility at the intersection of Irvine Boulevard and “N” Street. On the west side of “N” Street Tierra Verde Industries operate a rectangular yard used for receiving primarily wood and cardboard products which are pulverized, chipped, and ground into wood chips and sawdust size particles. The Tierra Verde facility on the east side of “N” Street is used as a receiving facility for greenwaste, and has been improved with the construction of a scale house, maintenance shop, and offices. The structures are primarily concrete floored, and metal roofed and sided. Tierra Verde constructed the maintenance shop to service the heavy equipment used in the loading, chipping, and grinding of the greenwaste and previously manufactured wood products. The area leased by Tierra Verde Industries used to be a chicken ranch and the chicken coops are visible on the older aerial photographs. Tierra Verde Industries stores bulk new oil, hydraulic oil, grease, and coolant in 55-gallon drums and 5-gallon containers at the eastern facility. Diesel and gasoline are stored in ASTs. Waste oil is stored in a 500-gallon AST and picked up on a regular basis for recycling.

Roger Aguinaga leases approximately 21-acres on both sides of “N” Street from The Irvine Company. Aguinaga operates a composting facility on the eastern side of “N” Street and has modular offices, a maintenance shop, and used equipment and material storage on the west side of “N” Street. The area historically was used as chicken ranches. The Aguinaga storage yard on the west side of “N” Street is used for maintenance of heavy equipment and rolling stock, storage of bulk oil, hydraulic fluids, grease, coolant, diesel, and gasoline. The diesel and gasoline are stored in ASTs mounted on flatbed trailers that have secondary containment berms built around them. There are also numerous diesel and gasoline ASTs that are not secondarily contained. The new oil and grease are commonly stored in 55-gallon drums and waste oil is stored in 55-gallon drums and a waste oil AST.

GE/EER operate a energy research plant on the east side of “N” Street. The 25-acre parcel is leased from The Irvine Company and is currently used as a test facility. GE/EER performs research and development for improved boiler combustion and emissions control testing. Site facilities include a main office trailer, a two story office/document storage structure, a machine shop, a combustion test area, an analytical laboratory, several storage sheds, and several outdoor storage areas. Operations at the facility include burners that simulate industrial boilers and other combustion facilities test fires to evaluate combustion emissions control designs. Also, fuel types and flow rates are controlled and modified to simulate different combustion conditions, and differing types of

emission monitoring equipment are attached to the boiler to test and monitor improvements in the combustion engines.

Feedstock material historically used to fuel boilers and burners include natural gas, diesel, fuel oil, biomass, paper, cardboard, plastic, oil/water emulsion, and auto shredder waste. GE/EER personnel state that hazardous wastes have not been used to fuel the boilers and burners.

Four USTs that formerly contained gasoline, diesel, and crude oil were located in the northwest portion of the site. These tanks were removed in 1991 and 1992. Following onsite bioremediation and testing of hydrocarbon impacted soils from the area of the USTs, OCHCA approved the soils for placement as fill. Closure for the former UST emplacement was issued by OCHCA in November 1993.

The site has been a test facility since 1960, and prior to that it was a gravel quarry. Ford Motor Company/Philco Corporation operated a rocket engine, small missile, shape charge, flare, and separation testing area onsite from 1960 to 1966. Ultrasystems Inc. occupied the site beginning in 1975 and land use occupancy between 1966 and 1975 is currently unknown. Ultrasystems Inc. tested various burner configurations for high efficiency, low emission commercial boilers and GE/EER was formed from Ultrasystems.

Custom Country Landscape Yard: Surface soils in several small areas at the Custom Country Landscape Yard (Field 308) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with portable aboveground storage tanks seated in steel saddles and the waste oil stored in open-topped 5-gallon buckets. None of the tanks appeared to be leaking, and the small releases appear to be accidental during use.

D & D Yard: Surface soils in several small areas at the D & D Yard (Field 303) were observed to be stained with hydrocarbons during AECs site inspection. D & D also stores agricultural chemicals in a locked steel container equipped with a solid floor. Mixing of the chemicals is performed onsite using a hose bib. The mixing area is on hard-packed dirt.

Aguinaga Yard: Surface soils in several small areas at the Aguinaga Yard (Field 372) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with the ASTs that are located onsite. Aguinaga operates a 500 gallon gasoline, (2) 750 gallon diesel, one 1,000-gallon waste oil AST, an 8,000-gallon diesel AST, and maintains approximately 13 unused ASTs. The yard also stores bulk quantities of new oil, hydraulic oil, grease, and coolant in 55-gallon drums and 5-gallon buckets. Bags of fertilizer are stored inside a steel container, and waste oil and waste filters are stored in 55-gallon drums and 5-gallon containers. Aguinaga also has a boneyard of miscellaneous used equipment and materials including two older model suction dispensers.

Planning Area 8A

Planning Area 8A consists solely of areas developed for agricultural purposes currently planted with tomatoes. There are hard-packed dirt access roads that border the fields and the two fields are separated by a eucalyptus windbreak. The northeast corner of Field 219 is used as a staging area for three approximately 4,000-gallon poly constructed liquid fertilizer storage tanks. The poly tanks are in very good condition and there appears to be no visible signs of leaks around the base of the tanks. Adjacent to the poly tanks is the irrigation piping system. At the southeast corner of the eucalyptus windbreak is a hard-packed dirt storage area for wooden tomato stakes and plastic drip irrigation line. An irrigation water drainage ditch forms the western and southern boundaries of the site.

Planning Area 9

The subject property consists of areas developed for agricultural purposes and commercially developed property. Also, the Irvine Company's agricultural produce Packing House Complex is located within the study area. The Irvine Company's Agricultural headquarters are located on Packing House Way, however, all the structures have a Jeffrey Road address. The approximate 24-acre parcel has been cut out of Field 305, which during the time of the site inspection was planted with strawberries. The developed parcel consists of the original Irvine-Valencia Growers (IVG) facility (5-acres); the Vegetable Packing House (tomatoes) and the Avocado/Strawberry Packing House facility (10.5-acres), the Irvine Farm Management and Maintenance facility (6.5-acres) and open ground storage (2-acres).

The original IVG facility at 13242 Jeffrey Road was constructed in 1926 as an orange packing co-op and it was an active facility for citrus processing until 1996. The two-story citrus packing and cold storage facility is constructed of concrete with a wood roof. The insulation is cork in the older cold storage structure. The foundation is concrete and the second story floor is wood constructed. The offices adjoining the south side of the IVG facility were used through 2000, then they were also closed. The facility is currently leased to Weyerhaeuser and used for box storage, material packaging storage, and for equipment storage. The area surrounding the IVG facility is paved with asphalt, except around the corrugated metal storage sheds that are currently leased by Gargiulo which consists of hard packed dirt and gravel. These sheds are used for the storage of spray equipment and irrigation supplies.

The Vegetable Packing House at 13250 Jeffrey Road was originally constructed in 1972 and was primarily used for the packing and cooling of corn, celery, and broccoli; then transitioned into a tomato packing shed in the early 1990's. The facility is currently leased to Gargiulo and is used for large-scale packaged tomato production. Gargiulo has upgraded the facility into an automated receiving, sorting, and packing system that is located inside the main facility and beneath the open-sided structure. The floor of the facility is cement and this area is surrounded by asphalt paving.

The Avocado/Strawberry Packing House at 13250 Jeffrey Road was constructed in 1983 and used for strawberry cooling and packaging of avocados. Currently, the facility has contracted offsite avocado packaging services, and has expanded its strawberry production capabilities.

The Irvine Farm Management facility at 13256-13258 Jeffrey Road was constructed in 1999 as a replacement for the former Agricultural Main Yard located at 13042 Old Myford Road. The facility provides office space for Irvine Company agricultural employees maintenance and shop services capabilities. The northern portion of the building contains the offices and the central and southern portion of the building is used for storage of equipment and primarily vehicle maintenance and repair. The service bays are concrete floored and equipped with hydraulic lifts. On the eastern side of the service bays is a concrete constructed wash rack with a sloped collection drain. The effluent water drains to the west beneath the building and is collected in a three-stage clarifier. When full, the clarifier is pumped out and the water disposed. Further east of the Office/Shop complex is an open-sided corrugated metal constructed storage area having a gravel floor. This area is used for the storage of spray rigs and tractors. A waste oil AST, 55-gallon drums of used filters, and some used 12-volt batteries are located along the northern interior wall of the structure. Along the north eastern exterior wall are drums labeled “hazardous waste” from a spill on April 23, 2001. Also in this area is a drum labeled “toxic” and containing ethylene glycol (antifreeze) and some additional waste oil and filters. Further south of the Offices/Service Shop building is a fenced storage yard containing two diesel trapwagons and at the southern end of the yard is another wash pad area.

Planning Area 9 also consists of the Northwood Golf Center which was constructed on former Field 226 beginning in 1997. The golf driving range is built into a retention basin that is under easement to the Orange County Flood Control District and the recreational easement is reserved by The Irvine Company with the rights assigned to the James Golf Development Corporation. The Northwood Golf Center consists of a clubhouse, paved parking area, practice ranges and putting greens. The facility also consists of a metal Quonset type storage shed, and a rectangular metal container used for storage. The Quonset shed is used for equipment and material storage and the metal container stores small volumes of agricultural chemicals. An equipment wash area has been established by the southeast corner of the Quonset shed. The wash pad is on a dirt surface and has been used to wash engine parts.

Hines Nursery leases approximately 185-acres on the east side of Jeffrey Road in Planning Area 9. The lease property was acquired by Hines Nursery around 1980. The property had been cultivated as citrus and cover crops prior to its use as nursery ground. Hines Nursery uses this acreage primarily for greenhouse, shade netting, and open-air cultivation of ornamental plants, and a smaller portion of the property has been developed with buildings including the agricultural chemical storage and mixing work station, a laboratory, pest control facility, corrugated metal-sided warehouse, and small team leader offices. Septic systems are associated with the structures and consist of holding tanks and leach lines. The holding tanks are pumped on an “as-needed” basis to remove solids and the effluent water drains into the leach lines. Also, excess irrigation water is collected in small holding areas then booster pumped beneath Jeffrey Road via pipeline and into the culvert collection system that drains into the collection reservoir.

Planning Area 9 also consists of land solely under agricultural use and cultivation and are divided into Fields. The Fields are leased to tenant farmers that primarily cultivate strawberries, tomatoes, and beans and are identified as Field 213, Field 220, Field 221, Field 222, Field 223, Field 227, Field 228, Field 229, Field 305, Field 307, Field, 308, Field 309, Field 310, Field 314, and Field 315. The tenant farmers have converted a small portion of their leased ground into agricultural storage and maintenance yards. It is within these yards that the majority of environmental concerns are normally discovered. Orange County Produce operate two yards, one within Field 227 accessed via Trabuco Road, and one within Field 309 accessed via Sand Canyon Avenue. Fujishige Farms operate a storage yard in Field 307, Etchandy Farms operates a small storage yard in Field 213, and Wall Farms have a storage yard in Field 310, all accessed via Sand Canyon Avenue. B & E Farms operates one yard within the study area in Field 315 and is accessed via Sand Canyon Avenue. DC Berry operates one yard adjacent to Field 305 and is accessed via Jeffrey Road. The majority of these Fields were initially planted with citrus, therefore, needed windmachines for frost protection. The citrus was pulled out between 1994 and 1997 and the acreage was converted to row crops.

Orange County Produce Trabuco Yard: At the Orange County Produce Trabuco Yard there are numerous rectangular metal containers used for equipment storage and agricultural chemical storage. Also, there are mobile homes that have been converted to offices, and they have created a covered work place for vehicle maintenance and repair. The maintenance area has a concrete floor. Orange County Produce operates a wash rack on the west side of the storage sheds, and stores diesel and gasoline fuels in trapwagon ASTs. Waste oil is stored in secondarily contained AST and the used filters are stored in 55-gallon drums.

Surface soils in several small areas at the Orange County Produce Trabuco Yard (Field 227) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with portable aboveground storage tanks referred to as “trapwagons.” The tanks hold either gasoline, or diesel, and are prone to spillage during use. None of the tanks appeared to be leaking, and the small releases appear to be accidental during use. The storage of waste oil is in a 500-gallon AST that is secondarily contained. Orange County Produce has regular pickups of its waste oil by Golden Oil Company. Orange County Produce also stores and mixes agricultural chemicals onsite. The agricultural chemicals are stored in a locked enclosed storage container that has a floor in very good condition.

Orange County Produce Sand Canyon Yard: The Orange County Produce Sand Canyon Yard is hard-packed dirt, fenced, and is primarily used solely as a storage yard for farm equipment and materials. The yard is subleased to a portable toilet contractor, and a masonry contractor, each of who store their materials onsite. To the south of the storage yard, outside of the fenced area is a drum storage location.

Surface soils in several small areas at the Orange County Produce Sand Canyon Yard (Field 223) were observed to be stained with diesel and waste oil during AECs site inspection. These areas are primarily associated with the trapwagon aboveground storage tanks and small containers of waste

oil. Orange County Produce also maintains large volume (approximately 3 to 4,000-gallon) poly tanks that hold liquid fertilizer.

B & E Farms Sand Canyon Yard: The B & E Farms Yard is located off of Sand Canyon Avenue and consists of hard packed dirt surface. There is a mobile office onsite, an open-sided wood constructed building used for vehicle maintenance, and a metal constructed container used for agricultural chemical storage. B & E has constructed secondary containment for one diesel and one gasoline AST. Waste oil is stored in drums, as are the used filters. The agricultural chemicals are kept locked inside the metal container. On the southeast corner of the container there is a hose bib used for mixing the agricultural chemicals. There is also a drainage path cut into the soil from this hose bib to the drainage culvert that parallels Sand Canyon Avenue. Another secondarily contained diesel AST is located alongside the east wall of the metal container.

Surface soils in several small areas at the B & E Farms Sand Canyon Yard (Field 315) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with the ASTs that are located onsite. B & E Farms operates a 500 gallon gasoline, 300 gallon diesel, and 500 gallon diesel ASTs located in secondary containment. Waste oil was identified in 55 gallon drums and 5 gallon buckets. The storage of the agricultural chemicals are in the steel container equipped with a solid floor. Mixing of the chemicals are performed onsite using the hose bib located at the southeast corner of the steel container. The effluent water is allowed to migrate into the concrete-lined drainage culvert paralleling Sand Canyon Avenue. B & E farms also perform rolling stock maintenance in their open sided shed that has a dirt floor. Waste oil was observed on the dirt floor beneath the truck undergoing repairs. B & E Farms have regular pickups of waste oil by Starlite Reclamation Company.

Hiramatsu Sand Canyon Yard: The Hiramatsu Farms Yard is located on the west side of Sand Canyon Avenue. The floor of the open-sided sheds are cement, with wood framing. The storage portion of the yard is hard packed dirt. The Hiramatsu Sand Canyon Yard (Field 309) was constructed in 1999 and is very neat and orderly. There was new oil (hydraulic and lubrication) identified in 55-gallon drums within the compound but no staining. The agricultural chemicals are stored in an open-sided structure in the western portion of Field 309 and it is also very clean and orderly. Hiramatsu Farms stores its gasoline and diesel in secondarily contained ASTs near the eucalyptus windbreak separating Field 309 from Fields 222 and 223. There were also 55-gallon drums of waste oils stored near the windbreak.

Fujishige Farms Sand Canyon Yard: The Fujishige Farms storage compound is located adjacent to Sand Canyon Avenue and north of Irvine Boulevard. The yard consists of hard packed dirt surface. There are two dilapidated wooden sheds used for the storage of new oils, hydraulic fluids, and agricultural chemicals. A large portion of the yard is used for storage of used farming equipment. There is one diesel and one gasoline AST mounted in steel saddles. Waste oil is stored in drums and 5-gallon buckets, as are the used filters. Near the ASTs is the hose bib used for mixing the agricultural chemicals and washing down farm equipment.

Surface soils in several small areas at the Fujishige Sand Canyon Yard (Field 307) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with saddle-mounted aboveground storage tanks and portable aboveground storage tanks referred to as “trapwagons.” The tanks hold either gasoline, or diesel, and are prone to spillage during use. None of the tanks appeared to be leaking, and the small releases appear to be accidental during use. The storage of waste oil is in 5-gallon buckets and 55-gallon drums that are stored on pallets or surface soil. Also, Fujishige Farms operates a wash rack and agricultural chemical mixing area at the north side of the yard. The agricultural chemicals are stored in a locked enclosed wooden storage container that is in poor condition.

Etchandy Farms Sand Canyon Yard: The Etchandy Farms storage compound is located adjacent to Sand Canyon Avenue and south of Portola Parkway. The yard consists of hard packed dirt surface. There are two wooden sheds used for the storage of farm materials and agricultural chemicals. A large portion of the yard is used for storage of rolling stock. There is one diesel and two gasoline ASTs enclosed with secondary containment. Waste oil is stored in a 55-gallon drum.

Surface soils in several small areas at the Etchandy Farms Sand Canyon Yard (Field 213) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. These areas are primarily associated with the ASTs that are located onsite. Etchandy Farms operates a 500 gallon gasoline, 1,00-gallon gasoline, and 1,000- gallon diesel ASTs located in secondary containment. Waste oil was identified in a 55 gallon drum adjacent to the diesel AST and in additional 55-gallon drums outside the fenced yard to the north. The storage of the agricultural chemicals are in the wooden constructed shed equipped with a solid floor. Mixing of the chemicals are performed onsite.

Wall Farms Sand Canyon Yard: The Wall Farms storage compound is located adjacent to Sand Canyon Avenue and south of Portola Parkway. The yard consists of hard packed dirt surface and is cut out from a hillside. There are two modular units used as office space and steel containers used for the storage of agricultural chemicals. A large portion of the yard is used for storage of used rolling stock and equipment. There are diesel and gasoline ASTs and trapwagons. Waste oil and used filters are stored in a 55-gallon drums on pallets.

DC Berry Jeffrey Yard: Surface soils in several small areas at the DC Berry Jeffrey Yard (Field 305) were observed to be stained with diesel, waste oil, and gasoline during AECs site inspection. The waste oil was primarily stored in 5-gallon buckets and 55-gallon drums. The diesel and waste oil fuel were either in trapwagons, or secondarily contained ASTs. Agricultural chemical storage is in a locked shed with a competent floor.

The Irvine Company - Irvine Farm Management: The corrugated metal-sided structure with the 13258 Jeffrey Road address stores waste oil in an AST, and 5-gallon buckets, used oil filters, and antifreeze (Field 305). There is some surface staining of the soil. Also, on the east side of the structure are several 55-gallon drums labeled “hazardous waste” from a clean-up on April 23, 2001. These drums are stored on wooden pallets. The shop building with the 13256 Jeffrey Road address

conducts maintenance on The Irvine Company farm vehicles. There is a new hydraulic hoist in the service bay. A steam wash pad is located on the east side of the building and the clean-out consists of a three chambered clarifier on the west side of the building. There are also several trapwagons containing diesel fuel in the storage yard to the south, and further south at the end of the storage yard is another wash area for equipment.

Finally, there is a massive aboveground water storage tank located in a cut out area of Field 315. The water storage tank was installed in 1982 and is operated by the Irvine Ranch Water District (IRWD).

Agricultural Chemicals

The Irvine Company, and the farmers that lease Irvine Company property all use agricultural chemicals to assist in the production of high yield and high quality produce. The chemicals used in Planning Area 6 are categorized as pesticides, herbicides, fungicides, fertilizers, and surfactants.

All the farmers are registered with the Orange County Agricultural Commissioners Office (OCACO) and provide proper notification prior to applying the chemicals to their fields. There have been no “Notice of Violations” (NOVs) issued by the OCACO for the misuse, or mishandling of the chemicals by the farmers in Planning Area 6 during the past year. Also, each farmer has been issued a Restricted Materials Permit Number by the Agricultural Commissioners office.

All of these farmers use licensed Pest Control Advisors (PCAs) to evaluate agricultural chemical selection and volume of application. The chemicals are applied in accordance with labeled instructions on the original container, and then the containers are triple rinsed prior to disposal.

Site Reconnaissance and Interviews

Hazardous Substances in Connection with Identified Uses

The majority of agricultural chemical handling and storage, hydrocarbon fuel handling and storage, solvent use, battery storage, miscellaneous chemical storage, waste water creation and disposition, and waste oil and fluid storage all occur within the boundaries of the storage yards and maintenance shops. The Fields under cultivation only receive prescribed amounts of agricultural chemicals that dissipate quickly due to irrigation watering, the sun, and the chemical composition.

Typical to each yard are ASTs and USTs containing diesel, gasoline, waste oil, acids, and fertilizers. Also identified were 55-gallon drums of new oil, hydraulic oil, grease, and coolant. Agricultural chemicals in liquid, granular, and powdered form were always identified in locked storage rooms and containers. Welding gases including oxygen and acetylene are necessary for repair work of equipment and rolling stock. Most of these containers were labeled as to the correct contents.

In March 2000 AEC removed eight 500 gallon USTs from PA 8A that formerly contained gasoline. Initial soil sampling conducted beneath the former tank locations exhibited non-detectable concentrations of gasoline-range hydrocarbons. Subsequent re-sampling of the former tank locations, under Orange County supervision, also identified no detectable concentrations of gasoline-range hydrocarbons. No additional hazardous materials were identified during the site inspection or during the interview process.

Unidentified Substance Containers

Some drums at the B & E Farms yard and Hines Nursery maintenance facility within PA 5B and at each of the yards reviewed in PA 6 and 9 were not labeled as to their contents. However, visual identification indicated that the contents appeared to be waste fluid consisting of either waste oil, grease, hydraulic fluid, or coolant. Hines Nursery and B & E Farms personnel will be required to identify the contents of the drums and consolidate “like” fluids for disposal, in accordance with their existing permits.

Storage Tanks

Hines Nursery operates three 8,000-gallon double-walled steel constructed USTs in PA 5B, and Irvine-Valencia Growers (IVG) operates the only active double-walled UST in PA9. These tanks are permitted for gasoline, diesel, and off-road diesel and are in full compliance with applicable standards and regulations. In addition, PA 8A used to operate eight 500 gallon gasoline USTs for the operation of the engines to power the frost control windmachines. The USTs were removed by AEC in March 2000 and analytical results of soil samples collected beneath the USTs indicate non-detectable concentrations of gasoline range hydrocarbons. AEC re-sampled the former tank locations, under Orange County supervision, to confirm the absence of gasoline-range hydrocarbons on July 12, 2001. It is the opinion of AEC that all USTs not currently in use have been removed from the Northern Sphere Area.

Several ASTs are located within the Northern Sphere Area. Planning Area 5B contains two steel constructed ASTs used to store fuel and a few poly-constructed tanks that store liquid fertilizer were identified at the B & E Farms yard and at the irrigation/sand filter station. Hines Nursery uses numerous poly and steel constructed ASTs for agricultural chemical storage, and the majority of the ASTs are within secondary containment. Several steel constructed ASTs used to store diesel, gasoline, and waste oil are located at each of the yards within Planning Area 6, and numerous poly-constructed tanks that store liquid fertilizer are located at each yard and at the irrigation/sand filter stations. Planning Area 8A contains three large-capacity poly constructed liquid fertilizer aboveground storage tanks are located at the northeast corner of Field 219. Planning Area 9 contains many steel constructed ASTs used to store fuel at each of the yards, and numerous poly-constructed tanks that store liquid fertilizer at each yard and at the irrigation/sand filter stations.

Planning Area 5B

The Hines Nursery facility currently operates three 8,000 gallon double-walled USTs. Two of the tanks contain diesel and one holds gasoline. These USTs were installed in 1998 in accordance with applicable State and County requirements regarding secondary containment and monitoring of UST systems. There is an individual dispenser associated with each type of fuel. The active USTs are located on the north side of the vehicle and farm equipment service shop. The island is raised concrete, and the drive and UST pad is also concrete.

Hines Nursery has gone through two tank removal and replacement events during the 1990's. South of the maintenance garage Hines Nursery used to maintain a 12,000-gallon diesel UST (installation date approximately 1978) and on the north side of the service bays they operated a 880-gallon waste oil UST and a 500-gallon new oil UST (installation date approximately 1971). The USTs were removed during February and March 1990 by Hekimian and Associates. During the tank removal procedures contaminated soil was identified. It was deemed that the contaminated soil originated from overspill and that the USTs exhibited no signs of leaking. The impacted soil was removed by excavation and transported to a recycling facility. All work associated with the USTs were supervised by OCHCA personnel. Also, the USTs associated with the fueling islands were lined in 1990 and put back into service.

The second phase of tank removals occurred between the latter portion of 1997 and early 1998. Hines Nursery contracted for the removal of the two existing USTs and replacement with three new 8,000-gallon double-walled USTs. The UST installation is currently in compliance with the South Coast Air Quality Management District (SCAQMD), Orange County Fire Authority (OCFA), and Orange County Health Care Agency (OCHCA).

The Irvine Company also operated four 500-gallon capacity windmachine USTs in Field 301. These USTs contained gasoline and were used to fuel engines that powered the fan on a windmachine for frost protection purposes. The USTs were steel constructed, had 2-inch diameter vent and fill lines, and the product line consisted of 3/8-inch flexible copper tubing that was plumbed directly from the tank to the windmachine. The product delivery operated on a vacuum system, therefore, if there was a leak in the copper tubing the engine would not receive fuel, thus minimizing the potential for releases of any significant volume. The windmachines were placed on 10-acre centers. AEC conducted an OCHCA and OCFA permitted removal of these USTs in July 1998. A Tank Closure Report was prepared by AEC documenting the removal of the windmachine gasoline tanks and submitted to the OCHCA. AEC is awaiting a "no further action" letter from OCHCA.

Planning Area 6

The Irvine Company operated 280-gallon to 500-gallon capacity windmachine USTs in Avocado Fields 301 and 306. The one UST in Field 301 and the four USTs in Field 306 contained gasoline and were used to fuel engines that powered the fan on a windmachine for frost protection purposes. The USTs were typically steel constructed, had 2-inch diameter vent line and fill, and the product

line consisted of 3/8-inch flexible copper tubing that was plumbed directly from the tank to the windmachine. The product delivery operated on a vacuum system, therefore, if there was a leak in the copper tubing the engine would not receive fuel, thus minimizing the potential for releases of any significant volume. AEC permitted the five windmachine gasoline USTs and removed the USTs, under OCHCA supervision, on June 14, 2001. The soil samples collected beneath the USTs exhibited non-detectable concentrations for TPH-gasoline, volatile aromatics, and full scan of oxygenates. AEC is awaiting a “no further action” letter from OCHCA.

Planning Area 8A

Field 219 and Field 225 used to be planted with citrus. In an effort to protect the citrus crop from freezing The Irvine Company installed four windmachines in each field (approximate 10-acre centers). The engine that powered the shaft that turned the fan operated on gasoline supplied by 500-gallon USTs. The tanks were constructed of steel and the product delivery lines were 3/8-inch diameter copper tubing plumbed from the tanks directly to the engines. The four 500 gallon USTs located in Field 219 were removed by AEC on March 1, 2000 and the four 500 gallon USTs located in Field 225 were removed by AEC on March 16, 2000. The USTs were removed at staggered time frames due to access restrictions to Field 225 (crop rotation). Because of time constraints applied by the tenant (Gargiulo) the USTs were not removed under Orange County Health Care Agency (OCHCA) permits, and soil samples were not collected under their supervision, however, AEC performed the removal, sampling, and backfilling of the USTs in accordance with OCHCA guidelines. The soil samples collected from beneath each of the USTs exhibited non-detectable concentrations of TPH-gasoline, volatile aromatics (BTXE), and Methyl tertiary Butyl Ether (MTBE). Also, there was no hydrocarbon stain, or odor, associated with the UST removals.

Bulk Quantity Chemicals: Bulk quantities of liquid fertilizer are staged in large plastic ASTs adjacent to the irrigation water supply piping at the northeast corner of Field 219 (Bryan Avenue and Jeffrey Road). The tanks observed appear to be in good condition and there did not appear to be any obvious releases of fertilizer on surface soil surrounding the ASTs.

The liquid fertilizer can pose a potential problem if elevated concentrations are able to migrate to groundwater, or if a large volume is released into an irrigation water collection area that has the ability to migrate to a surface water storage area. Even small releases over long time periods can result in persistent accumulation of nitrate concentrations.

Planning Area 9

The IVG facility formerly operated a 7,500-gallon gasoline UST that was removed by Kal-Vac in 1993. The UST was located to the east of the IVG corrugated metal-sided storage structures and paralleled Packing House Way. The UST was removed under Orange County Health Care Agency (OCHCA) permit and Orange County Fire Authority approval. Analytical results of soil samples collected beneath the UST indicated acceptable hydrocarbon concentrations. IVG also removed from the premises a 1,000-gallon gasoline UST and a 2,000-gallon gasoline UST on December 3,

1985. IVG also operates a double-walled fiberglass gasoline UST connected to a dispenser and covered by a canopy located in the central portion of the packing house property. The UST permits with OCHCA and South Coast Air Quality Management District (SCAQMD) are current. It has also been upgraded in accordance with the required regulations and issued permit # 08724.

The Irvine Company also operated 280-gallon to 500-gallon capacity windmachine USTs. These USTs contained gasoline and were used to fuel engines that powered the fan on a windmachine for frost protection purposes. The USTs were typically steel constructed, had 2-inch diameter vent line and fill, and the product line consisted of 3/8-inch flexible copper tubing that was plumbed directly from the tank to the windmachine. The product delivery operated on a vacuum system, therefore, if there was a leak in the copper tubing the engine would not receive fuel, thus minimizing the potential for releases of any significant volume. The windmachines were commonly placed on 10-acre centers. AEC has been involved with the majority of permitted windmachine UST removals on the agricultural parcels, however, windmachine USTs have also been inadvertently removed by the tenant farmers during the deep ripping of the fields. It has been communicated to AEC that when a farmer hit a tank with the shank, they either removed the steel UST and placed it within one of the eucalyptus windbreaks, or transported the tanks to a metal recycler. AEC identified two USTs in the eucalyptus windbreak separating Field 220 from the Northwood Golf Center that were devoid of any gasoline residues, however, it was impossible to confirm from which Fields the tanks originated. These USTs were triple-rinsed and disposed of at a metal recycling facility during July 2001.

AEC has been involved with the removal, and/or investigation of the majority of the windmachine gasoline USTs on The Irvine Company property. AEC was contracted by Treasure Farms (farming entity that leased the majority of The Irvine Company's property during the mid 1980's to the early 1990's) to prepare a Risk Assessment (January 29, 1993) for the gasoline impacted windmachine tank sites. AEC was then retained to prepare a Vapor Extraction Workplan (September 1993). The reports were submitted to OCHCA and it was decided to treat the gasoline impacted soil via vapor extraction. Between September 1993 and November 1993 the leaking tank sites were remediated using a portable vapor extraction machine and mobile carbon units. The vapor extraction machine operated until the Lower Explosive Limit (LEL) approached 1% to 2%. AEC was able to complete the mitigation of the former tank sites, however, closure was not obtained because Treasure Farms declared bankruptcy during the latter stages of the remediation therefore, the project was tabled. Also, a 4-inch diameter groundwater monitoring well was installed at former windmachine UST location 227-2 in February 1990 by GeoAudit. The results of the groundwater sampling indicate non-detectable concentrations of gasoline. The depth to water is approximately 85-feet bgs. Current status of the well is unknown.

Indications of PCB(s)

Electric transformers (both pad and pole mounted) are located at the Hines Nursery facility, El Modena Gardens, and the northern extension of Jeffrey Road businesses, "N" Street businesses, the Northwood Golf Center, IVG, Irvine Farm Management facility, and the storage yards within PA

9. Electric transformers are owned and operated by Southern California Edison (SCE). According to information obtained from SCE, all transformers within the SCE power distribution network suspected of containing PCB's in concentrations exceeding 50 parts per million were removed and replaced by 1987. Manufacture of PCB-containing electric power transformers was discontinued in 1984. PCB sampling and laboratory analysis was not conducted as part of this preliminary assessment.

Indications of Solid Waste Disposal

Miscellaneous trash and refuse are collected in bins located around the facilities and routinely removed for offsite disposal by a commercial waste hauler. Miscellaneous plastic and drip hose are located on PA 8A awaiting disposal. No indications of disposing of onsite solid waste by landfilling were identified on the subject property during the site reconnaissance portion of this assessment.

Indications of Waste Water Disposal

Planning Area 5B - Onsite waste water generated during steam cleaning, or mixing of agricultural chemicals, generally follow the topographic gradient on the hard packed dirt as identified in the B & E Farms storage yard then drains into the concrete lined drainage culvert that parallels Jeffrey Road. The Hines Nursery shop facility operates a cement constructed wash rack pad. The wash rack effluent water, consisting of the cleansing soap and residual hydrocarbons and agricultural chemicals, collects in a drain constructed in the center of the sloped concrete pad and flows into a 30' underground piping run that surfaces and drains onto the hard-packed soil. The effluent waste water then commingles with the run-off of irrigation water and drains into the water collection reservoir at the southwest corner of the nursery. Sanitary effluent from restroom facilities at the Hines Nursery site is also discharged into septic tanks and leach lines. The solids in the septic tanks are pumped on an as needed basis and the leach lines disperse the effluent water.

Planning Area 6 - Onsite waste water generated during steam cleaning, or mixing of agricultural chemicals, generally follow the topographic gradient on the hard packed dirt as identified in the storage yards. El Modena Gardens has a series of ditches used for the collection of the excess irrigation water. The water is filtered and then recycled. Bordier's Nursery uses overhead sprinklers on there plants being cultivated in pots at the leased Fields 311 and 352. The excess irrigation water drains into sumps, then pumped into a larger reservoir, filtered, then recycled. Pacific Coast Nursery and Village Nursery are primarily "box" nurseries and use drip irrigation to water the trees and shrubs. Sunny Slope Nursery uses drip and overhead sprinklers. Sanitary facilities at the office structures at The Irvine Company leased properties are typically composed of holding tanks that retain the solids and leach lines that drain the liquids. The holding tanks are pumped when necessary.

Planning Area 8A - Onsite irrigation water is diverted to the drainage culverts located on the western and southern property boundaries. There are no sanitary disposal systems.

Planning Area 9 - Onsite waste water generated during steam cleaning, or mixing of agricultural chemicals, generally follow the topographic gradient on the hard packed dirt as identified in the storage yards. The water drains into the concrete lined drainage culverts that parallel Sand Canyon Avenue and Jeffrey Road. Effluent water at IVG and The Irvine Company Yards are collected in clarifiers, then pumped out when full. Sanitary effluent from restroom facilities at the site is also discharged into septic tanks and leach fields. Irrigation water at the eastern portion of the Hines Nursery is collected in small sumps at the southwest corner of the property then pumped through an underground pipeline to the western portion of the facility where it is diverted into drainage ditches to the irrigation water collection reservoir.

Radon

Radon is a colorless, odorless, tasteless, naturally occurring radioactive gas formed by the decay of uranium in soil and bedrock. Because uranium and radon occur naturally in varying amounts within rocks and soils found throughout the United States, radon is present in all the air that we breathe. Long-term exposure to elevated concentrations of radon in confined areas has been associated with an increased risk of lung cancer. The present action levels require exposure to concentrations of at least four picocuries/liter (4 pCi/L) of radon over an extended period of time. The State of California Department of Health Services conducted radon surveys across portions of Orange County, during 1990. These surveys did not indicate the widespread presence of radon in concentrations exceeding 4 pCi/L within Orange County. Radon is commonly found in granitic source terrain, therefore, unlikely to be a concern in areas of alluvium as identified in the subject area. Therefore, a low risk of radon is present within the development area.

Asbestos Containing Materials (ACM's)

Asbestos containing materials (ACM's) were commonly used in a wide variety of building products such as roofing shingles, composite siding, linoleum flooring, acoustic ceiling tiles, furnace and water heater exhaust piping and insulation, glues and mastics, stucco, joint compounds, and composite wallboards prior to 1980. ACM's can be divided into material considered friable (easily crumbled or reduced to powder) and nonfriable. Friable ACM's are regulated as hazardous materials due to the elevated long-term risk of developing lung cancer upon respiratory exposure and must be properly removed prior to renovation or demolition of any structure containing these materials. In addition to structures, ACM's have been historically used as "transite" irrigation piping within many agricultural parcels throughout California. Transite piping was visually identified in the southern drainage culvert along Trabuco Road near the western border of PA 8A. The integrity of the pipe observed by AEC appeared very good and did not appear damaged in any way. Varying diameters and lengths of "transite pipe" was identified in the eucalyptus windbreak separating Field 309 from Field 222. Asbestos sampling and laboratory analysis was not conducted at this level of assessment.

Lead

According to information published by the United States Department of Housing and Urban Development (HUD), approximately three out of every four pre-1978 buildings contain lead-based paint. Based on the apparent ages of the structures located within on the leased properties, there is a potential presence of lead-based plumbing and/or paints within the Hines Nursery facility, structures within PA 6, and the IVG structure within PA 9. However, there is limited presence of lead-based plumbing and/or paints within PA 8A. Lead sampling and laboratory analysis was not conducted at this level of assessment.

Other Potential Conditions of Concern

Wildland Fire Hazard

In accordance with Section 51178 of the California Government Code, the Irvine City Council adopted Ordinance No. 95-14 to designate Very High Fire Hazard Severity Zones found in the city. Such zones are defined as "...any geographic area designated per Government Code Section 51178 which contains the type and condition of vegetation, topography, weather and structure density which potentially increased the possibility of wildland conflagration fires." These areas have been classified as very high fire hazard in response to recommendations by the Orange County Fire Authority and the California Department of Forestry and Fire Protection, who conducted an assessment of environmental conditions throughout the county, in accordance with state-wide evaluation criteria. It was their determination that the areas shown in Exhibit 4-33 are places where structures and other human development meet or intermingle with wildland or vegetative fuels and/or which contain the type and condition of vegetation, topography, weather, structures density and other relevant factors which potentially increase the possibility of uncontrollable fire spread resulting from airborne and/or groundborne fire.

Exhibit 4-33 City of Irvine Fire Hazard Areas

Fuel Modification Regulations

A fuel modification zone is a wide strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with drought-tolerant, fire-resistant plants to provide an acceptable level of risk from wildland fire. Fuel modification guidelines were established by the Orange County Fire Authority - Wildland Urban Interface Task Force in July 1994. The purpose of these guidelines is to provide information on how fuel modification zones are to be designed, installed, and maintained in order to meet safety requirements. Projects located in high fire hazard areas are required to provide fuel modification zones that follow these guidelines.

Fuel modification zones vary in complexity and are dependent upon the amount and arrangement of vegetation, topography, degree of exposure, local weather conditions, construction, design, and placement of structures. A typical fuel modification consists of a 20-foot setback zone (Zone A), a minimum of 50-foot irrigated zone (Zone B), with an additional minimum 100-foot area of brush thinning zones (Zones C and D). In most cases the minimum width of a fuel modification zone is 170-feet (see Exhibits 4-34 and 4-35).

In large developments, fuel modification zones should be located within common areas owned and maintained by private homeowners associations. Provisions for continuous maintenance by the homeowners association are noted on the preliminary and final fuel modification plans.

The integrity and longevity of the fuel modification zones are ensured through appropriate conditions of approval for individual subdivisions and site-specific development projects and through recordation of Covenants, Conditions and Restrictions (CC&Rs) that specify restrictions and maintenance responsibilities within the fuel modification areas. Typical maintenance procedures include anything needed to keep the fuel modification area in a fire-safe condition as required by the Orange County Fire Authority (OCFA), such as periodic removal and thinning of undesirable vegetation; replacement of dead and dying fire-resistant plantings; upkeep of the irrigation system; and preservation of identification markers.

Compliance with OCFA's Fuel Modification Guidelines involves several steps. The first step is the submittal of primary fuel modification plans in conjunction with applications for tentative subdivision maps. These plans must be approved by the OCFA Fire Chief and the City of Irvine. City review of the fuel modification plan is part of the Community Development Department's evaluation of an urban edge treatment plan. The fuel modifications plan will show conceptually the areas and structural elements of fuel modification necessary to achieve an acceptable level of risk regarding exposure of structures to combustible vegetation. Following the submittal and approval of the primary fuel modification plans and conceptual drawings, and prior to issuance of a grading permit, a final, precise fuel modification plan must be approved by the Fire Chief and the City of Irvine. Installation of fuel modification zones occurs under the supervision of the Fire Chief. Brush removal and thinning is required prior to issuance of a building permit. Prior to issuance of certificates of use and occupancy for structures adjacent to the fuel modification area, a final inspection and approval will be obtained from the Fire Chief and the City of Irvine.

Exhibit 4-34 Fuel Modification Zone Standards (Downslope)

Exhibit 4-35 Fuel Modification Zone Standards (Downslope)

City of Irvine Emergency Management Plan

An Emergency Management Plan (EMP) has been prepared by the City of Irvine to provide guidance for the City's response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies. The plan does not address normal, day-to-day emergencies or the well established and routine procedures used in coping with such emergencies. It also does not address planning and design of development projects or land use planning efforts such as the adoption or amendment of general plans, zone changes, master plans, etc. Instead, the EMP focuses on potential large-scale disasters which can generate unique situations requiring unusual emergency responses. The objective of the EMP is to incorporate and coordinate all the facilities and personnel of the City into an efficient organization capable of responding to any emergency. It establishes the emergency organization, assigns tasks, specifies policies and general procedures, and provides for coordination of planning efforts of the various emergency staff and service elements utilizing the California Standardized Emergency Management System (SEMS). The key assumptions inherent in the EMP are:

- The City of Irvine is primarily responsible for emergency actions and will commit all available resources to save lives, minimize injury to persons, and minimize damage to property.
- The City of Irvine will utilize SEMS in emergency response operations.
- The Director of Emergency Services will coordinate the City's disaster response in conformance with its Emergency Services Ordinance.
- The City of Irvine will participate in the Orange County Operational Area.
- The resources of the City of Irvine will be made available to local agencies and citizens to cope with disasters affecting this area.
- The City will commit its resources to a reasonable degree before requesting mutual aid assistance.
- Mutual aid assistance will be requested when disaster relief requirements exceed the City's ability to meet them.

The EMP is intended to accomplish three main goals, as follows:

- Provide effective life safety measures and reduce property loss.
- Provide for the rapid resumption of impacted businesses and community services.
- Provide accurate documentation and records required for cost recovery efforts.

Primary responsibility for directing emergency evacuation procedures lies with the Irvine Police Department. They may call for assistance from other participating departments or agencies, if needed, such as the Orange County Fire Authority in the event of a major fire that requires evacuation of local residents.

4.7.2 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on environmental hazards if it will:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.
- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Risks Associated With Hazardous Substances

Agricultural Storage and Maintenance Yards

Agricultural storage and maintenance yards are a necessity to any farming operation and are used for the storage of agricultural chemicals, bulk oils, antifreeze, and diesel and gasoline fuels required to successfully operate and maintain farm equipment and agricultural land. Also, farmers want their storage yard adjacent to their fields, therefore, it is common to cut out a 1 to 5 acre parcel of the agricultural land and convert it to a storage and maintenance yard, and because it used to be farmland it is very rare to find a yard that has been paved. The “hazardous” materials releases commonly associated with a farm operation rarely occur due to negligence, rather it is commonly from small leaks and spills associated with the handling of the materials on a daily basis. The releases are usually aboveground, small in quantity, and spill onto the dirt surface, therefore, vertical and lateral migration potential is limited.

Underground and Aboveground Storage Tanks (USTs)

Various aboveground and underground storage tanks are located throughout the project area. Owners and operators of USTs are required to register them with the State Water Quality Control Board which is responsible for administering the federally mandated UST program. Prior to development of each Planning Area, all ASTs and USTs shall be removed in accordance with existing standards and regulations prior to commencement of grading operations.

Asbestos Containing Materials

Transite piping will probably be unearthed during the grading of the properties in row crop production, which may contain asbestos. As a result, all unused, and/or unearthed transite pipe shall be consolidated and disposed of an approved acceptance facility in Los Angeles County (Orange County accepts no asbestos related material).

Potential Conflicts with an adopted Airport Land Use Plan

The former Marine Corps Air Station (MCAS), El Toro is located adjacent to the southern border of the project site. The City of Irvine’s adopted General Plan for the reuse of the former Marine Corps Air Station El Toro (MCAS El Toro), located adjacent to the project site and primarily within the City’s Sphere of Influence, is comprised of a mix of uses including preservation, recreation, commercial, multi-use, residential, institutional, and research and industrial. Approximately 440 acres of the former MCAS El Toro is currently within the City’s incorporated boundary. The County of Orange has designated the site for reuse as an airport or as airport-compatible uses in conflict with the City’s plan. The California Environmental Quality Act (CEQA) requires that all potentially significant environmental effects be analyzed and disclosed. The City and County plans conflict, and therefore in an abundance of caution, both plans will be analyzed in the cumulative

impact analysis in Section 4.9 of this EIR. There are no private airstrips located in the vicinity of the project area.

Possible Interference with an Emergency Response or Emergency Evacuation Plan

As discussed earlier in this section, the City's Emergency Management Plan (EMP) does not specifically address planning or design standards for development projects or land use planning programs. The proposed project would not, therefore, have any effect on the EMP. However, the EMP may need to be reviewed or expanded to address the proposed annexation of the Northern Sphere Area.

Should an emergency develop within and be confined to the Northern Sphere Area, it is expected that on-site residents would have sufficient emergency evacuation options. Emergency evacuation routes to the outlying arterial roadway system would be available via several different outlets. Residents could access the Eastern/Foothill Transportation Corridors from Trabuco Road, Irvine Boulevard, and Portola Parkway. In addition, residents could access the Santa Ana (I-5) Freeway from the Eastern Transportation Corridor (SR-133), Sand Canyon Avenue and Jeffery Road. The adequacy of the available emergency evacuation routes will be reviewed by the Public Safety Department as each tentative subdivision map is submitted.

If electrically-operated, gated entrances are included in the residential developments, special mechanisms will need to be built into those gates to ensure that they can be opened manually in the event of a power failure. Such gates will also need to be designed in accordance with the standards of the OCFA and the City of Irvine Public Safety Department to ensure that they are adequately accessible by fire engines and other emergency response vehicles.

Creation of a Health Hazard

Residential, Multi-Use, Medical and Science uses, Community Commercial uses, Institutional uses, parks and a public school would be developed within Northern Sphere Area. Residential, Commercial, and Institutional uses typically do not generate, store, dispose of or transport significant quantities of hazardous substances. Such land uses also normally do not involve any dangerous activities that could expose on-site residents or the surrounding community to any health hazards. Land uses, such as Medical and Science, that typically involve hazardous substances are subject to the additional analysis through the conditional use permit process. Therefore, this project is not expected to result in the creation of any health hazards.

Wildland Fire Hazard

Development of a residential community in Planning Area 6, adjacent to a large natural landscape that contains extensive coverage by a variety of flammable native vegetation, would pose a risk to life and property within Planning Area 6, due to a potential for an uncontrolled fire within the natural landscape spreading into structures within the developed portions of Planning Area 6, and

fire exposures from adjacent structures and structure fires spreading to wildland fuels. Risks of wildland fires within Planning Area 6 would be significantly reduced from the current undeveloped condition by the introduction of non-combustible landscape materials, removal of combustible native and ruderal vegetation, installation of a pressurized water supply system with suitably placed fire hydrants, and substantially improved vehicular access to and within the project site. In addition, the proposed project includes a fuel modification zone along all proposed edges between development and adjoining natural landscape, although most of the development area is separated by the Foothill (SR-241) Transportation Corridor. Specific design elements of these zones are not currently known; however, these will be defined with subsequent subdivision maps and site specific development plan submittals, and will be prepared in accordance with the OCFA Guidelines, as previously described.

Due to the reduction in combustible landscape area and the introduction of a variety of fire prevention and fire suppression elements into the built environment within Planning Area 6, no significant impacts involving wildland fire hazard are expected to result from this project.

Cumulative Impacts

Removal of any contaminated soils within Northern Sphere Area that may be required would involve only site-specific activities and would not add to or combine with similar site-specific impacts that may occur during the development of Planning Area 40/Spectrum 8 or Millennium Plan II. No dangerous activities or significant use of hazardous substances presently occur or are anticipated in the existing or future residential areas surrounding Northern Sphere Area. No adverse cumulative impacts related to hazardous substances or the creation of any health hazards are anticipated as a result of this project.

Full buildout of Northern Sphere Area would add 12,350 new households to the immediate area, and a resident population estimated at nearly 34,843 persons. However, development of a large-scale residential communities within Planning Area 6, will substantially reduce the present level of wildland fire hazard in northern Irvine. This would result from conversion of large areas of presently natural, flammable landscape into an urbanized landscape that includes non-combustible vegetation, on-site irrigation, a pressurized water system and fire hydrants, and improved site access. As a result, implementation of the Northern Sphere Area along with other cumulative development in the area is expected to significantly reduce the fire hazard potential.

4.7.3 MITIGATION MEASURES

Existing Regulations and Standard Conditions

- 7.1 Subdivision maps and site-specific development projects within Planning Area 6 shall be submitted by the landowner or subsequent project applicant to OCFA for review to ensure compliance with the Orange County Fire Authority's "General Guidelines for Development Within & Exclusion from Very High Fire Severity Zones," "Guidelines for Fire Authority

Emergency Access (Gates and Barriers),” “Guidelines for Fuel Modification Plans and Maintenance,” and “Guidelines for Fire Apparatus Access Roads and Fire Lane Requirements.”

Project Design Features/Special Development Requirements

No project design features or special development requirements related to hazards and hazardous materials are proposed.

Additional Mitigation Measures

- 7.2 Prior to approval of tentative subdivision maps and site-specific development projects within Northern Sphere Area, the landowner or subsequent project applicant shall submit evidence demonstrating compliance with City of Irvine Ordinance No. 95-14, Exhibit “D.” The City of Irvine Ordinance No. 95-14 includes the adoption of a High Fire Hazard Zone along with required conditions of approval.
- 7.3 Prior to issuance of a grading permits for each Planning Area, a Phase I Environmental Site Assessment and Phase II Site Assessment, if necessary, shall be completed for the Planning Area by the landowner or subsequent project applicant and submitted to the Community Development Department.
- 7.4 Prior to issuance of a grading permit or a demolition permit for on-site buildings, an asbestos survey shall be conducted for irrigation pipes and/or buildings and submitted to the Community Development Department by the landowner or subsequent project applicant. If the materials are found to contain asbestos fibers, demolition shall be conducted in accordance with federal, State, and local laws.
- 7.5 Prior to issuance of grading permits for each Planning Area, the landowner or subsequent project applicant shall submit evidence to the Community Development Department that all ASTs and USTs have been removed in accordance with existing standards and regulations. Soils samples shall be collected beneath the tanks to determine if any leaks occurred. Soils samples shall be analyzed for hydrocarbons including gasoline and diesel.

4.7.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The mitigation measures identified above would reduce potential impacts associated with environmental hazards to a level of insignificance. The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

4.8 Hydrology and Water Quality

In August 2001, RBF Consulting prepared a report titled Concept Drainage Study for Northern Sphere Area. In October, 2001, GeoSyntec prepared a report titled Northern Sphere Area Water Quality Assessment Technical Appendix. This section includes a summary of the drainage report as well as a summary of information on water quality. The Concept Drainage Study and Water Quality Assessment Technical Appendix is included in its entirety as Appendix J of this EIR.

4.8.1 ENVIRONMENTAL SETTING

Physical Setting

The proposed project is located within the San Diego Creek watershed, which is 105 square miles in area and drains to Upper Newport Bay. The project site can be divided into three drainage sub-basins within the San Diego Creek watershed. Portions of the project lying west of the Eastern (SR-133) Transportation Corridor are tributary to the Central Irvine Channel (also known as the Trabuco Channel). Portions of the project extending from the Eastern Transportation Corridor to approximately the intersection of Portola Parkway and the Foothill (SR-241) Transportation Corridor are tributary to the Marshburn Channel. The easternmost portions of the project are tributary to the Agua Chinon Wash.

The topography of the project site consists of moderately steep canyons north of the Eastern/Foothill Transportation Corridors, with reduced gradients towards the lower elevations to the west. The elevation of the portion of the site proposed for development ranges from approximately 170 feet to approximately 770 feet above mean sea level. (USGS Topographic Map, Tustin and El Toro Quadrangles.) The watershed has a Mediterranean-type climate characterized by short, mild, semi-wet winters and hot, dry summers. Even in the winter, rainfall tends to arrive in multiple storms followed by long dry periods. The 40-year average annual rainfall, recorded at Tustin-Irvine Ranch Station, was calculated to be 12.67 inches, of which 90 percent occurs between November and April. (OCPFRD, Rainfall Data for Orange County, 1998.)

Existing Drainage Facilities

The major drainage courses within the site are characterized by relatively steep incised channels in the upper canyons and foothills northerly of Portola Parkway. South of Portola Parkway, the land is generally characterized by mild gradients on the gently sloping plains at the base of the foothills. Agricultural channels installed on the plains dictate much of the drainage patterns south of Portola Parkway. Numerous regional flood control and local drainage systems have been constructed within the project area.

The existing flood control facilities proximate to the site are the Trabuco Basin, Marshburn Basin (outside of the project site), Agua Chinon Retarding Basin, and the Bee Canyon and Round Canyon Retarding-Basins. The Trabuco Retarding Basin is located at the northeast corner of Jeffery Road

and Trabuco Road. The Marshburn Retarding Basin is located outside of the project site north of Irvine Boulevard, and east of Sand Canyon Avenue. The Agua Chinon Retarding Basin is located south of the Foothill (SR-241) Transportation Corridor, near the eastern edge of the site. The Bee Canyon and Round Canyon Retarding-Basins are located north of SR-241, and provide storm water detention for the watershed that is tributary to the Marshburn Channel.

The existing channel facilities proximate to the site are the Central Irvine (Trabuco) Channel, the Marshburn Channel, the Bee Canyon Drain, the Round Canyon Drain, and the Agua Chinon Wash. The Central Irvine Channel extends from the Peters Canyon Channel to Jeffrey Road, and terminates at the Trabuco Retarding Basin. The Round Canyon Drain and a portion of the Bee Canyon Drain flow to the Marshburn Basin, and then to the Marshburn Channel, which is a concrete-lined trapezoidal channel that flows along the eastern side of State Route 133 from Irvine Boulevard to the project limits at Trabuco Road. The Agua Chinon Wash is an improved earthen channel with concrete drop structures extending from the outlet of the retarding basin to approximately 2,000 feet downstream. Below this point, the wash is a natural incised channel which flows across the site boundary with the former Marine Base.

Existing Culverts and Storm Drain Facilities

Existing storm drain facilities are shown on Exhibit 4-36. The following is a discussion of the existing culverts and storm drain facilities located in the project area.

Eastern/Foothill Transportation Corridor Facilities - Construction of the Eastern/Foothill (SR-133 and SR-241) Transportation Corridors was completed in October 1998. As a result of the construction, numerous drainage facilities were constructed to convey offsite flows from one side of the road to the other, as well as drain the roadway itself. The roadway drainage systems are designed to convey a 25-year storm event. The cross-culvert facilities are designed to convey a 100-year storm event.

Portola Parkway - Portola Parkway full street improvements have been completed from Jeffrey Road to the intersection with the Foothill Transportation Corridor. These improvements included installation of cross drainage culverts to convey offsite runoff. Local drainage crossings were designed for a 10-year storm event. Cross culverts for the Bee and Round Canyon water courses were designed for a 100-year storm event.

Jeffrey Road - Jeffrey Road is a major arterial road which traverses the Northern Sphere Area from north to south. Local drainage improvements have been completed with the roadway improvements. These drainage facilities generally include local storm drain systems to intercept roadway runoff, and cross-culverts at major street intersections.

Exhibit 4-36 Existing storm drain facilities

A earthen trapezoidal channel (F05S05) parallels Jeffrey Road from Irvine Boulevard to Trabuco Road. At the location of the existing agricultural packing plant (north of Bryan Avenue), the channel flow is intercepted and conveyed within the street section in 2 parallel 54-inch pipes. South of Bryan Avenue, the channel has been recently improved as part of the Trabuco Retarding Basin improvements. The channel in this reach is a composite section with an earthen bottom and concrete-lined side slopes. Immediately upstream of the Trabuco Basin, the channel section is also designed to function as the emergency spillway for the basin. Flows in excess of the basin design capacity (100-year storm event) would overtop the channel along this reach, and flow downstream along Jeffrey Road.

Sand Canyon Avenue - Sand Canyon Avenue is major north-south arterial roadway adjacent to the Eastern Transportation (SR-133) Corridor. No major drainage facilities are constructed within the road. The drainage facilities in Sand Canyon Avenue include cross-culverts at the intersections with Trabuco Road, Irvine Boulevard, and Portola Parkway.

Trabuco Road - Trabuco Road is an east-west roadway along the southern boundary of the Northern Sphere Area. No drainage facilities are constructed within Trabuco Road along the project area. West of Jeffrey Road, the Central-Irvine Channel is constructed adjacent to Trabuco Road. An existing earthen ditch along the north side of Trabuco Road between Jeffrey Road and Sand Canyon Avenue conveys runoff from the tributary agricultural fields to the Trabuco Retarding Basin.

Irvine Boulevard - Irvine Boulevard is a major east-west arterial roadway through the Northern Sphere Area. Storm Drain Facility F25P03 is the only major longitudinal storm drain system within the street section. This existing system varies from 36 to 42 inches along the project site. The system was designed in 1977 to convey a peak runoff of 174 cfs from PA 5B. Existing cross-culverts are located within the roadway for the existing agricultural ditch between Jeffrey Road and Sand Canyon Avenue, Marshburn Channel, and the Bee Canyon Wash.

Existing Channel Facilities

Central-Irvine Channel - The existing Central-Irvine Channel (Facility No. F25) extends from the Peters Canyon Channel to Jeffrey Road, and terminates at the Trabuco Retarding Basin. This channel is the major drainage facility to convey runoff from the western portion of the Northern Sphere Area. The channel has been improved in various stages, with the current improvements constructed between 1977 and 1996. The channel improvements constructed in 1977 and 1983 extend from Culver Drive to Jeffrey Road, and were original designed to convey a 25-year storm event. These reaches of channel were designed and constructed prior to the preparation of the Flood Control Master Plan for San Diego Creek (FCMPSDC). The calculated design discharges for these improvements did not account for detention basins proposed and constructed as part of the FCMPSDC. Subsequent improvements by Caltrans, from Culver Drive west to the Peters Canyon Wash, and improvements at Jeffrey Road constructed in conjunction with the basin improvements, were designed to convey the 100-year design discharge. These later improvements were designed using peak discharges determined from the FCMPSDC. The existing channel from west of Jeffrey

Road to west of Culver Drive is not capable of conveying the tributary 100-year storm water runoff under the existing conditions.

Marshburn Channel - Marshburn Channel (Facility F16) is a concrete lined trapezoidal channel which flows north to south along the eastern side of the Eastern (SR-133) Transportation Corridor from Irvine Boulevard to the project limits at Trabuco Road. The channel along this reach has not been constructed to the ultimate configuration. Previous studies by Silverado Constructors indicate that the existing channel at Irvine Boulevard has the capacity to convey approximately 300 cfs. Downstream of Trabuco Road to Irvine Center Drive, the Marshburn Channel has been constructed to the ultimate configuration. The segment from Irvine Center Drive to the outlet at San Diego Creek is designed and expected to complete construction by early 2002.

Aqua Chinon Wash - Aqua Chinon Wash (Facility F18) is an improved earthen channel with concrete drop structures from the outlet of the retarding basin to approximately 2,000 feet downstream. Below this point, the wash is a natural incised channel to the boundary with the former Marine Base. The LOMR application for the wash indicates that the existing and improved channel generally has the capacity to convey the discharge from a 100-year storm event.

Existing Reservoirs and Flood Control Facilities

Trabuco Retarding Basin - A critical element in the flood control system for the planning area is the Trabuco Retarding Basin, Facility No. F25B01. The basin constructed in 1996 is within a flood control easement and is operated and maintained by Orange County Flood Control District (OCFCD). The basin is excavated below ground and has an earthen embankment located at the northeast corner of Jeffrey Road and Trabuco Boulevard. The basin has three primary inflow systems and a double 6.5' x 6' outlet conduit. The earthen dam has a storage capacity of approximately 270 acre-feet below the spillway crest and is under the jurisdiction of the State of California Department of Water Resources Division of Safety of Dams (DSOD).

The Trabuco Basin is a major impoundment which receives tributary drainage and runoff from the proposed development watershed. The original design of the basin will dictate the ultimate drainage patterns for the development of the tributary area. Three inflow collector systems were installed with the basin, and drainage patterns for the tributary area must be designed to conform to the assumptions made for the original basin design. The FCMPSDC identified a 100-year ultimate condition peak outflow from the basin of 952 cfs.

Marshburn Retarding Basin - The Marshburn basin (Facility No. F16B01) was recently constructed within the watershed, but outside of the project site, as part of the Eastern (SR-133) Transportation Corridor improvements. The basin is located north of Irvine Boulevard, approximately 2,500 feet east of Sand Canyon Avenue. The overall basin was designed and constructed to accommodate the future ultimate condition drainage, however, the inflow collector systems and outflow discharge line were constructed for the interim condition only. The interim condition configuration for the basin was designed such that the interim discharge from the basin would not exceed the capacity of the

existing downstream Marshburn Channel. Reconstruction of the collector system and outflow line will be required to accommodate ultimate development of the watershed.

The "*Final Design Report, Marshburn Retarding Basin*," prepared by John M. Tettemer & Associates, dated August 21, 1997 was approved by the County of Orange on August 19, 1998. The report, prepared for the design of the basin, developed ultimate condition flow rates and drainage patterns which differed from the original patterns in the FCMPSDC. The Marshburn Channel was designed for an 100-year ultimate condition peak inflow rate of 4,086 cfs, with a corresponding peak outflow of 901 cfs. Proposed drainage patterns for the Northern Sphere Area should be designed to follow the assumptions used for the design of the basin.

Bee and Round Canyon Detention Basins - These two major drainage facilities were constructed on the northern side of the Foothill (SR-241) Transportation Corridors in 1994. These two jurisdictional sized dams provide storm water retention for the watershed tributary to the Marshburn Channel. These existing facilities will not be impacted by the development of the Northern Sphere Area. Peak outflow from these basins shall be used for the design of downstream drainage improvements. The FCMPSDC identified a 100-year ultimate condition peak inflow and outflow from the Bee Canyon Retarding basin of 2,027 cfs and 94 cfs, respectively. The FCMPSDC identified a 100-year ultimate condition peak inflow and outflow from the Round Canyon Retarding Basin of 2,293 cfs and 182 cfs, respectively.

Agua Chinon Retarding Basin - The Agua Chinon Basin (Facility F16B01) is a regional storm water detention basin constructed within the eastern limits of the Northern Sphere Area. The earthen dam has a storage capacity of approximately 250 acre-feet below the spillway crest and is under the jurisdiction of the DSOD. The FCMPSDC identified a 100-year ultimate condition peak inflow and outflow from the basin of 2,433 cfs and 275 cfs, respectively.

Watershed Hydrology

Existing Baseline Drainage Sub-basin

The pre-development hydrology was established for the project watershed which will serve as the benchmark for comparison and evaluation of the magnitude of hydrologic impacts from the development. The baseline hydrology will allow quantifying the "pre-development" watershed runoff values. Pre-development hydrology calculations were performed using the guidelines established in the Orange County Hydrology Manual, 1986 Edition. Existing condition hydrology for the Marshburn and Agua Chinon watersheds was taken from previous studies recently performed for these watersheds. The Existing Condition Hydrology Map is shown on Exhibit 4-37.

Trabuco Drainage Sub-basin - The majority of runoff from the Northern Sphere Area within the Trabuco drainage sub-basin is tributary to the Trabuco Retarding Basin at the north-east corner of Jeffrey Road and Trabuco Road. Runoff from PA 5B is tributary to the existing 42 inch storm drain system (Facility F25P03) in Irvine Boulevard, and runoff from PA 8A is flows directly to the

Exhibit 4-37 Existing Condition Hydrology Map

Central-Irvine Channel west of Jeffrey Road. An existing condition hydrologic analysis was prepared to determine the peak flow rates to these facilities under the pre-development land use condition, using the current County hydrology criteria.

Two recent hydrology studies have been previously prepared for the area. These studies include the FCMPSDC, and the Peters Canyon Wash Update. The Peters Canyon Wash Update was prepared in 1996 to revise the design flow rates in the FCMPSDC based on changes to the watershed as a result of land use changes and modifications to the Eastern (SR-133) Transportation Corridor alignment. The interim condition flow rates in the Peters Canyon Wash Update Report were intended to represent the existing condition after the completion of the Eastern (SR-133) Transportation Corridor improvements. A detailed review of the watershed boundaries in the Peters Canyon Wash Update within the Northern Sphere Area was performed to determine if the analysis accurately reflects the current pre-development condition of the watershed. Minor variations to the watershed boundaries were identified based on a field survey of the watershed, and a detailed review of record drawings for street and drainage improvements. The modifications to the drainage patterns include:

- The Update Report was completed prior to the completion of the final Corridor improvements, and does not reflect corridor runoff north of Portola Parkway which discharges to the Trabuco drainage sub-basin via a storm drain system discharging south of Portola Parkway.
- Runoff north of Trabuco Road and east of Sand Canyon Avenue is conveyed across Sand Canyon Avenue via an existing 45 inch storm drain pipe and is included in the Trabuco watershed. A portion of this area was not included in the Trabuco drainage sub-basin in the Update Report.
- A small drainage area north of Portola Parkway and west of Jeffrey Road is shown in the Update Report as draining to PA 5B. Portola Parkway record drawings indicate that this area discharges directly to the Hicks Canyon Channel.

A updated existing condition hydrology study for the Trabuco drainage sub-basin within the Northern Sphere Area was prepared as part of this master plan of drainage report. Peak discharges were calculated at the three concentration points where runoff from the project site is discharged to existing drainage facilities. These discharges will be used as the baseline condition to assess the condition of existing drainage facilities, and determine impacts from the proposed planned development. Table 4-28 includes a summary of existing condition runoff from the Northern Sphere Area within the Trabuco watershed.

Table 4-28 Existing Condition (Baseline) Hydrology Summary (Trabuco Watershed)					
Concentration Point	Location	MPD Analysis		Peters Canyon Wash Update ⁽¹⁾	
		Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)
447	PA 5B discharge to Fac. F25P03	642.4	316.5	706.4	312.4
409	Inflow/Outflow from Trabuco Basin	2,502/839 (113 ac-ft) ³	1,696	2,075/794 (96 ac-ft) ³	1,581
60	PA 8A discharge to Central-Irvine Channel	103.1	70.9	-- ²	--
Notes: 1. Interim Condition Flow Rate from "San Diego Creek Flood Control Master Plan, Peters Canyon Wash Updated." 2. "--" indicates that flow rates were not identified in the Peters Canyon Wash Update. 3. Peak storm volume in basin during the design storm event.					

Concentration Point 447 discharges to an existing storm drain (Facility F25P03) within Irvine Boulevard. The design discharge for the storm drain system, taken from the available record drawings, indicated that the 42 inch pipe was designed to convey 174 cfs. The existing drainage system is significantly undersized, and the resulting overflow is conveyed west along Irvine Boulevard to Yale Avenue. At Yale Avenue, a portion of the water is conveyed southerly down Yale, and the remaining flow continues west in Irvine Boulevard.

Runoff at concentration point 409 discharges to the Trabuco Retarding Basin (Facility F25B01). Outflow from the basin is conveyed to the existing Central-Irvine Channel. The Central-Irvine Channel downstream of the retarding-basin was originally sized to convey runoff from a 25-year storm event. The original design discharge in the existing channel at Jeffrey Road is 990.4 cfs as indicated on the "Construction Plans for the Improvements of Jeffrey/Trabuco Drainage Facilities and Monroe Crossing," approved August 1, 1983. The FCMPSDC did not identify improvements to the Central-Irvine Channel between Jeffrey Road and Culver Drive. Therefore, it is believed that the FCMPSDC intended to use the existing Central-Irvine Channel by mitigating upstream discharges to the design capacity of the existing facility. The 100-year peak outflow from the Trabuco Retarding Basin for the ultimate condition was determined to be 952 cfs in the Update Report. This peak outflow is less than the original channel design capacity for the downstream channel. However, since the original channel was designed for a 25-year storm event, increased discharges in the channel as the runoff proceeds downstream, resulting from lateral inflow between Jeffrey Road and Culver Drive was based on a 25-year event. Current criteria requires that regional channels be designed for a 100-year storm event. Assuming 100-year runoff from the tributary area

between Jeffrey Road and Culver Drive (approximately 1,090 acres) is to be intercepted and conveyed by the channel, the available capacity upstream at Jeffrey Road will be significantly reduced.

Concentration Point 60 discharges directly to the Central-Irvine Channel approximately 1,300 feet west of Jeffrey Road. As previously indicated, the Central-Irvine Channel was designed for a 25-year storm event. The existing channel does not have the capacity to convey the runoff from a 100-year storm event under the current conditions even with the recent construction of the Trabuco Retarding Basin.

Central Irvine Channel Capacity - A detailed hydraulic analysis of the existing Central-Irvine Channel was performed from downstream of Culver Drive to the Trabuco Retarding Basin. The purpose of the analysis was to verify the capacity of the existing facility, and determine the maximum outflow from the Trabuco Retarding Basin that will allow the channel to function in accordance with current criteria to convey a 100-year storm event. The 100-year lateral inflow to the channel was determined by subarea proration method. An ultimate condition peak discharge at Culver Drive (2,517 cfs) was determined using the HEC-1 hydrograph model from the Peters Canyon Wash Update, revised to reflect the new confluence with the freeway drain downstream of Culver Drive. The design discharge from the Trabuco Retarding Basin was then subtracted from the Culver Drive peak flow rate to determine the lateral inflow along the subject reach. The lateral inflows at major side drain locations were then prorated from the change in discharge based on the tributary area to the side drain. Inflow at the Yale Avenue street crossing also included street flow from drainage areas north of Irvine Boulevard.

The results of the hydraulic analysis indicate that assuming no outflow from the Trabuco Retarding Basin, the existing channel downstream of Yale Avenue does not meet current criteria for freeboard requirements during a 100-year storm event. A bank full capacity analysis was also prepared. The results of the bank full analysis indicate that a maximum outflow of approximately 300 cfs from the retarding basin will result in the downstream channel flowing at the top of the channel banks during a 100-year storm event.

Marshburn Drainage Sub-basin - Runoff from the project site within the Marshburn drainage sub-basin is tributary to the existing Marshburn Retarding Basin, and the Marshburn Channel at Trabuco Road. The existing condition runoff from the project site within the Marshburn watershed has been recently studied as part of the "Final Design Report, Marshburn Retarding Basin," dated August 21, 1997. A field survey of the drainage sub-basin boundaries and land use assumptions for the interim condition analysis indicate that the study accurately reflects the current pre-development condition, except at concentration point 4 at Irvine Boulevard. The field review indicated that an additional 26 acres is tributary to the Marshburn Channel at this point. The interim condition hydrology from the Marshburn Retarding Basin report will be used as the baseline condition to represent the existing condition of the watershed, with the additional 26 acres of drainage area added at Irvine Boulevard. The model from the Marshburn Retarding Basin report was then extended downstream to Trabuco Road. The downstream reach of the channel intercepts runoff between the

ETC and the Marshburn Channel, and from the northwest corner of the MCAS El Toro base. A field review of the base drainage patterns was performed to identify the area tributary to the Marshburn Channel. The field review indicated that the base drainage area is in conformance with the area previously identified in the FCMPSDC. Table 4-29 includes a summary of existing condition runoff at the downstream limits of the Northern Sphere Area within the Marshburn watershed.

Table 4-29 Existing Condition (Baseline) Hydrology Summary (Marshburn Watershed)			
Concentration Point	Location	Existing Condition	
		Q ₁₀₀ (cfs)	Area (acres)
94	Inflow/Outflow from Marshburn Basin	1,938/97 (232 ac-ft) ⁽¹⁾	3,687.5
4	Discharge to Marshburn Channel at Irvine Blvd.	195	3,773.5
7	Marshburn Channel Discharge at Trabuco Road.	1,048	4,233.5
<i>Notes:</i> 1. Existing Condition Flow Rates at CP 94 taken from Interim Condition Flow Rates from "Final Design Report Marshburn Retarding Basin." 2. Peak storage volume in the basin during the design storm event.			

The Marshburn Basin was designed to ultimately handle the runoff from the developed condition watershed. However, the inflow and outflow facilities for the existing basin were constructed for the interim condition only. The interim condition was designed to operate under the existing land use condition, and result in a maximum discharge to the Marshburn Channel at Irvine Boulevard of less than 300 cfs. Modifications to the basin will be required as a part of the project development to retrofit the inflow and outflow facilities to handle the ultimate condition discharges.

Agua Chinon Drainage Sub-basin - Runoff from the project site within the Agua Chinon drainage sub-basin is tributary to the existing Agua Chinon Retarding Basin, and downstream at an existing storm drain culvert at the former Marine Corps Base boundary. A hydrologic analysis for the Agua Chinon drainage sub-basin has been prepared as part of the FCMPSDC. The analysis was only prepared for the developed condition, and assumed single family residential development (5-7 dwelling units/acre) for much of the watershed. Per the FCMPSDC, the Agua Chinon Retarding Basin was designed to mitigate developed condition flow rates to the capacity of the existing downstream drainage facilities within the former Marine Corps Base. As indicated in the "Application/Certification Forms to obtain a Letter of Map Revision for Agua Chinon Retarding Basin, Agua Chinon Wash in Orange County, California," dated November 2000, the existing facilities downstream of the basin have the capacity to convey the design flow rates. The proposed

development of the Northern Sphere Area will result in less intensive land uses than what was assumed in the FCMPSDC, therefore, no impact to the regional channel is anticipated from the project development. Table 4-30 includes a summary of design runoff to the Agua Chinon Retarding Basin, and at the downstream limits of the Northern Sphere Area within the Agua Chinon watershed.

Table 4-30 Design Discharge Hydrology Summary (Agua Chinon Watershed)			
Concentration Point	Location	Design Condition ⁽¹⁾	
		Q ₁₀₀ (cfs)	Area (acres)
8	Inflow/Outflow from Agua Chinon Basin	2,686/278 (224 ac-ft) ⁽²⁾	1,410
403	Discharge to Agua Chinon Channel at Marine Corps Boundary	634	1,760
Notes: 1. Flow Rates from "Application/Certification Forms to obtain a Letter of Map Revision for Agua Chinon Retarding Basin, Agua Chinon Wash in Orange County, California." 2. Peak storage volume in the basin during the design storm event.			

Watershed Uses

For many years the San Diego Creek watershed, a portion of which constitutes the Northern Sphere Area, was used primarily for ranching and agriculture. More recently, the watershed has been increasingly urbanized. As of the year 2000, the percentage of agricultural land in the watershed is approximately 7% of the total land area. (Toxics TMDL Final Problem Statement, p. 12.) The project site, consisting of approximately 7,745 acres, contains approximately 5,215 acres of existing open space. Currently, the portion of the site used primarily for agriculture includes approximately 1,128 acres of irrigated row crops (strawberries, tomatoes, celery, and beans), 378 acres of orchard crops, primarily avocados, 799 acres of nursery stock, and 200 acres of grazing land. The existing agricultural practices include soil fumigation, the use of plastic mulch on raised strawberry rows, drip irrigation, and slow release fertilization. Pesticides have been and currently are used at the property.

Table 4-31 lists land uses for the existing and developed conditions. In addition to the approximately 3,000 acres of existing open space in PA 3 that will be preserved, an additional 1,600 acres of open space in the Northern Sphere Area have been offered for dedication as a result of the project (see Table 2-4 in Section 2 of this EIR). Planning Area 3 and Implementation District "P" and the Trabuco Retarding Basin were not included in the water quality model (described in more

**Table 4-31
Land Use and Modeling Assumptions (Acres)**

Land Use & Percent Imperviousness		Northern Sphere Planning Area Totals					Totals	Modeled as
		2/3*	5B	6	8A	9A		
EXISTING								
Open Space and Recreation	0	4,493	32	1,304		132	5,961	Open
Ag - Nursery	10		224	231		344	799	Row crop
Ag - Strawberries	50		63	110		573	746	Row crop
Ag - Other Row Crop	0			81***	73	228	382	Row crop
Ag - Orchards	0			378			378	Orchards
Ag - Grazing	0			200			200	Open
Water Bodies	100			25			25	Water
Totals		4,493	319	2,329	73	1,277	8,491	
PROPOSED								
Open Space		748					748	
Preservation**	0	3,745		852			4,597	Open
Recreation	0			258		72	330	Open
Water Bodies	100			25			25	Water
Medium Density Res.	60		319	866	73	678	1,936	SF Res.
Medium-High Density Res.	70					89	89	MF Res.
Multi-Use	90			20		60	80	Commercial
Commercial Recreation	0					51	51	Open
Community Commercial	90			20			20	Commercial
Medical and Science	90			285		317	602	Commercial
Institutional	70			3		10	13	Education
Totals		4,493	319	2,329	73	1,277	8,491	
Notes:								
* Planning Area 3, Implementation District “P” within Planning Area 2, and the Trabuco Retarding Basin were not included in the water quality model because there are no land use changes proposed for these areas as part of the project. Of the 3,745 acres of existing open space, approximately 730 acres constitute the Frank R. Bowerman sanitary landfill, which may in the future (not as a result of the Project) be used for recreation. As a result, water quality in these areas would not be affected by the proposed development.								
** Preservation: open space areas that will be preserved in their existing condition.								
*** Agricultural uses including some equipment and material storage.								
Sources: Northern Sphere Area Draft EIR (Table 2-2), and table of leased agricultural acreage provided by P. Changala, TIC.								

detail in the Water Quality Assessment Technical Appendix (GeoSyntec, 2001)) because the project does not alter the existing condition of that land. By analyzing those areas that are proposed for development, the water quality model more accurately describes the changes that will result from the project.

Water Quality

Receiving Waters Beneficial Uses

Some runoff waters from the project area discharge directly into Agua Chinon Wash, a water body with beneficial uses. Some runoff waters from the project area discharge directly into the Central Irvine (Trabuco) Channel which is a tributary of Peters Canyon Wash. Some runoff waters from the project discharge directly into the Marshburn Channel. No beneficial uses have been specified for the Marshburn Channel. Other runoff water from the proposed project will discharge into the municipal storm drain system that eventually drains into San Diego Creek. The San Diego Creek, in turn, drains into Upper Newport Bay. The Regional Board has established beneficial uses for some of these water bodies, as indicated in Table 4-32.

Surface Water Quality

In storm water runoff, sediment, nutrients, and pesticides are generally considered the most prevalent pollutants to enter the storm drain system from agricultural crop and nursery uses. Average expected storm water concentrations and loads for constituents found in runoff waters from agricultural land with uses similar to the existing uses of the proposed project site are provided in Table 4-33. As described in more detail in the Water Quality Assessment Technical Appendix (Geosyntec, 2001), Table 4-33 is based both upon agricultural data (both row crop data and orchard data) from Ventura County, which sampled storm water runoff water from agricultural land ("the Ventura County Data") and, where applicable, upon open space data from upland Los Angeles County. The characteristics of the drainage areas from which this data was obtained are generally similar to those of the proposed project site.

Table 4-32 Beneficial Uses of Upper Newport Bay, San Diego Creek, and Tributaries				
Beneficial Use	Other Tributaries	San Diego Creek Below Jeffrey Rd.	San Diego Creek⁽¹⁾ Above Jeffrey Rd.	Upper Newport Bay
Groundwater Recharge	X		X	
Water Contact Recreation	X	X	X	X
Non-Contact Water Recreation	X	X	X	X
Commercial and Sportfishing				X
Warm Freshwater Habitat	X	X	X	
Preservation of Biological Habitats of Special Significance				X
Wildlife Habitat	X	X	X	X
Rare, Threatened, or Endangered Species				X
Spawning, Reproduction, and Development				X
Marine Habitat				X
Shellfish Harvesting				X
Estuarine Habitat				X
<i>(1) For areas of San Diego Creek upstream of Jeffrey Road, the Agua Chinon Wash, and other tributaries, applicable beneficial uses are intermittent only, meaning that water conditions do not allow the beneficial use to exist year-round.</i>				

Table 4-33 Expected Development Area Pre-Development Stormwater Pollutant Concentrations and Calculated Loads				
	Constituent	Units for Concentration	Average Expected EMC⁽¹⁾	Calculated Annual Load (lbs.) ⁽²⁾
Nutrients	Total Kjeldahl Nitrogen	mg/l (milligrams per liter)	6.00	12,297
	Nitrate-Nitrogen	mg/l	8.21	16,821
	Total Phosphorus	mg/l	2.03	4,153
Sediment	Total Suspended Solids	mg/l	1,085	2,222,400
Metals	Total Copper	ug/l (micrograms per liter)	120	245.1
	Total Lead	ug/l	39	79.9
	Total Zinc	ug/l	257	527
<i>Source: Water Quality Assessment Technical Appendix (Geosyntec, 2001)</i> <i>(1) EMC: Event Mean Concentration, which is the concentrations that would be measured if the entire runoff from an event was captured and mixed before sampling</i> <i>(2) Load: The mean annual mass of the constituent leaving the development area.</i>				

For these reasons, the estimates in the analysis below are considered to be reasonable approximations of existing storm water quality conditions for development areas within the project site.

Pathogens and nitrate are generally considered the most prevalent pollutants associated with dry weather flows in the storm drain system. Dry weather flows are typically low in sediment (and pollutants associated with sediments) because the flows are relatively slow and the more coarse sediment tends to settle out or be filtered by algae and other plants growing on the channel bottom of the drainage. The analysis of dry weather flows is based on data obtained by the Orange County Public Facilities and Resource Department (OCPFRD, 2000) at several locations whose catchments represent a mix of open space, commercial, residential and agricultural land uses.

Sediment. The estimated sediment load of 2,222,400 pounds per year in Table 4-33 is based on runoff estimates from local climatic data and on water quality data taken from field-scale monitoring of two agricultural sites in Ventura County and on data taken from one open space site in upland Los Angeles County. The estimate corresponds to about 0.2 to 0.6 tons of sediment per acre per year, depending on the type of crop. This estimate is sensitive to two important assumptions: 1) the extent to which the data is, representative of existing conditions, and 2) the effective imperviousness of the current agricultural fields, some of which incorporate plastic mulch on berries. As discussed

in more detail in the Water Quality Assessment Technical Report (Geosyntec, 2001), the characteristics of the drainage areas from which the data was obtained are generally similar to those of the project area, so the data is deemed to be valid for purposes of this analysis.

A second approach to estimating sediment yield uses the extensive flow and sediment data collected on San Diego Creek. (Inman and Masters, Report on Existing Conditions ("Inman & Masters Technical Appendix"). In the Inman and Masters Technical Appendix, a 20-year review of sediment flux values yielded data showing that sediment delivery to Upper Newport Bay varies depending on annual rainfall. Inman and Masters estimated a mean annual basin yield of 1.8 tons/acre/yr., with a range of 0.2 to 5.5 US tons/acre/yr. depending on rainfall. The sediment yield estimates are likely to be higher for agricultural fields compared with areas with natural vegetation, with the sediment yield from agricultural fields ranging from 1 to 12 tons/acre/yr. The limitations of this estimate lie in the difficulty of apportioning the basin-wide load to a specific site, such as the proposed development site. The mean annual basin yield of 1.8 tons/acre/yr. includes sediment that may arise from a variety of sources (e.g., stream bed downcutting), whereas the modeling results in Table 4-33 represent sediment from land surface erosion only. Modeling results in Table 4-33 are consistent with the Inman and Masters' Data.

Nutrients. Nutrient loading to Newport Bay contributes to seasonal algae blooms (primarily in the summer) which negatively impact beneficial uses such as water contact recreation and wildlife habitat of the Upper Bay. (Nutrient TMDL; OCPFRD, Annotated Bibliography of Existing Information on the Newport Bay/San Diego Creek Watershed ("Annotated Bibliography"), p. 3.4.2.) The nutrients of concern include both nitrogen and phosphorous compounds, including nitrate. Nitrate is a dissolved constituent, whereas phosphorous tends to be more associated with particulates.

Along with the effects of the tidal prism, a significant element of eutrophication²⁸ in Newport Bay is the continued input of nitrate nitrogen from the San Diego Creek. (See Annotated Bibliography, p. 3.4.3.) The average dry weather discharge rate in 1998 was between 12 to 15 cubic feet per second (cfs) and the average dry weather nitrate nitrogen concentration was approximately 15 milligrams per liter. San Diego Creek was estimated to have discharged over 1,000 pounds of nitrate nitrogen per day into the Bay in 1998. (Id.)

Irrigation return flows from the irrigation of agricultural crops and from several commercial nurseries in the watershed were identified to be the predominant sources of nutrient input to Newport Bay. (Nutrient TMDL.) Despite substantial reductions in nutrient loading over the years, largely due to the introduction of more controlled irrigation systems and/or recycle systems, both San Diego Creek and Upper Newport Bay remain listed as impaired due to nutrients, although on October 26, 2001, the RWQCB proposed to delist these water bodies for nutrients. Estimated

²⁸ *An effect occurring in water bodies where high levels of minerals and organic nutrients in water cause the proliferation of plant life, especially algae, which reduces dissolved oxygen and can adversely affect species diversity.*

pre-development storm water nutrient concentrations and loads for the development site are provided in Table 4-33.

Pathogens. Pathogens in runoff are typically more prevalent where there is grazing or feedlots, rather than row crops. However, pathogens in runoff from row crops at the project site could originate from wildlife (e.g., birds) that use the row crops for forage and/or habitat. Pathogens may also originate from grazing activities. Traditionally, pathogen presence has been measured indirectly by bacteriological indicators such as total coliform, fecal coliform, enterococci, and *E. coli* bacteria (EPA, Guidelines for Preparation of Comprehensive State Water Quality Assessments). These indicators provide an indication of the levels of human pathogens. While they have been relatively successful in assessing human pathogens in sanitary system discharges, the indicators are relatively poor when used for storm water.

Pesticides and Other Toxics. Extensive toxicity testing conducted in the watershed indicates that organophosphate pesticides, copper and selenium may be sources of toxicity in San Diego Creek and Upper Newport Bay. (Toxics TMDL Final Problem Statement, pp. 7, 8.) Other pollutants, including other trace metals and polycyclic aromatic hydrocarbons (PAHs) have not been identified as contributing to toxicity in the watershed. Soils naturally contain trace levels of heavy metals, and some fertilizers and pesticides can contain heavy metals. Thus, metals are carried in agricultural runoff, as verified by the Ventura County Data used as the source of the Table 4-33 estimates.

Pesticides are applied to the agricultural fields at the project site. The amounts and time of year of application depend upon crop type and growing season. The Ventura County Data shows measurable concentrations of pesticides from agricultural land planted in row crops.

Groundwater

The site has two different groundwater regimes that correspond to the two physiographic areas of the site, specifically, the Tustin Plain and the foothills of the Santa Ana Mountains. The groundwater in the foothills of the Santa Ana mountains (located in the northern and eastern portions of the site) typically consists of perched groundwater within alluvial filled canyons and of groundwater seepage from fractured bedrock. Depths to perched water vary from canyon to canyon, generally ranging from between 10-25 feet, to up to 50-70 feet. Groundwater seeps are present in the foothill areas and are most prevalent near agricultural areas. (NMG, 2001.) The regional groundwater table underlying the mountainous regions is thought to be hundreds of feet in depth. (NMG, 2001.)

Groundwater in the Tustin alluvial plain (located in the western and southern portions of the site) generally flows in a westerly direction corresponding to regional topography. At the site, the alluvial plain ranges in thickness from a few feet in the foothill areas up to 300 feet in the southwest corner. Recharge areas are found in the foothill plain regions where sandy soils are predominant. Clayey and less permeable surface materials occur in the southwest portions of the site, providing less opportunity for recharge. Groundwater depths within the Tustin plain range from 45 feet in the

southwest corner to up to 125 feet in the northeast corner. A shallow perched groundwater table (depths 15-25 feet) located to the west of the site is not present on the site. (NMG, 2001.)

There are no potable water supply wells within the site. (NMG, 2001; IRWD, pers. comm. 2001.) Consequently, there is little information about groundwater quality underlying the site. Limited historical data from deep agricultural production wells are available from the Irvine Ranch Water District. Nitrate concentrations in water samples collected in two off-site wells at depths ranging between 200-1500 feet, were between 1.4 to 15 mg/L (the federal drinking water standard is 10 mg/L as nitrogen). These data were collected between 1953-1965 and in 1983.

Limited historical and recent groundwater quality information is available from seven monitoring wells located in residential areas immediately west and southwest of the site. (IRWD, 2001.) These wells withdraw water from the shallow aquifer west of the site, at depths generally between 10-25 ft. Historical data (1981-89) indicate nitrate concentrations generally below or slightly above 10 mg/L in most samples, with a few wells showing concentrations above 20 mg/L. Concentrations of total dissolved solids ("TDS") ranged from 230-2150 mg/L (recommended maximum contaminant level for taste and odor control is 1,000 mg/L). Data collected in June 1999 show increased nitrate levels in comparison with historical data; nitrate concentrations in nearly all samples were above 10 mg/L, and generally ranged between 15-35 mg/L. The location of these shallow groundwater wells is down-gradient of groundwater flow emanating from the site, which suggests the source of elevated nitrate is either within the residential area, or more likely from agricultural practices in the up-gradient area.

Elevated concentrations of nitrate and TDS in the shallow wells west of the site are indicative of general basin characteristics. Elevated levels of nitrate and TDS are generally attributed to agricultural practices, although TDS levels in the development area may be naturally elevated as a result of groundwater movement through soil. IDMI is a multilevel monitoring well about two miles west of the site, constructed and maintained by the Orange County Water District. Groundwater samples from December 1997 show high nitrate and TDS concentrations (above recommended levels) in the shallow zone (85-95 feet) and low concentrations (<1000 mg/L TDS and under 10 mg/L nitrogen) in the lower zones (270-1060 feet).

The limited data did not indicate the presence of organic compounds (e.g., solvents, fuels) in groundwater within the site. A large plume of groundwater contaminated by a number of organic compounds including trichloroethylene (TCE) is present beneath the former El Toro Marine base directly south of the site. (www.atsdr.cdc.gov.) This plume should have no impact on the quality of groundwater underlying the site because the plume is down gradient of groundwater flow emanating from the site.

Floodplains

The Master Plan of Drainage prepared by RBF Consulting (1) documents existing conditions, and (2) recommends the drainage infrastructure needed to provide the necessary level of flood protection while ensuring that the "baseline" watershed hydrology is maintained to the extent possible. The hydraulic conditions analyzed in the Master Plan of Drainage include the existing condition, which models the existing undeveloped peak flow rates with the existing channel geometry; and the ultimate (or fully developed) condition, which models the ultimate, developed peak flow rates with the channel improvements constructed as part of the project.

According to the hydraulic analysis, the Central Irvine Channel system is deficient under the current 100-year existing conditions. In addition, portions of the site are located within areas identified by the Federal Emergency Management Agency ("FEMA") as subject to the inundation by the 100-year flood event (Flood Hazard Zone "A"), as shown on Exhibit 4-38. The areas shown in Flood Hazard Zone "X" have been identified as an area of moderate or minimal hazard from the principal source of flooding in the area. However, buildings in this zone could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in the community's Flood Insurance Study. There would be a high flood risk if a local drainage system were to fail.

FEMA is currently processing two modifications (associated with the Eastern (SR-133) Transportation Corridor improvements) to the flood plain maps. Once these modifications are processed, the only portions of the site identified by FEMA as subject to such inundation will be located (1) along the existing earthen Central Irvine Channel which runs along Jeffrey Road between Irvine Boulevard and Jeffrey Road, (2) along the Central Irvine Channel westerly of Jeffrey Road, and (3) along the natural drainage course downstream of the Round Canyon Detention Basin to the Marshburn Retarding Basin.

Regulatory Setting

Water Quality

The proposed development is subject to regulation of surface water quality by the U.S. Environmental Protection Agency ("EPA"), the California State Water Resources Control Board ("State Board"), the California Regional Water Quality Control Board, Santa Ana Region ("Regional Board"), the County of Orange ("the County"), and the City of Irvine ("the City").

Exhibit 4-38 FEMA Flood Zone Map

Federal Clean Water Act

The federal Clean Water Act (33 U.S.C. §1251 et seq.) is the principal federal statute governing water quality. The goal of the Clean Water Act is to protect the physical, chemical, and biological integrity of the waters of the United States. The Clean Water Act requires the State to adopt water quality standards for water bodies subject to review and approval by EPA. Water quality standards consist of a designated use or uses for a particular water body, along with water quality criteria based upon these uses (40 C.F.R. §131.3(i)). Designated uses of water bodies describe the appropriate uses of that water body, such as contact recreation, warm water wildlife propagation, and municipal or drinking water uses. Water quality criteria are expressed either as numeric concentrations or levels of constituents or as narrative statements which represent the quality of water that support a particular use.

The EPA has established numeric water quality criteria for receiving waters in the form of the National Toxics Rule ("NTR") (40 C.F.R. §131.36) and the California Toxics Rule ("CTR") (40 C.F.R. §131.38). The NTR and the CTR provide water quality criteria that apply to receiving waters (as opposed to runoff entering receiving waters) based upon certain beneficial uses specified for them. California, in turn, established implementation measures for the NTR and the CTR as discussed further, below.

Direct discharges of pollutants into waters of the United States are not allowed, except in accordance with the permitting program of the Clean Water Act, the National Pollutant Discharge Elimination System ("NPDES") (33 U.S.C. §1342(p)). The agencies with lead authority to implement and administer the NPDES program in the State of California are the State Board and the Regional Boards. Pursuant to the NPDES program, permits have been issued which apply to stormwater discharges from large municipal storm drain systems ("MSW Permits"), specific industrial activities, and large construction activities. The County and the City hold a NPDES permit governing their storm drain systems (see discussion below). In addition, the State has issued a NPDES permit relating to construction activities on sites over 5 acres in area (see discussion below).

Federal regulations require limitations for pollutants that may cause or contribute to an exceedance of a state water quality standard. (40 C.F.R. §122.44.) NPDES permits may establish enforceable effluent limitations on discharges, require monitoring of discharges, designate reporting requirements, or require the permittee to perform best management practices ("BMPs"). BMPs are procedures and design features designed to minimize the release of pollutants. BMPs may be used in addition to numeric effluent limitations, or, in some cases, in lieu of numeric effluent limitations. (40 C.F.R. §122.44(k).)

When application of numeric effluent limitations is infeasible, such as in most permits governing stormwater discharges, effluent limitations have typically been expressed as BMPs. (See discussion below regarding State Construction Storm Water Permit.) For stormwater runoff, Section 402(p) of the Clean Water Act provides that MSW permits must require controls to reduce the discharge of pollutants to the maximum extent practicable (known as "MEP"). The MEP standard was

clarified by the federal courts, which held that MEP did not require that municipal stormwater discharges strictly comply with state water quality standards. (*Defenders of Wildlife v. Browner*, 191 F.3d 1159 (9th Cir. 1999).) The MEP standard is attained by the use of BMPs. For a particular permit, EPA generally bases the MEP standard on technological feasibility, water quality objectives, and other site specific considerations.

Where water quality standards are not being achieved, the Clean Water Act requires identifying and listing that water body as "impaired" under Section 303(d). Once a water body has been deemed "impaired" a Total Maximum Daily Load ("TMDL") for the offending pollutant must be developed for that water body. A TMDL is an estimate of the total load of pollutants that a water body may receive without exceeding applicable water quality standards. Once established, the TMDL is allocated among current and future dischargers into the water body. Impaired waters relevant to the proposed development are the San Diego Creek and the Upper Newport Bay. TMDLs have been established for the San Diego Creek and the Upper Newport Bay. Existing and anticipated TMDLs are discussed further, below.

State and Regional Water Regulatory System

Nonpoint Source Program. The EPA approved the State's Nonpoint Source Program Strategy and Implementation Plan, 1998-2013 ("NPS") in July 2000. The NPS is required under the Clean Water Act and the Coastal Zone Management Act, and is jointly managed by the State Board and the California Coastal Commission. By statute (Cal. Water Code §13369), the State Board was required to take certain actions to establish the implementation program for the NPS. On or before February 1, 2001, the State Board was required to develop and submit to the Legislature a detailed program to implement the NPS and to develop guidance to be used by the State Board and the Regional Boards to describe the procedures to implement and enforce the NPS. To satisfy that requirement, on February 1, 2001, the State Board issued a draft Compliance Assistance Guidance ("CAG"), which has not yet been finalized. The NPS uses a 3-tiered system that relies upon BMPs as a means of implementing management measures identified in the NPS. The tiers may be summarized as follows:

- Tier 1 relies on the discharger's self-determined or voluntary implementation of BMPs.
- Tier 2 allows the State Board and the Regional Boards to encourage implementation of specific BMPs by either conditionally waiving waste discharge requirements under the Porter-Cologne Act or entering into agreements with other agencies who can enforce implementation of BMPs under their own authorities.
- Tier 3 uses enforcement authorities to permit the State Board and Regional Boards to set and enforce waste discharge limitations for a discharger at a level that, in practice, requires implementation of BMPs.

NPS management measures relevant to the proposed development include: Urban Areas (3.1 Runoff from developing areas, 3.2 Runoff from construction sites, 3.3 Runoff from existing development); and Vegetated Treatment Systems (6 C and D). Emphasis in the NPS is placed upon the Watershed Initiative Program, which uses watershed-wide approaches to provide the rationale for programmatic measures such as the 208 Program for the Upper Newport Bay, and the San Joaquin Marsh water quality treatment program, discussed later, and the proposed Natural Treatment System discussed below in Regional Planning Measures.

Basin Plan of the Regional Board and the CTR. The Regional Board maintains a Basin Plan for waters within its jurisdiction which identifies designated uses and water quality objectives (criteria) for surface waters in the region. CTR criteria apply to receiving waters for which the Basin Plan identifies beneficial uses relating to aquatic life or human health, such as Agua Chino Wash, San Diego Creek, and Upper Newport Bay. However, there presently is no plan to incorporate the CTR criteria as numeric effluent limits into stormwater permits. (See State Board, Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, at 1 n.1 (The CTR implementation plan does not apply to stormwater discharges; instead, those discharges are regulated through municipal stormwater permits and state stormwater permits.)).

TMDLs. Newport Bay and San Diego Creek have three applicable TMDLs and one future TMDL. Each of the established TMDLs has been amended to the Basin Plan. The TMDLs apply to the proposed development inasmuch as the proposed development drains into storm drains and other water bodies which eventually discharge into the San Diego Creek and Newport Bay. At this time and in accordance with the TMDLs' phased programs for achieving objectives, the regulatory and private entities are conducting monitoring studies in order to determine how to attain the TMDL objectives. The Irvine Company ("the project proponent") has been a participant in these monitoring studies, and contributes financially to the monitoring efforts. For sediment, nutrients and pathogens, waste load allocation have been established and are proposed for inclusion in the MSW permit; for toxics, waste load allocations have not yet been established. Table 4-34 describes the TMDLs in more detail.

NPDES Storm Water Regulations/Permits. The State has issued a general permit for storm water discharges associated with construction activities ("General Construction Activities Storm Water Permit"). (State Board Order 99-08-DWQ, NPDES No. CAS000002.) This permit addresses both storm water and certain non-storm water discharges from construction sites, and applies to construction sites over 5 acres, such as the proposed project. The General Construction Activities Storm Water Permit requires development of a Storm Water Pollution Prevention Plan ("SWPPP") (including monitoring plan), and relies upon BMPs instead of end-of-pipe numeric effluent limitations. The rationale underlying the use of BMPs is that, "the substantial variability of storm events and pollutant constituents and concentrations in storm water runoff makes it extremely difficult to formulate numeric effluent limitations bearing a reasonable relationship to established water quality standards." (San Francisco Baykeeper v. California State Water Resources Control

Table 4-34
TMDLs Applicable to Newport Bay and San Diego Creek

	Sediment	Nutrients	Pathogens	Toxics (Future)
General Info & Reduction	1998 estimate: 250,000 tons deposited/yr. Reduction: 50% (to 125,000 tons /yr.) within ten years.	1998 estimate: 1,087,000 lbs/yr. Predominant sources: commercial nursery and agricultural land tailwaters. Reduction: 50% by 2012.	Fecal coliform bacteria used as indicator. Reduction: less than 200 organisms/ 100 ml. No more than 10% of samples to exceed 400 organisms/ 100 ml for any 30-day period.	San Diego Creek and Newport Bay are "impaired" water bodies for toxic substances. Problem toxic substances: PCBs, DDT, diazinon, chlorpyrifos, toxaphene, copper and selenium (may occur naturally).
Allocation	62,500 tons to Newport Bay. 62,500 tons to rest of the watershed. Load Allocations (total 10 yr. running annual avg. (in tons/yr): open space = 28,000; agriculture = 19,000; construction = 13,000; urban = 2,500.	Loading targets for seasonal and annual amounts of total nitrogen and phosphorus, with 5, 10, and 15-year target dates. Waste & load allocations for total nitrogen (5-year target) (in lbs/season): nursery = 67,344; Silverado Constr. = 25,671; urban = 20,785; agricultural = 22,963; open space & natural = 63,334. Waste & load allocations for total phosphorous (5-year target) (in lbs/yr): urban = 4,102; construction = 17,974; agricultural = 26,196; open space = 38,640.	Waste & load allocations (14 yr. target date): urban runoff (incl. storm water), agricultural runoff (incl. storm water), and natural sources = 5-day sample/30-day geometric means of less than 200 organisms/ 100 ml, no more than 10% of samples to exceed 400 organisms/ 100 ml for any 30-day period; vessel waste = 0.	Not yet determined.
Implementation	Monitoring and surveys conducted by the County, and cities of Irvine, Tustin, Lake Forest, Costa Mesa, Santa Ana, and Newport Beach with the financial assistance of The Irvine Company.	Agricultural Nutrient Management approved by Regional Board identifies management measures and guidance practices. Based upon monitoring studies, Regional Board will review and may revise the current nitrogen objective for San Diego Creek in the Basin Plan.	Monitoring plans resulting from studies conducted by County Health Care Agency. Monitoring study to determine appropriateness of current bacteria objectives and reduction target.	Future toxics TMDL by 2002.

Bd., at 6; see also, *Defenders of Wildlife v. Browner*, at 1166 (upholding storm water permits that rely on BMPs rather than numeric effluent limits in order to attain water quality standards).

The Regional Board has issued a MSW Permit to the County, the County Flood Control District, and most of the incorporated cities in the County, including the City of Irvine for their storm drain systems. (Regional Board Order 96-31.) The MSW Permit requires the County and the City to establish a storm water management program, including a Drainage Area Management Plan ("DAMP"). Additionally, the MSW Permit requires that the County and the City reduce the discharge of pollutants to the maximum extent practicable. Although it governs primarily storm waters discharged into the County and City storm drain systems, the MSW Permit contemplates and conditionally permits certain non-storm waters to be discharged through the storm drain systems. These waters include irrigation return flows, footing drains, fire hydrant flushing (if water has been dechlorinated), air conditioning condensate, and certain other non-storm waters expected to be discharged from areas such as the project site.

The MSW Permit for the northern portion of Orange County is currently in the process of being renewed by the Santa Ana Regional Water Quality Control Board. An interim draft MSW Permit was issued on November 5, 2001. Once that permit is adopted, the proposed project would be required to comply with all applicable requirements contained in the forthcoming MSW Permit. A final vote on that permit is expected to take place in December 2001.

Although the provisions of the draft MSW permit may still be modified prior to the final vote on the permit, the current draft of the MSW permit (dated November 5, 2001) contains the following requirements:

- pollution in discharges from the Municipal Separate Storm Sewer System ("MS4") must be reduced to the maximum extent practicable;
- certain non-storm water discharges are conditionally allowed (such as irrigation return flows, non-commercial car wash water, fire fighting flows) but other non-storm water discharges to the MS4 are prohibited;
- local governments must inspect and report upon certain commercial, industrial, and construction facilities on a specified schedule;
- local governments are given specific guidance regarding the elimination of illicit and illegal connections to the MS4, regarding the repair of leaking sanitary sewer and septic lines that might discharge into the MS4, regarding water quality from municipally-owned construction and industrial properties, regarding mandatory citizen education programs, and regarding regional monitoring of water quality;
- local governments must review their project approval process to focus upon specified water quality improvement goals;
- in lieu of an approved water quality management plan, or equivalent or alternative regional water quality controls, new development projects that have not received tentative tract map approval by July 1, 2003 must implement structural best management practices meeting a

-
- specific design standard (treatment, infiltration, or filtration of specified volumes or flow rates associated with a design storm event);
 - by October 1, 2003, the permittees must review and revise the Drainage Area Management Plan to reflect specific water quality goals set for new development and significant redevelopment and to make any other revisions to the document annually necessary to comply with the permit; during the revision process, the permittees must implement their existing requirements for new development;
 - discharges from the MS4 are subject to relevant waste load allocations established in the Total Maximum Daily Loads for the area.

The Regional Board also has issued a permit for discharges to surface waters which pose an insignificant (de minimus) threat to water quality ("De Minimis Permit"). (Regional Board Order 98-67.) The De Minimis Permit applies to groundwater dewatering, hydrostatic testing of pipelines, and other construction non-storm water discharges. The De Minimis Permit requires testing and monitoring of certain construction discharges, and requires those discharges to meet numeric effluent limitations.

County and City Requirements

The current DAMP established by the County and the City pursuant to the MSW Permit relies upon BMPs instead of numeric effluent limitations to comply with the Basin Plan. Although the original DAMP was prepared in 1993, it has been revised several times, most recently in September 2000. The DAMP approved by the Regional Board includes an appendix that specifically addresses "Best Management Practices for New Development." It describes the range of structural (e.g., filtration and common area efficient irrigation) and non-structural (e.g., education of property owners) BMPs to address surface water quality. Additionally, the DAMP includes other programs, such as fertilizer management and efficient irrigation programs, and requires preparation of a Water Quality Management Plan ("WQMP") (project-specific plan) to address post-construction water quality. The City intends to revise its guidelines addressing WQMP preparation based upon expected future modifications to the MSW Permit, and, as a result to the DAMP.

The County and City grading ordinances each contain erosion and sediment control provisions that serve to aid in water quality and drainage control. Both the City and the County grading ordinances are scheduled for revisions to be consistent with the General Construction Activities Storm Water Permit and in conjunction with the scheduled update of the MSW Permit. Both ordinances require the preparation of erosion control plans showing BMPs employed to reduce erosion, which require annual updating during construction. (County Code of Ordinances, § 7-1-836; City Code of Ordinances, § 5-10-137.) Additionally, the City has water quality regulations (Ordinance 94-17) which implement the MSW Permit for the City. The City's water quality regulations, require preparation of a water quality management plan for new developments and significant redevelopment, and prohibit the discharge of polluted waters into the storm drain system. Excepted from the prohibition are irrigation return flows, and waters covered under any other Regional Board permit (including the MSW Permit) or the General Construction Activities Storm Water Permit.

Regional Planning Measures

Certain regional programmatic water quality measures have been instituted for the entire San Diego Creek watershed and Newport Bay. These comprehensive measures consider all local conditions and pollutant sources, and address the constituents of concern regardless of the source of the runoff. In this way, the regional measures offer an across-the-board solution to solving the water quality problems in the area, and ensure that water quality issues are addressed as a whole rather than on a piecemeal basis. Such regional measures are emphasized in the State's Nonpoint Source Program.

1. Sediment Reduction

Sediment TMDL for Newport Bay/San Diego Creek. The sediment TMDL represents a systematic approach to controlling sediment in the watershed. Monitoring of sediment under the TMDL has been conducted on a watershed-wide basis. The goal of the TMDL is to reduce sediments in the watershed by 50 percent by 2008. Further details regarding the sediment TMDL are discussed, above, in section I.C.

208 Plan for Upper Newport Bay. In accordance with Section 208 of the Clean Water Act governing areawide waste treatment management, a 208 Plan was established for the Newport Bay Watershed and San Diego Creek to control sediment deposition in the bay. The Executive Committee for the 208 Plan includes representation from the California Department of Fish and Game; the County; the Cities of Tustin, Irvine, and Newport Beach; and the project proponent. The 208 Plan consists of agricultural BMPs to reduce erosion from agricultural lands; construction site BMPs; in-channel basins in the lower end of San Diego Creek to capture coarser sediments before they enter Upper Newport Bay; in-bay basins in the Upper Bay to capture fine particles; channel stabilization to reduce the erosion of earthen channels; foothill basins to capture sediments produced by natural erosion in the foothills; and monitoring. (U.S. Army Corps of Engineers, DEIS/EIR, at 2-9.) Creation and maintenance of the basins in Newport Bay, termed Units I, II, and III, have included the dredging of 3,005,000 cubic yards of sediment since 1985. Construction of the basins in San Diego Creek removed 340,000 cubic yards of sediment in 1982 (Id.) with additional material removed since that time. Such basins were constructed with significant financial assistance from The Irvine Company.

In furtherance of the 208 Plan, Congress has authorized the U.S. Army Corps of Engineers to plan and design a project to restore and dredge Upper Newport Bay. The proposed dredging project would increase the width and depth of the basins and provide additional channels in the bay. Initial dredging would involve approximately 2 million cubic yards of materials, and would include a plan to conduct maintenance dredging 21 years after this initial dredging project. In addition to the dredging aspect to the Army Corps proposal, the Corps is also proposing to create, restore, or enhance several wetlands sites near the bay. (U.S. Army Corps of Engineers, DEIS/EIR, Engineering Appendix, at iii-iv.)

Natural Treatment System Master Plan. The IRWD is presently preparing a Natural Treatment System Master Plan ("Plan") of which the Trabuco Retarding Basin (improved as part of the PDF) will be a part. The Plan is intended, along with other programs, to meet water quality objectives for San Diego Creek and Upper Newport Bay through the installation of a network of "natural treatment" wetland facilities throughout the San Diego Creek watershed. The improved Trabuco Basin is consistent with the proposed Plan, and would act as a stand-alone component of the overall system being proposed. The plan would be expected to reduce nutrients, pathogens, sediment and toxic pollutants.

2. Non-point source controls

San Joaquin Marsh and Seasonal Duck Ponds. The San Joaquin Marsh lies on the old flood plain of San Diego Creek, which has been much altered historically. The current marsh and duck pond system was enhanced through the collective efforts of, among others, the Irvine Ranch Water District ("IRWD"), the Regional Board, the City, and The Irvine Company, with IRWD and The Irvine Company sharing in the \$12 million cost to construct the enhancements. The marsh, including the duck ponds, is approximately 2/3 the size of Central Park in New York City, and provides a sanctuary for over 200 species of birds, fish, wildlife, and vegetation.

One purpose for enhancing the marsh and creating the seasonal duck ponds was to remove nitrate from water passing through the marsh and shorebird habitat. Nitrates are removed from high nitrate water from the San Diego Creek which is pumped into the marsh. Nitrates are removed by indigenous bacteria which, under anaerobic conditions, convert the excess nitrate to nitrogen gas. The necessary organic carbon for this process is provided by addition of wheat straw and by the summer draining and planting of grasses in the marsh. IRWD diverts approximately 3 million gallons per day from San Diego Creek into the marsh. This water remains in the pond and marsh system for roughly two weeks before its return to the San Diego Creek. The design estimates for nitrogen removal rates for the marsh were 300 to 500 mg N/m²/d. Weekly measurements made by IRWD during 1998 and 1999 demonstrated a removal rate of up to 3,400 mg N/m²/d. (Alex Horne Assoc., Pond System Organic Carbon Evaluation 1998B99, at v-vi.) The marsh and duck ponds represent a regional approach to dealing with excess nitrogen levels in San Diego Creek and Newport Bay. The enhanced marsh system removes the nitrogen from waters in San Diego Creek, returns the cleaner water to the creek, and thereby reduces the nitrogen levels in the bay downstream.

Nutrient, Pathogen, and Future Toxics TMDLs. The nutrient and pathogen TMDL represents a regional approach to addressing the problems in Newport Bay and San Diego Creek associated with excessive nutrient and bacteria levels. These problems can include nutrient-induced algae blooms in the bay, health problems related to harvesting of bacteria-infested shellfish in the bay, and health-related issues linked to contact with bacteria-laden waters. The nutrient TMDL requires a 50 percent reduction in nutrients by 2012, and the pathogen TMDL places a limit on fecal coliform bacteria of 200 organisms per 100 milliliters by 2012. Central to the pathogen TMDL has been the systematic and comprehensive monitoring of the watershed, while the primary emphasis of the

nutrient TMDL has been to implement a management program for nutrients flowing from nurseries and agricultural tailwaters. The toxics TMDL is scheduled for completion by 2002. Three constituents have been identified as of principal importance: the pesticide chlorpyrifos, the pesticide diazinon, and selenium.²⁹ Further details regarding these TMDLs may be found, above, in section I.C.

Flood Protection Requirements

The goal of the master plan is to provide a 100-year level of protection for all habitable structures in accordance with the guidelines established in the County of Orange, Local Drainage Manual, and the City of Irvine, Standards and Design Manual. The County criteria for level of protection is based on the concept that local runoff from a 100-year storm event can be conveyed in a combination of street flow and storm drain capacity. Regional drainage facilities shall be designed to convey the entire runoff from a 100-year storm event.

The regional flood control systems within the Northern Sphere Area development will be designed so they could be owned and maintained by the County of Orange through an agreement with the developer. The smaller storm drain systems (non-regional) outlined in the Master Plan of Drainage facilities are proposed to be maintained by the City of Irvine. The section on Facilities Maintenance of this report provides additional discussion on suggested typical maintenance responsibilities for the flood control infrastructure.

Design Criteria

The criteria for the development of the master plan drainage facilities is based on the guidelines established in the County of Orange Local Drainage Manual, and the Flood Control Design Manual. The final design of all facilities should be completed in accordance with the requirements of these manuals and the City of Irvine Standards and Design Manual.

The following summarizes the basic criteria used for the preliminary design of the master plan drainage facilities shown in this MPD:

1. Return Frequencies:
Regional Facilities (Serving greater than 640 acres) - 100 year storm event
Master Planned Storm Drain Systems (Serving less than 640 acres) - 25 year storm event

²⁹ Regarding the two pesticides, see discussion in Section IV.B relating to the EPA phase out of chlorpyrifos and possible phase out of diazinon.

2. Freeboard Requirements:

a. Regional Channels:

1.5' Subcritical Channels
3.0' Stable Supercritical Channels

b. Master Planned Storm Drains:

Approx 2-3' below existing grades (Mainline)
0.5' at Catch Basins (Laterals)

Storm Water Quality Analytical Approach

As discussed in the regulatory setting section, an effective approach for addressing potential storm water impacts of urban development is to identify and impose project-specific BMPs to complement regional BMPs addressing water quality issues on a watershed or regional basis. Construction impacts are addressed, primarily through a SWPPP consistent with the requirements for coverage under the State's Storm Water Permit, and longer term potential post-construction impacts are addressed, primarily, under a separate WQMP, as required by the MSW Permit, regional DAMP, and municipal ordinance. The SWPPP contains additional elements related to post-construction impacts, requiring, for example, descriptions of post-construction BMPs.

The Legislature has directed that, "environmental impact reports shall be tiered whenever feasible, as determined by the lead agency." (Cal. Pub. Res. Code § 21093(b).) As explained in the CEQA Guidelines:

Tiering is appropriate when the sequence of analysis is from an EIR prepared for a general plan ... to a site specific EIR or negative declaration. ... Where a lead agency is using the tiering process in connection with an EIR for a large-scale planning approval, such as a general plan or component thereof (e.g., an area plan or community plan), the development of detailed, site-specific information may not be feasible but can be deferred, in many instances, until such time as the lead agency prepares a future environmental document in connection with a project of a more limited geographical scope.... (Cal. Code Regs. tit. 14, § 15152.)

With respect to surface water quality impacts (as well as several others), tiering analyses from the general planning and zoning levels of project scrutiny to the grading and/or subdivision levels is typical and appropriate. The assessment of and precise mitigation measure for water quality impacts is often dependent on subdivision map, site and grading plan details such as pad elevations, slope heights and orientation, landscaping and open space design, design of irrigation systems, the lengths and grades of streets, placement of parking areas, and similar details that generally cannot be known at the general plan and zoning stage. Those subsequent approvals (i.e., subdivision map, site and grading plan approvals, including approval of the WQMP) are themselves subject to additional environmental review under CEQA, which makes them adaptable to "tiered" analyses.

With respect to water quality concerns generally, and the appropriateness of tiered analyses in this regard, the November 5th draft MSW Permit states that:

[t]he major focus of storm water pollution prevention is the development and implementation of [an] appropriate DAMP including best management practices (BMPs). The ultimate goal of the urban storm water management program is to support attainment of water quality objectives for the receiving waters and to protect beneficial uses through the implementation of the DAMP. (Draft MSW Permit ¶26.)

The DAMP, in turn, in the New Development BMPs (Appendix G) recommends standard conditions for implementation of the DAMP that require, prior to the earlier of recordation of a final subdivision map or issuance of precise grading permits, preparation and approval of a WQMP. The WQMP must identify BMPs, including both structural and non-structural measures, must discuss the assignment of long-term maintenance responsibilities (specifying the developer, parcel owner, maintenance association, lessee, etc.), and must reference the location(s) of structural BMPs. The City's standard conditions as well as the City's water quality ordinance require preparation of a WQMP prior to issuance of precise grading permits. If a newly adopted MSW Permit or revised DAMP results in any changes to requirements applicable to new developments, those changes must be reflected in all subsequent WQMPs and SWPPPs prepared for the project site.

Advancements in the ability to characterize storm water quality and the relatively flat topography of a large portion of the project site make it possible to broadly address water quality impacts at this stage of development review for the proposed project. The relatively flat land is proposed for development (in general, areas with steeper terrain will remain as open space) with land uses with predictable water quality. Accordingly, Section 4.8.3 discusses the water quality impacts of the project. The options available and the decision-making approach which will be utilized to prepare a WQMP and SWPPP at the time that project-specific plans are finalized are outlined in the Water Quality Assessment Technical Appendix (GeoSyntec, 2001).

4.8.3 ENVIRONMENTAL IMPACTS

Thresholds of Significance

Pursuant to Appendix G to the CEQA Guidelines (Cal. Code Regs. tit.14, div.6, ch.3, app.G), thresholds of significance considered for purposes of this chapter are whether the project would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

-
- 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- or off-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- or off-site.
 - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
 - Otherwise substantially degrade water quality.
 - Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary of 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 flows.
 - 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.
 - Inundation by seiche, tsunami, or mudflow.

The proposed development will discharge storm water and other incidental non-storm waters (i.e., irrigation return flows) into the municipal storm drain system and other water bodies, which, in turn, empty into San Diego Creek (and ultimately Upper Newport Bay). Those receiving waters have been declared by the Regional Board to be impaired for certain identified beneficial uses. For these impairments, the Regional Board has established or soon will establish TMDLs for sediment, pathogens, nutrients, and toxics. Accordingly, for purposes of water quality standards, the threshold question is whether or not the project would contribute to the impairment of the receiving waters for the constituents listed in the TMDLs or would otherwise significantly adversely affect the beneficial uses of the waters in San Diego Creek and Upper Newport Bay.

For potential pollutants for which the receiving waters are not impaired, the threshold question is whether the project would cause the receiving waters to fail to meet applicable standards in a way that is not found today or would affect the beneficial uses of the waters in San Diego Creek, Upper Newport Bay, Agua Chinon Wash and other tributaries, if applicable.

Given the applicability of the County's MSW Permit to the project's discharges to the storm drain system, attention also has been given to whether the project's storm water discharges would comply with the MSW Permit and the DAMP established pursuant to that permit. Additionally, the County and City grading ordinances and the State's General Construction Activities Storm Water Permit have been considered when determining significance regarding potential erosion and siltation, both on- and off-site.

Project Hydrology Impacts

The ultimate condition hydrology was established for the project watershed, based on the most current land use planning to identify impacts to existing drainage facilities, and determine required drainage facility sizes for the development of the Northern Sphere Area. Ultimate Condition Hydrology Maps are shown on Exhibits 4-39 and 4-40.

Trabuco Basin Drainage Sub-basin - The results of the existing condition hydrology analysis indicated that the existing drainage facilities servicing the Northern Sphere Area within the Trabuco watershed are severely deficient in conveying the existing tributary runoff. To develop potential mitigation measures to eliminate impacts to these existing systems, two alternative drainage patterns were prepared for the ultimate condition analysis. Alternative A maintains the drainage boundaries, and generally follows the ultimate drainage patterns developed in the FCMPSDC. Alternative B was developed to limit the runoff from PA 5B to the existing storm drain facility F25P03 in Irvine Boulevard to the design capacity of the system. The remainder of the runoff from PA 5B will be diverted to the Trabuco Retarding Basin. The remaining ultimate condition drainage patterns are the same as Alternative A. A summary of the results of the ultimate condition hydrology are shown in Table 4-35.

Table 4-35
Ultimate Condition Hydrology Summary
(Trabuco Drainage Sub-basin)

CP	Location	MPD Analysis				Peters Canyon Wash Update ⁽¹⁾	
		<i>Alternative A</i>		<i>Alternative B</i>		Q ₁₀₀ (cfs)	Area (acres)
		Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)		
447	PA 5B discharge to Fac. F25P03	832 (630) ⁽³⁾	317	227 (174) ⁽³⁾	72.9	706	312
409	Inflow/Outflow from Trabuco Basin	3,827/948 (164 ₍₄₎ ac-ft)	1,786	4,257/1,008 (195 ₍₄₎ ac-ft)	2,029	--- / 952	1,779
60	PA 8A discharge to Trabuco Channel	176	70.9	176	70.9	— ⁽²⁾	---

Notes:

1. *Ultimate Condition Flow Rate from "San Diego Creek Flood Control Master Plan, Peters Canyon Wash Updated."*
2. *"—" indicates that flow rates were not identified in the Peters Canyon Wash Update.*
3. *() 25-year ultimate condition discharges.*
4. *Peak storage volume in the basin during the design storm event.*

Exhibit 4-39 Ultimate Condition Hydrology Map - Alternative A

Exhibit 4-40 Ultimate Condition Hydrology Map - Alternative B

Marshburn Drainage Sub-basin - An ultimate condition hydrology analysis for the Marshburn drainage sub-basin was prepared to reflect the drainage patterns and conceptual land uses planned within the Northern Sphere Area. The majority of the Northern Sphere Area within the Marshburn drainage sub-basin is tributary to the Marshburn Retarding Basin. The Final Design Report prepared for the Marshburn Retarding Basin developed drainage patterns tributary to the three inflow systems to the basin. The ultimate condition analysis was developed to approximate the drainage patterns and peak flow rates to the existing basin intake systems. A summary of the results of the ultimate condition hydrology analysis are shown in Table 4-36.

Table 4-36 Ultimate Condition Hydrology Summary (Marshburn Drainage Sub-basin)					
CP	Location	MPD Analysis		Marshburn Basin Design Report ⁽¹⁾	
		Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)
93	Basin Inflow #1	1,562	537	1,260	556
76	Basin Inflow #2	2,014	2,793	2,163	2,774
88	Basin Inflow #3	784	327	963	327
Basin	Total Inflow/Outflow	4,000/909 (218 ac-ft) ⁽³⁾	3,687.5	4,086/901 (210 ac-ft) ⁽³⁾	3,688
4	Discharge to Marshburn Channel at Irvine Blvd.	1,019	3,773.5	921	3,747
7	Marshburn Channel flow at Trabuco Road	1,838	4,233.5	1,860 ⁽²⁾	
Notes: 1. Ultimate Condition Flow Rate from "Final Design Report Marshburn Retarding Basin." 2. Ultimate Condition Design Flow Rate from "Final Design, Marshburn Channel Improvements." 3. Peak storage volume in basin during design storm event.					

Agua Chinon Wash - No new ultimate condition hydrology analysis was prepared for the drainage sub-basin tributary to the Agua Chinon Wash. The design discharges for the drainage facilities within the watershed have been previously developed as part of the FCMPSDC, and no significant changes to the drainage patterns or land uses are proposed as part of the Northern Sphere Area.

Hydrologic Impacts

Development of the Northern Sphere Area will result in a change in the character of the runoff from the project site. A comprehensive storm water mitigation program must be developed to address the potential impacts of increased runoff associated with the Northern Sphere Area development. Potential impacts will be mitigated by either, (a) reducing peak storm water discharges to levels equal to or below pre-project levels, (b) making improvements to downstream drainage facilities so they have the capacity to convey the increased discharges, or (c) some combination of the two whereby peak flows are reduced, but not to levels equal to or below pre-project levels, and improvements are made to downstream facilities so they have the capacity to convey the reduced peak flows. The project impacts and mitigation requirements within each of the three drainage sub-basins are summarized in the following sections.

Trabuco Basin Drainage Sub-basin - The results on the hydrology analyses indicate that the project development will increase runoff from the project site compared with the existing condition. A comparison of the computed pre-development and post-development (unattenuated) flows indicates that discharges increase moderately in the after-project condition. Table 4-37 shows the 100-year discharges at the major concentration points.

Table 4-37 Comparison of Existing and Ultimate Condition Discharges (Trabuco Drainage Sub-basin)							
CP	Location	MPD Analysis - Ultimate Condition				Existing Condition	
		Alternative A		Alternative B			
		Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)
447	PA 5B discharge to Fac. F25P03	832 (630) ⁽¹⁾	317	227 (174) ⁽¹⁾	73	642	317
409	Inflow/Outflow from Trabuco Basin	3,827/ 948	1,786	4,257/ 1,008	2,029	2,502/ 839	1,696
60	PA 8A discharge to Central-Irvine Channel	176	70.9	176	71	103	71
Notes: 1. () 25-Year ultimate condition discharges							

Alternative A is in substantial conformance with the FCMPSDC and the Peters Canyon Wash Update, and will not impact the Trabuco Retarding Basin or downstream facilities which have been constructed to the ultimate configuration. However, the immediate downstream facilities have not been constructed to the ultimate size, and the increased runoff from the project site will result in

additional flooding and adverse impacts to the downstream Central-Irvine channel and storm drain facility F25P03. Alternative B results in a watershed diversion from the drainage patterns in the FCMPSDC and the Peters Canyon Wash Update. The alternative was developed to eliminate impacts to storm drain facility F25P03, however, the watershed diversion results in an increase in the flow rates and runoff volume to the Trabuco Retarding Basin.

Marshburn Drainage Sub-basin - The results of the hydrology analyses indicate that development of the Northern Sphere Area will increase runoff from the project site. Table 4-38 shows a comparison of the 100-year discharges at the major concentration points.

Table 4-38 Comparison of Existing and Ultimate Condition Discharges (Marshburn Drainage Sub-basin)					
CP	Location	MPD Analysis Ultimate Condition		Existing Condition ⁽¹⁾	
		Q ₁₀₀ (cfs)	Area (acres)	Q ₁₀₀ (cfs)	Area (acres)
94	Total Inflow/Outflow to Marshburn Basin	4,000/909	3,687.5	1,938/97	3,688
4	Discharge to Marshburn Channel at Irvine Blvd.	1,019	3,773.5	195	3,774
7	Marshburn Channel discharge at Trabuco Road	1,838	4,233.5	1,048	4,234
<i>Notes:</i> 1. Existing Condition Flow Rate at CP 94 taken from Interim Condition Flow Rates from "Final Design Report Marshburn Retarding Basin.					

The ultimate condition analysis assumes that the Marshburn basin inflow and outlet systems are reconstructed to the ultimate configuration. This results in a significant increase in runoff to the Marshburn Channel compared to the existing condition. The existing Marshburn Channel at Irvine Boulevard was estimated in previous studies to have a capacity of approximately 300 cfs. Downstream of Irvine Boulevard the channel is a concrete-lined trapezoidal section to Trabuco Road, and has not been constructed to the ultimate configuration. From Trabuco Road to Irvine Center Drive the channel has been constructed to the ultimate configuration in accordance with the peak discharges determined in the FCMPSDC. Improvements from Irvine Center Drive to the outlet at the San Diego Creek have been designed, and are anticipated to completed construction in mid-summer 2001.

The development of the Northern Sphere Area will not impact the ultimate condition design discharges to the Marshburn Retarding Basin or the downstream channel. The FCMPSDC developed a 100-year ultimate condition flow rate of 1,000 cfs for the Marshburn Channel at Irvine

Boulevard, and the recent improvements downstream of Trabuco Road were sized for an ultimate condition discharge of 1,860 cfs (per the *Final Design, Marshburn Channel Improvement Report*).

Agua Chinon Drainage Sub-basin - The change in peak runoff that will occur as a result of development within the drainage sub-basin which is directly tributary to Agua Chinon Wash is insignificant since the planned development will be in substantial conformance with original FCMPSDC. Consequently, no mitigation is necessary.

Hydraulics

Hydraulic calculations for this study included the development of preliminary regional channel configurations and sizes, and preliminary storm drain sizing for the master planned facilities. Master plan level storm drain systems are generally those facilities with a storm drain diameter of 36 inches or larger. The hydraulic requirements for the systems are determined by the County and City, which include regulations set forth by FEMA. The regional and master planned facilities are illustrated on Exhibits 4-41 and 4-42, Master Plan of Drainage Facilities Maps for Alternatives A and B.

Master Planned Storm Drain Facilities - The preliminary hydraulic sizing of the master planned storm drain facilities was taken from the assumed pipe sizes from the 25-year rational method calculations or based on normal depth calculations. The rational method estimates required pipe sizes using normal depth calculations. The Manning's "n" values for RCP used in the analysis was 0.013. The storm drain system will be designed to convey the 25-year discharge within the system. The 100-year storm will be contained using a combination of the storm drain capacity and street capacity.

Pipe sizes ranged from 36" to 120" Reinforced Concrete Pipe (RCP). Exhibits 4-41 and 4-42 show the approximate locations and sizes of the proposed back bone storm drains system. The sizes listed on the exhibit are for master planning purposes only. Final hydraulic calculations must be performed before final design of the storm drain system.

Storm Water Retention

The proposed development will change land uses in the project area from primarily agricultural and nursery uses to primarily residential, commercial and research and development office park uses. The proposed development will include roads, parking lots, buildings, landscaped areas, and drainage facilities. Changes to the existing agricultural and natural terrain resulting from development of the Northern Sphere Area are expected to increase impervious surfaces, accelerate storm runoff and increase the volume of runoff resulting in higher peak flow rates. One effective means of mitigating peak flow rates is to attenuate the flows with the use of detention basins. Storm water detention basins can also be a joint-use facility to potentially accommodate both peak flow rate reduction, and provide storm water quality benefits.

Exhibit 4-41 Master Plan of Drainage Facilities Map-Alternative A

Exhibit 4-42 Master Plan of Drainage Facilities Map-Alternative B

Storm Water Peak Flow Rate Reduction

Five existing regional storm water retention basins receive drainage from the project site. Four basins are within the project site, and one basin, Marshburn Basin, is outside of project site boundaries. These basins were designed and constructed to reduce the ultimate condition peak flow rates from their tributary area in accordance with the recommendations of the FCMPSDC. The basins include: 1.) Trabuco Basin, 2.) Marshburn Basin, 3.) Bee Canyon Basin, 4.) Round Canyon Basin, and 5.) Agua Chinon Basin. The development of the drainage plan for the Northern Sphere Area was designed to conform to the parameters used for the original design of the basins. No modifications to the basins are required for the development of the Northern Sphere Area, except for the Marshburn Basin, which will require the construction of the ultimate intake and outlet systems. The existing basin only included the construction of the inlet and outlet systems for the interim condition, which will need to be retrofitted when the watershed is developed to the ultimate condition.

Additional storm water retention will be required to mitigate runoff from PA 5B. Runoff from this area currently drains to an existing 42 inch storm drain system within Irvine Boulevard. The system has an original design capacity of 174 cfs. The 25-year storm event ultimate condition runoff from PA 5B is 630 cfs. Two alternatives have been identified to mitigate runoff from PA 5B. The alternatives include: A) construct a storm water retention basin within PA 5B to mitigate ultimate condition runoff to the capacity of the existing storm drain system, or B) divert runoff from PA 5B to the Trabuco Basin so that the ultimate condition runoff to the existing storm drain is at or below the system capacity. Alternative B will require modifications to the Trabuco Basin to accommodate the additional runoff.

Storm Water Quality Impacts

Impervious surfaces affect the amount of pollutants that could potentially be discharged from the site after development. Pollutants on impervious surfaces may arise from a variety of sources including automobile tire and brake pad wear and fluid leaks, atmospheric deposition, construction materials, litter, animal waste and other sources. These pollutants may be mobilized and transported across impervious surfaces on the site as well as the storm drain system. Pollutants such as pesticides may also be mobilized during dry weather (e.g., by excess irrigation and fertilization). However, impervious surfaces may also reduce pollutant runoff by controlling areas that might have previously contributed to the storm drains and receiving waters pollutants such as sediment, fertilizer residues (nutrients), pesticide residues, and other pollutants adhering to sediment.

Pollutants of concern have been identified by the regulatory agencies based on an assessment of the effects of water quality on beneficial uses in Upper Newport Bay and San Diego Creek. (See Section titled Existing Drainage Facilities, above.) These pollutants are sediment, nutrients, pathogens, and toxicity, potential sources of which include metals (copper/selenium) and pesticides (diazinon, chlorpyrifos). Table 4-39 shows the pollutants of evaluated for purposes of assessing

project impacts on storm water quality, the rationale for the selection, and the potential sources of those pollutants from the proposed development.

Table 4-39 Pollutants of Concern			
Category of Constituents	Specific Constituents	Rationale	Potential Sources Associated with Proposed Project
Sediment	Total Suspended Solids (TSS)	Sediment TMDL for San Diego Creek watershed and Upper Newport Bay	Construction phase
Nutrients	Nitrate, other nitrogen compounds, phosphorous compounds	Nutrient TMDL for San Diego Creek watershed and Upper Newport Bay	Fertilizer application for landscape maintenance, parking lots and roads (automotive exhaust)
Pathogens	Pathogenic bacteria, viruses, and protozoa	Pathogen TMDL for San Diego Creek watershed and Upper Newport Bay (TMDL allocation expressed in terms of indicator fecal coliform, with initial focus on monitoring and assessment)	Animal sources (birds, pets, etc.) and organic fertilizers
Toxics	Trace metals (e.g., copper, lead, zinc) (2 identified—selenium and copper) Various pesticides (2 identified—diazinon, chlorpyrifos)	San Diego Creek and Upper Newport Bay are listed water bodies for metals, pesticides, and unknown toxicity; TMDL scheduled for completion by Dec. 2002	Metals: parking lots, roads (brake pad and tire wear), selenium may occur naturally Pesticides: application for landscape maintenance, historically polluted soils (e.g., some agricultural soils)

Storm water runoff water quality will vary within a storm event depending on the rainfall pattern and storm duration (intra-event variability). Because of this variability, water quality concentrations are often expressed in the form of event mean concentrations ("EMCs"), which are the concentrations that would be measured if the entire runoff from an event were captured and mixed before sampling. The extensive use of event mean concentrations to characterize storm water quality was initiated in EPA's Nationwide Urban Runoff Program ("NURP") (EPA, *Nationwide Urban Runoff Program*, Executive Summary, 1983).

Storm water runoff water quality also will vary from storm to storm (inter-event variability) depending on a variety of conditions, including the characteristics of the storm event, the time between storms, conditions in the watershed, and time of year. This latter effect is particularly

important in semi-arid environments where there is a dry and wet season, and where soil saturation and runoff vary greatly depending on the season and changes in long-term climate cycles. Because of this intra- and inter-event variability, storm water quality is often expressed and evaluated statistically.

For open space and developed areas, post-development conditions at the development site were modeled using data collected by Los Angeles County as part of its storm water NPDES Program ("the LA Data") (Los Angeles County, Storm Water Quality Data Tables for Period 1994-2000). The LA Data were selected based on a review of available water quality monitoring data in Southern California. The counties of Los Angeles, Orange, San Diego, and Ventura have conducted storm water monitoring studies that differentiate the monitored basins by type of land use (e.g., residential, commercial, open space). The monitoring conducted by Los Angeles County includes the additional resolution of reporting the residential monitoring data by single family, multi-family, and mixed residential land uses, while it appears the other three counties simply report "residential" monitoring data. In addition, the LA County Data is more comprehensive, e.g. in terms of the number of samples taken. For these reasons, the modeling relied on EMC data from LA County, except for agricultural land uses (not monitored in the LA study and not applicable to the post-construction land uses proposed).

For agricultural areas, pre- and post-development conditions were modeled using data from Ventura County as described in the Water Quality Assessment Technical Appendix (GeoSyntec, 2001). The Ventura County data were used to represent potential runoff EMCs from agricultural land uses. Data from land uses that were similar to those anticipated for this project were selected.

The following analysis discusses the impact of the project on storm water quality. There are several reasons why the analysis likely overstates project impacts to storm water quality. First, air pollution, which can be an important source of pollution in urban runoff, is typically more severe in Los Angeles than in Orange County. Therefore, using the LA Data to estimate water quality in Orange County may overstate impacts from the proposed development. Second, since the new draft MSW Permit is not yet final, the water quality analysis did not assume the water quality effects of compliance with more stringent requirements contained in the draft permit. Since this project and all other new development and significant redevelopment will be required to comply with the MSW Permit once it is adopted, an analysis that does not include those requirements likely overstates impacts from the project. Third, prior to the earlier of recordation of a final subdivision map or issuance of precise grading permits, the DAMP requires preparation and approval of a WQMP. Since the model data were obtained from existing developments that were subject to less stringent requirements than those currently in place or proposed to be adopted, a water quality analysis that does not take into account the more stringent requirements likely overstates project impacts. Fourth, the project proponent proposes to include as part of the project design a feature (the "Project Design Feature" or "PDF") to further improve water quality. The proposed PDF will include BMPs; since the BMPs will improve water quality, an analysis that does not assume the water quality benefits of the proposed PDF overstates impacts from the project.

The proposed PDF consists of two components. First, the existing Trabuco Retarding Basin will be modified to treat over a 24-hour period the volume of runoff produced by a 24-hour, 85th percentile storm event (runoff from 0.75 inch, 24-hour storm) over the 1226-acre Planning Area 9A, which constitutes approximately 40 percent of the development area. Second, for the remaining 60 percent of the development area (those areas within Planning Areas 5B, 6 and 8A which are not tributary to the Trabuco Retarding Basin and which will be developed), BMPs (for example, BMPs that achieve similar performance per National BMP Database ratings as catch basin inserts) will be designed to infiltrate, filter or treat the volume of runoff produced by either (a) a 24-hour, 85th percentile storm event (runoff from 0.75 inch, 24-hour storm), or (b) the maximum flow rate of runoff produced by a rainfall intensity of 0.2 inch of rainfall per hour.

The following discussions are broken down by constituent type and describe the post-development site conditions as well as the effect on water quality of the expected change from existing agricultural and nursery uses to residential, commercial, and research and development office park uses. The further beneficial effect of the proposed PDF on water quality is also addressed.

Sediment. Sediment runoff expressed in terms of total suspended solids ("TSS") is estimated to be relatively low for the proposed development because areas will either be impervious or landscaped and the relatively flat topography will minimize erosion from landscaped areas. Average concentrations are likely to be low (91 mg/l before taking into account the benefits provided by the PDF) relative to urbanized areas in general. For example in the NURP, the site median EMC was about 100 mg/l (ASCE (American Society of Civil Engineers), *WEF Manual of Practice No. 23 and ASCE Manual and Report on Engineering Practice No. 87*).

Using the LA data, the post-development estimate of sediment yield, before taking into account the benefits provided by the proposed PDF, is 445,283 lbs/yr for a typical rainfall year (approximately 12 inches). As discussed previously in the context of existing conditions, estimates of sediment loading vary greatly depending upon the amount of rainfall. The figures in the table below represent an estimate typical of years with average amounts of rainfall. Pre-development sediment yield from the site could be much higher during extremely wet El Niño years due to the small amount of impervious cover and substantial amount of disturbed soils on agricultural land. Under the proposed development, the sediment yield should remain relatively constant (even during El Niño years) because of the increased amount of impervious cover associated with the development. Therefore the estimated percentage change in annual sediment delivery shown below (-80%) on Table 4-40, represents an average-year estimate; the percentage change of sediment yield from pre-development to post-development conditions during an El Niño cycle could be larger.

Table 4-40 Estimated Development Area Sediment Delivery							
Constituent	Pre-development		Post-development		Percent Change		Standard from TMDL
	EMC	Load	EMC	Load	EMC	Load	
Total Suspended Solids (w/o PDF)	1,085	2,222,400	91.0	445,283	-92	-80	50% annual load reduction by 2008
Total Suspended Solids (w/ PDF)			68.2	333,685	-94	-85	
(1) EMC in mg/l (2) Load in lbs/yr							

When the water quality benefits provided by the PDF are included, the post-development annual sediment delivery is estimated to be 333,685 lbs/yr, an estimated 85% change from pre-development levels, and the post-development EMC is estimated to be 68.2 mg/l, an estimated 94% change from pre-development levels.

Nutrients. Nutrients consist primarily of compounds of nitrogen and phosphorous. Based on modeling results shown on Table 4-41, the average total phosphorous level in runoff from the proposed development before taking into account the benefits provided by the PDF is anticipated to be less than 1 milligram per liter (part per million). Phosphorous has a tendency to be more associated with particulates and likely will be relatively low during storm events because of the low sediment concentrations.

Nutrients also include nitrogen compounds. In particular, nitrate is an important nutrient for the growth of algae and other plants (McCutcheon, *Water Quality*, in Handbook of Hydrology, ch. 11). Even before taking into account the benefits provided by the PDF, average concentrations of nitrate (expressed as nitrogen) in storm water runoff from the proposed development is estimated, based on the LA data, to be less than one milligram per liter (part per million).

The Basin Plan objectives for Total Inorganic Nitrogen are 13 milligrams per liter for the lower reach of San Diego Creek, and 5 milligrams per liter for the upper reach. The major component of Total Inorganic Nitrogen is Nitrate-Nitrogen. Before taking into account the water quality benefit of the PDF, post-development storm water runoff is estimated to have less than 1 milligram per liter of Nitrate-Nitrogen, well below the Basin Plan objectives for either reach of San Diego Creek. Post-development TKN loadings are estimated to increase slightly over pre-development conditions (by approximately 11%). However, since this form of nitrogen is generally not bioavailable (the key

issue of concern for nutrients), and since there would be no violation of existing water quality standards, impacts from TKN loadings are expected to be less than significant.

Table 4-41 Estimated Annual Nutrient Delivery							
Constituent	Pre-development		Post-development		Percent Change		Standard from TMDL
	EMC ⁽¹⁾	Load ⁽²⁾	EMC	Load	EMC	Load	
Total Kjeldahl Nitrogen (w/o PDF)	6.00	12,297	2.80	13,710	-53	11	
Total Kjeldahl Nitrogen (with PDF)			2.38	11,633	-60	-5	
Nitrate-Nitrogen (w/o PDF)	8.21	16,821	0.758	3,708	-91	-78	50% avg. annual load reduction in TIN by 2012
Nitrate-Nitrogen (with PDF)			0.710	3,472	-91	-79	
Total Phosphorus (w/o PDF)	2.03	4,153	0.359	1,757	-82	-58	
Total Phosphorus (with PDF)			0.304	1,487	-85	-64	
(1) EMC in mg/l (2) Load in lbs/yr							

When the water quality benefits provided by the PDF are included, the post-development average total phosphorus level (EMC) is estimated to be 0.285 mg/l, an estimated 86% change from pre-development levels, and the post-development Nitrate-Nitrogen EMC is estimated to be 0.685 mg/l, an estimated 92% change from pre-development levels. Post-development TKN loadings are estimated to be 10,907 lbs/yr, an estimated 11% change from pre-development levels.

Pathogens. Bacteria, viruses, and protozoa that can cause health problems are pathogens; and indications of the presence of these organisms has traditionally depended on measurements of indicator organisms, a common example of which is fecal coliform. Fecal coliform is the indicator being used in the pathogen TMDL for San Diego Creek and Upper Newport Bay. The fecal coliform (used as an indicator organism) standard for waters with recreation uses such as San Diego Creek is a log mean concentration with a maximum probable number of either 200 or 2,000

organisms (depending upon the type of recreational use) per 100 milliliters. (Basin Plan, at 4-6.) Bacteriological data sufficient to calculate an EMC were not collected in the LA monitoring program; therefore, no statistical comparison of pre- or post-pathogens was made.

The presence of pathogens in the post-development condition is not expected to substantially change as a result of the project. Development of the site into residential, commercial, and research and development office uses will reduce some of the existing sources of pathogens by eliminating the row crops which tend to attract birds and other wildlife searching for foraging and habitat areas. Grazing will also be eliminated from the Project site, thereby removing that source of pathogens. As a result, the existing sources of pathogens are anticipated to be reduced after development. While existing pathogen sources are expected to be reduced, the proposed development will introduce new sources. Urban runoff characteristically contains indicator organisms from known and unknown sources, including, for example, pets. The development will be a new development with new infrastructure, thus no leakage from the sanitary sewer system would be expected. This would help minimize the human pathogen loading to the receiving waters. On balance, however, no substantial change is anticipated.

Although it is not possible to quantify, the proposed PDF is expected to reduce pathogens in storm water runoff. Some fraction of pathogens in storm water runoff will adhere to larger particles. Particles in runoff tributary to the Trabuco Retarding Basin will then settle out in that basin; particles in runoff tributary to other water bodies will be filtered out by other means of treatment, as specified in the PDF. By these means, the PDF will help control pathogen indicators.

Metals. Trace metals such as copper, lead, and zinc are present in urban runoff due to the prevalence of automobiles, the wearing of break pads and tires on such automobiles, and the deposition of pollutants from exhausts and automobile leaks on roads and parking lots. Although automobile use at the site is likely to increase over present conditions, concentrations of metals are projected to decline. This reduction can be attributed, in part, to the reduction in sediment runoff from the site. Mobilization of soils containing metals in agricultural areas leads to higher concentrations and loads of metals than those concentrations and loads associated with urbanized areas, where sediment runoff is reduced.

Generally, metals partition between a particulate phase and a dissolved phase; the degree of partitioning depends, among other things, on the concentration of the particulates, the organic content of the particulate fraction, and the presence of iron, aluminum, and manganese oxides. The dissolved ionic phase (in contrast to the dissolved complexed phase) has been identified by EPA as the biologically important phase in terms of toxicity and standards such as those provided in the CTR are given in the form of the dissolved phase. CTR values are used for comparison in recognition of their relation to water quality standards for San Diego Creek.

Average post-development total concentrations of copper, lead, and zinc for the development area, as represented in Table 4-42, are all below values from urban areas monitored as part of the NURP study. For example, the average post-development (and pre-PDF) copper concentration of 12

micrograms per liter (parts per billion) is less than the site median concentration of 34 micrograms per liter in the NURP data. The lead concentrations are significantly lower than the NURP data because of the phasing out of leaded gasoline since the NURP data were collected.

Table 4-42 Average Concentrations of Metals							
Constituent	Pre-development		Post-development		Percent Change		CTR Standard ^{(1), (6)}
	EMC ⁽¹⁾	Load ⁽²⁾	EMC ⁽¹⁾	Load ⁽²⁾	EMC ⁽¹⁾	Load ⁽²⁾	
Copper (w/o PDF)	120	245.1	22	107.0	-82	-56	38 (dissolved)
Copper (with PDF)			17	81.5	-86	-67	
Lead (w/o PDF)	39	79.9	11	55.2	-71	-31	208 (dissolved)
Lead (with PDF)			8.9	43.7	-77	-45	
Zinc (w/o PDF)	257	527	126	614	51	17	297 (dissolved)
Zinc (with PDF)			95	467	-63	-11	
(1) EMC and CTR standard in ug/L (2) Total Load in lbs/yr (3) CTR values are the acute freshwater criteria concentrations assuming an average hardness value in the receiving water of 300 mg/l calcium carbonate. An average hardness value of 300 was chosen based on a review of water quality data from San Diego Creek.							

Copper and Lead. Even before taking into account the benefits provided by the PDF, post-development concentrations of total copper and lead are estimated to be reduced in comparison to existing conditions. Without the PDF, the average total copper concentration (EMC) is expected to decrease to 22 ug/l, an -82% change from pre-development levels, while the average annual copper load is expected to decrease to 107 lbs/year, a -56% change from pre-development levels. Similarly, before taking into account the benefits provided by the PDF, the average total lead concentration (EMC) is expected to decrease to 11 ug/l, a -71% change from pre-development levels, while the average annual lead load is expected to decrease to 55.2 lbs/year, a -31% change from pre-development levels. Post-development, pre-PDF estimated dissolved concentrations are far below the CTR limit for acute freshwater criteria, assuming an average hardness value in the receiving water of 300 milligrams per liter calcium carbonate. (An average hardness value of 300 mg/l was chosen based on a review of water quality data from San Diego Creek.) For copper, the post-development, pre-PDF estimated dissolved EMC is 13 ug/l, while the CTR limit is 38 ug/l. Similarly, for lead, the post-development, pre-PDF estimated dissolved EMC is 3 ug/l, while the CTR limit is 208 ug/l, as represented in Table 4-43.

When the water quality benefits of the PDF are taken into account, post-development concentrations and loadings of copper and lead are estimated to further decrease from pre-development conditions. With the PDF, the post-development copper loadings are estimated to be 81.5 lbs/yr, an estimated

67% change from pre-development levels, and the post-development total copper EMC is estimated to be 17 ug/l, an estimated 86% change from pre-development levels. With the PDF, the post-development lead loadings are estimated to be 43.7 lbs/yr, an estimated 45% change from pre-development levels, and the post-development total lead EMC is estimated to be 8.9 ug/l, an estimated 77% change from pre-development levels.

Zinc. Before taking into account the benefits provided by the PDF, total zinc concentrations are expected to decrease by 51%, to 126 ug/l, while zinc loadings are expected to increase by 17 percent, to 614 lbs/yr. EPA has reported that zinc does not bioaccumulate to any appreciable extent (EPA Doc. 823-R-00-001, Feb. 2000, Appendix p. 802). The most recent concentrations of locally collected zinc in mussel and fish tissue have been below screening values (TMDL Problem Statement, pp. 37, 54). Impacts from zinc loadings are expected to be less than significant based on the small magnitude of the increase, the lack of any appreciable bioaccumulation, the decrease in concentrations, and the lack of any evidence of impairment due to zinc in the San Diego Creek or Newport Bay. The receiving waters are not impaired for zinc, thus there would be no violation of existing water quality standards. Moreover, when the water quality benefits of the PDF are included, post-development zinc loadings are estimated to decrease by 11% from pre-development levels, to 467 lbs/yr, while total zinc concentrations are estimated to change by 63%, to 95 ug/l. Lastly, as was the case for copper and lead, post-development, pre-PDF estimated dissolved concentrations are far below the CTR limit for acute freshwater criteria for zinc, the estimated dissolved EMC is 71 ug/l, while the CTR limit is 297 ug/l.

Table 4-43 Estimated Annual Development-Area Dissolved Metal Concentrations				
Constituent	Pre-development EMC ⁽¹⁾	Post-development (w/o PDF) EMC ⁽¹⁾	Percent Change EMC	CTR Standard (ug/l) ⁽²⁾
Dissolved Copper	67	13	-82	38
Dissolved Lead	11	3	-73	208
Dissolved Zinc	140	71	-50	297
⁽¹⁾ Load in lbs/yr ⁽²⁾ CTR values are the acute freshwater criteria concentrations assuming an average hardness value in the receiving water of 300 mg/l calcium carbonate. An average hardness value of 300 was chosen based on a review of water quality data from San Diego Creek.				

Selenium. The project is not expected to affect selenium levels in San Diego Creek. The presence of selenium in surface waters may result from weathering of minerals in the soils, or it may originate from industrial uses (such as the electronics, paints, and rubber compounds industries). Given the anticipated non-industrial uses at the development site, likely sources of selenium, if any, will be those naturally occurring in the soils or groundwater. The elevated levels of selenium observed in San Diego Creek downstream of the project site are attributed to a combination of high selenium concentrations in shallow groundwater (in particular from groundwater near the confluence of El Modena Channel, Santa Fe Channel, and Peters Canyon Wash outside of the Northern Sphere Area) and the subsequent flow of that groundwater into streams (Hibbs and Lee, 2000). Selenium concentrations are believed to be high downstream of the project area because such areas, unlike the development area, are within the historical location of the Swamp of Frogs. In the past, selenium became sequestered in the peat soils of the anoxic marsh environment of areas downstream of the project site; today, selenium is being released from those areas as oxygenated ground water flows through soils where the marsh once existed. Because the project is not expected to affect groundwater flows downstream in this area, and because discharges of sediment are expected to decline significantly over existing levels, the discharges of selenium associated with groundwater are not expected to change, and the discharges of selenium associated with sediment transport are expected to decrease.

Pesticides. Pesticides are of general concern in terms of toxicity and bioaccumulation in aquatic organisms and prey species such as birds. Historically, organochlorine pesticides such as DDT were phased out because of reported adverse effects. These pesticides were replaced with organophosphate pesticides, some of which now are being phased out because of human health considerations. Of concern in the San Diego Creek watershed are the pesticides chlorpyrifos and diazinon, both of which are noted as problem constituents in the Problem Statement for the Final Toxics TMDL. Recently, EPA has called for the phase-out of the use of chlorpyrifos for commercial and residential applications (e.g., retail sales will be phased out no later than December 2001). (EPA, *Chlorpyrifos Revised Risk Assessment and Agreement with Registrants*.) EPA recently reached an agreement with pesticide registrants to phase out all outdoor non-agricultural uses of diazinon by 2003. (See EPA, *Diazinon Revised Risk Assessment and Agreement with Registrants*.)

Pesticide concentrations and loading will likely decrease with the proposed development. Residential, commercial, and research and development office uses do not require application of pesticides on landscaping to the degree that pesticides are applied to row crops or orchards. Pesticides such as DDT, which tend to persist in soils used historically for agriculture, are made less available due to paving, buildings, and landscaping. The pesticides chlorpyrifos and diazinon will likely be reduced due to their phasing out by EPA, discussed previously.

Hydrocarbons. Due to a lack of reliable runoff data, no statistical comparison of pre- and post-hydrocarbons was made. Concentrations of hydrocarbons may increase over their present levels because of the increased levels of traffic and parking of automobiles. However, vehicles are currently used within the project site as a result of the existing roadways and agricultural uses. (The

project area is currently used primarily for agriculture and nurseries). In addition, farm and other equipment is present on the site, as are pesticides and fertilizers. Storm water runoff may come into contact with, and be discharged from, areas containing this equipment and materials.

After project development, leaks and spills of oil and grease may be assumed to be minimized at the proposed residential, commercial, and research and development office park uses based upon the reasonable expectation that vehicles utilizing the development will generally be recent models and will be well-maintained. Also, data from parking lot studies conducted by CalTrans indicate that concentrations of oil and grease are typically low (below 10 mg/l). Water Quality Assessment Technical Appendix (GeoSyntec, 2001). The Toxics TMDL Problem Statement did not identify hydrocarbons as contributing to toxicity in the watershed. Impacts from hydrocarbons, therefore, are expected to be less than significant based upon the typical low concentrations of hydrocarbons from parking lots, and the lack of any evidence of impairment due to hydrocarbons in the San Diego Creek or Newport Bay (both developed watersheds).

For new developments, prior to the earlier of recordation of a final subdivision map or issuance of precise grading permits, City ordinance requires preparation and approval of a WQMP. The WQMP must identify BMPs, including both structural and non-structural measures such as those identified in the MSW Permit Appendix G (New Development BMPs) of the DAMP, which will serve to minimize or eliminate the discharge of storm water runoff from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks or other outdoor work areas. More generally, to the extent that such activities are associated with the types of uses proposed for the site, they would also be expected to be associated with the areas from which the model input data was obtained. The effect of such activities on storm water runoff, therefore, is included in this analysis. It is not possible to provide additional detail on particular uses in a program-level EIR.

Although it is not possible to quantify, the PDF is expected to reduce hydrocarbons in storm water runoff. Hydrocarbons tend to be sticky, and as a result, to adhere to or coat larger particles. Particles in runoff tributary to the Trabuco Retarding Basin will settle out in that basin; particles in runoff tributary to other water bodies will be filtered out by other means of treatment. By these means, the PDF will act to reduce hydrocarbons present in storm water runoff.

Construction-Related Storm Water Quality Impacts. The potential impact of construction on water quality is related primarily to turbidity, sediments and pollutants that might be associated with sediments (e.g., phosphorous). These constituents currently are identified in the State Water Resources Control Board 1998 303(d) list as impairing beneficial uses in San Diego Creek, and are currently regulated under a sediment TMDL and a nutrient TMDL. The TMDL for sediment identifies construction sites as a major source of sediment and contains a target of no greater than 19,000 tons/yr. of sediment (as a 10-year running average) to be discharged from construction sites.

Construction-related activities that are primarily responsible for sediment releases are those that expose soils to potential mobilization by rainfall, runoff and wind. Such activities include removal of vegetation from the site, grading of the site, and trenching for infrastructure improvements. Environmental factors that influence erosion include topographic, soil, and rainfall characteristics. The development area is located in a relatively flat area that is subject to a mean annual rainfall of about 12 inches per year, although storm events can have high intensities.

Although the impact of construction on storm water quality was not quantitatively analyzed, any potential impacts will be reduced to a level of insignificance by compliance with existing regulations (described in more detail in the Mitigation Measures section) which require the development and implementation of erosion and sediment control BMPs. Erosion control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. A Storm Water Pollution Prevention Plan (SWPPP) will be developed in compliance with the General Construction Activities Storm Water Permit. This Permit requires BMP selection and implementation for various phases of construction, and BMP maintenance. In the recently revised General Permit, water quality monitoring is required in addition to visual monitoring.

Specific BMPs that will be considered in the development of the SWPPP include:

Erosion Control BMPs:

- Minimize soil exposure, especially during the wet season.
- Hydro-seed or otherwise stabilize exposed soil.
- Design the drainage systems and grading patterns to limit slope length.
- Stabilize outfalls (e.g., with rip rap).

Sediment Control BMPs:

- Protect storm drain inlets using hay bales or other means.
- Construct temporary detention basins.
- Install wash racks or other means to control off-site tracking of sediment.
- Construct in-channel sediment traps and drop structures.

In addition to the site-specific BMPs, construction impacts will be further reduced as a result of the existing Trabuco Retarding basin. A major portion of the development area (approximately 40%) drains to the Trabuco Retarding Basin, which will effectively settle out coarser sediments that may be discharged during the construction phase.

Lastly, Planning Area 6 includes areas of the San Joaquin foothills. The San Joaquin foothills are considered one of the three major sources of sediment in the watershed along with construction sites and channel banks. Conversion of portions of these lands to urban uses will result in stabilization of watershed sources of sediment as areas will either be made impervious or will be vegetated and irrigated. BMPs during construction will specifically address the higher potential for erosion from steeper locations in the development area.

The combination of on-site controls implemented as part of the SWPPP, and the Trabuco Basin should result in substantial control of sediment (and pollutants associated with sediment) in construction storm water runoff.

Construction-related activities can also result in the release of pollutants other than sediment and pollutants associated with sediment. Such releases can occur when rainfall and runoff come into contact with concrete or products used in concrete, and during sawcutting, the washing of buildings and equipment, and the fueling and maintenance of vehicles, among other activities. These and other potential sources of pollutants will be identified as part of preparation of the SWPPP, discussed above. The SWPPP will identify BMPs to be implemented in order to minimize the impact of these construction activities on water quality. Such measures generally focus on good housekeeping activities including: designating and lining concrete washout areas, removing construction debris in a timely manner, providing enclosures and, if appropriate, secondary containment for fuels and lubricants, and avoiding over-applying fertilizers and pesticides as part of soil stabilization and landscaping. A detailed list of potential controls to be used to manage runoff water quality from construction sites can be found in the Water Quality Assessment Technical Appendix (Geosyntec, 2001).

Determination of Project Effect, Level of Significance and Project Benefit Resulting from PDF

Stormwater. As discussed above, post-development concentrations of all constituents of concern (sediment, nutrients, pathogens, and toxins, including pesticides, copper, zinc and selenium) are anticipated to remain the same or be reduced in comparison to existing levels from the existing agricultural and grazing lands. The reduction in sediment may be attributed to the conversion of essentially open agricultural land and nurseries to paved and landscaped areas. The reduction in nutrients and pesticides may be attributed to, 1) the reduction in fertilizer and pesticide usage entailed in the conversion of agricultural uses to residential, commercial, and research and development office park uses, and 2) the covering or stabilization of nutrient and pesticide-laden soils which may have previously run off the site. Metals concentrations are also predicted to be lower post-development, due, in part, to reduced mobilization of sediment, which tends to reduce particulate metals affixed to the sediment. The presence of pathogens in storm water runoff is expected to remain substantially the same, based on the elimination of some existing sources of pathogens, and the addition of new sources, known and unknown. The presence of hydrocarbons discharged from the development site may increase over present levels based upon the increased presence of automobiles on the site but those increases, if any, are anticipated to be minimal, given the nature of the uses proposed for the site and the PDF. Hydrocarbons tend to attach to sediment and, therefore, will be expected to settle out in the Trabuco Retarding Basin and to be filtered out by catch basin inserts.

Even before taking into account the water quality benefit of the PDF, for all constituents, including all of the constituents of concern, effects of the proposed development project on surface water quality are expected to be less than significant. The reduction in potential pollutants (except for possibly hydrocarbons and pathogens) expected to be discharged from the development site will not

impair the beneficial uses of the receiving waters or areas that provide a water quality benefit, but will likely have the opposite effect, and may improve water quality over present levels. For hydrocarbons, the increase, if any, is expected to be minimal. For pathogens, there is not expected to be any change. As a result, storm water runoff from the project is not expected to have an adverse effect on the biological integrity of the affected waterways and water bodies, or their beneficial uses. With the PDF, impacts of the proposed development project will be further reduced, providing a benefit as compared to existing conditions.

Post-development conditions modeled in the tables and discussed above represent anticipated long-term conditions for the development site. During the construction phase of the proposed development, there is the potential for short-term, unquantifiable increases in pollutant concentrations from the site. However, as required by the State's Storm Water Permit, the project proponent will be adhering to a SWPPP that will minimize increases in pollutant concentrations which will reduce the potential for short-term impacts to below a level of significance.

Dry Weather Flows

Dry weather flows and quality are expected to change minimally or to improve as a result of the project. An analysis of dry weather flows was conducted using data from the Orange County Public Facilities and Resources Department. The analysis indicated that dry weather flows from agricultural areas are comparable to those from residential areas.

Sediment mobilization in urban areas is generally associated with storm water events and associated rainfall intensity. Dry weather flows are typically low in sediment because the flows are relatively slow, which causes sediment to settle out or to be filtered out by algae and other plants growing in the drainage channels. As a result, pollutants associated with suspended solids (e.g., phosphorous, some trace metals, and some pesticides) are typically found in very low concentrations in dry weather flows.

Nitrogen, since it is a dissolved constituent, was analyzed using a regression analysis. The analysis indicated that concentrations of total nitrogen in dry weather flows from agricultural areas were far higher than the concentrations in similar flows from residential areas. This suggests the project will reduce total nitrogen concentrations in dry weather flows.

Pathogen organisms are small, and can be effectively transported by dry weather flows. Since pathogen indicator data in Orange County are generally not available for small single land use-type catchments, it is not possible to quantitatively analyze the impact of the project on pathogens. The County of Orange Public Facilities and Resources Department intensively sampled fecal coliform in San Diego Creek (at Campus Drive) from April 1999 through February 2000. The results indicate that 30 day geometric means of fecal coliform during dry weather conditions are generally below the 200 MPN/100 ml standard except for few excursions where concentrations approach about 300-400 MPN/100 ml. Pathogen modeling conducted as part of the planning for the Natural Treatment System indicates that the proposed system (which includes the improved Trabuco Basin)

will be able to meet the fecal coliform standard during dry weather. Principal sources of human-derived pathogens in dry weather flows are leaking septic systems, cross-connections between sanitary sewers and storm drains, and leakage from the sanitary sewer system into groundwater, which feeds non-storm flows. Pet wastes can also be a source of pathogens. Since the project will have new storm drain and sanitary sewer systems which are expected to have minimal if any leakage, the project is not expected to substantially change dry weather pathogens from such sources.

As a result of the project, dry weather flows are expected to be comparable to existing flows. The project, therefore, would not significantly impact dry weather flows.

Groundwater

Groundwater levels and quality are expected to change minimally, if at all, as a result of the project.

Groundwater Levels. A major factor affecting groundwater infiltration is how irrigation practices change with the development. Current agricultural irrigation practices primarily use drip irrigation, although spray irrigation is used to establish some plants. The agricultural irrigation of the orchards and row crops located in the development area will be replaced with landscape irrigation, while the northeast portion of the site, which is underlain by more sandy soils, will largely continue to be a recharge area for the groundwater basin. In the development area, the conversion of agricultural land to urban uses may result in less total irrigation because of the substantial reduction in vegetated areas, and because water conservation practices are employed in irrigating the urban landscaping. Also, the increase in impervious surfaces will reduce the infiltration of rainfall compared to current conditions. Both of these effects would tend to reduce infiltration from the development area into the shallow groundwater. Since the northeast portion of the site will largely continue to serve as a recharge area for the deeper aquifer, however, the impact of these changes on aquifer groundwater levels is reduced. As a result, groundwater levels are expected to remain similar or become slightly lower than existing conditions. (NMG, 2001.)

Groundwater Quality. The concern for groundwater quality impacts arises largely from the potential for the infiltration of water contaminated with pollutants associated with urban runoff. Of particular concern is the infiltration of storm water collected and treated in water quality basins and in other types of water quality controls (e.g., landscaped areas used for bioretention). Research conducted on the effects on groundwater from storm water infiltration by Pitt et al, (1994) indicate that the potential for contamination is strongly dependent on a number of factors including the local hydrogeology and the chemical characteristics of the pollutants of concern.

Local hydrogeologic data indicate that the depth to groundwater varies from about 50 feet in the southwestern portion of the site (near the Jeffrey Trabuco Retarding Basin) to over 100 feet in the northwestern portion of the site (NMG, 2001). The site is primarily underlain with alluvium which varies from a few feet near the foothills to over 300 feet in the southwest corner of the site. The

surficial soils in the southwestern portion of the site have been found to have poor to moderate permeability whereas soils near the foothills have moderately rapid permeability.

Chemical characteristics that influence the potential for groundwater impacts include high mobility (low sorption potential), high soluble fractions, and abundance in storm water. As a class of constituents, trace metals tend to adsorb onto soil particles and are filtered out by the soils. This has been confirmed by extensive data collected beneath storm water detention/retention ponds in Fresno (conducted as part of the Nationwide Urban Runoff Program) that showed that trace metals tended to be adsorbed in the upper few feet in the bottom sediments. More mobile constituents such as nitrate would have a greater potential for infiltration.

The conversion from agriculture to urban land uses would likely result in a reduction in nitrate because of the reduced application of fertilizers in urban versus agricultural areas. Also, some of the constituents of concern would be treated in the water quality basins (e.g., basins with wetland plants could result in denitrification) which could be viewed as pretreatment prior to infiltration. The project, therefore, would not significantly impact groundwater levels or quality.

Flood Plains

The proposed development would increase the extent of impervious surfaces, and as a consequence would increase storm flows. Portions of the site are identified by FEMA as subject to the inundation by the 100-year flood event. FEMA is currently processing two flood plain modifications (associated with the Eastern Transportation Corridor improvements). Once these modifications are processed, the flooding limits will be located, (1) along the existing earthen Central Irvine Channel which runs along Jeffrey Road between Irvine Boulevard and Jeffrey Road, (2) along the Central Irvine Channel westerly of Jeffrey Road, and (3) along the natural drainage course downstream of the Round Canyon Detention Basin to the Marshburn Retarding Basin. Development at the site would increase surface water flow and, without flood control improvements, could potentially exacerbate the existing conditions.

Flooding. The required flood control improvements for the project site have been specified in the *Northern Sphere Area Master Plan of Drainage* prepared by RBF Consulting (2001). On-site flood control facilities would include regional and local storm drain pipelines, and would be constructed to City and County standards concurrent with development. The primary regional improvements would be to Trabuco Channel from Culver Drive to Jeffrey Road, and the Marshburn Channel from Irvine Boulevard to Trabuco Road. The required flood control improvements would be designed to protect all proposed residences and commercial structures from flooding during the 100-year flood event. With construction of the improvements identified in the *Master Plan of Drainage*, the project would not affect the potential for off-site flooding, except as previously indicated for the Central Irvine Channel.

The five existing detention basins were evaluated as part of the *Master Plan of Drainage*. Four of the basins, the Trabuco, Agua Chinon, Bee, and Round Canyon Basins, are under the jurisdiction

of the California Department of Water Resources, Division of Safety of Dams, and comply with all regulatory requirements. The Marshburn Basin is a smaller basin that was constructed as part of the Eastern Transportation Corridor improvements. The Marshburn Basin was designed for the ultimate (fully developed) condition drainage, but the inflow collector systems and outflow discharge line were constructed for the interim condition only. These would be reconstructed as part of this project in order to accommodate the ultimate development of the watershed. The five existing basins would accommodate the ultimate development of the watershed, conform to all regulatory requirements, and are designed to meet both seismic and flood hazard standards.

The Siphon Canyon Dam and Reservoir are located within the open space watershed area upstream of proposed development areas. A dam inundation report exists for Siphon Reservoir. The area of potential flooding from a catastrophic dam failure extends from the dam to the I-5 freeway. To ensure the safety of downstream areas, the dam is inspected annually by the State of California Department of Water Resources, Division of Safety of Dams. Thus, the project would not expose people or structures to a significant risk related to the failure of a levee or dam, either associated with a detention basin or a reservoir.

Erosion and Siltation

Runoff flow velocity tends to increase with urbanization because of the increase in impervious surfaces and the installation of drainage facilities that more efficiently convey runoff from the site to local water bodies. The *Master Plan of Drainage* describes the increase in flow rates (in cubic feet per second) at runoff concentration points and within the backbone drainage facilities. In and downstream of the development area, many of the streams have lined slopes and alluvial bottoms, therefore, slope instability is not an issue for these channels. Other channels (e.g., portions of Peters' Canyon Wash) will be unlined. However, the required flood control improvements specified in the *Master Plan of Drainage* include a number of grade control structures in the form of drop structures throughout the San Diego Creek watershed. These structures will minimize the channel down cutting that may otherwise result from the increased flows. As discussed in the *Master Plan of Drainage*, where erosive velocities are a concern, to prevent erosion and sediment transport the flows will be contained within improved channels. Channel stabilization and velocity control structures will be used to preserve vegetated reaches of existing channels. Other facilities that may be used include engineered stream courses, stable soft-bottom channels, open channels with in-channel energy dissipation structures or other hard revetment, pipelines, and reinforced concrete box channels.

In addition, the project is within the area addressed by the 208 Plan, discussed above. As part of the 208 Plan, basins to minimize the discharge of sediments to Newport Bay have been created, channels have been stabilized, and BMPs have been identified for specific activities. Continued implementation of the 208 Plan will help to ensure that erosion and siltation are minimal and do not adversely impact water bodies, either on- or offsite.

Inundation by Seiche, Tsunami or Mudflow

Tsunami and seiche are destructive waves of water that form in oceans and lakes, respectively, usually as a result of earthquake movement. Since the site is not located near any large bodies of water, there would be no impact to the site from these hazards. Since the portion of the site to be developed is relatively flat, there would be no impact to the site or off-site areas from mudflows.

Elements of a Master Water Quality Approach

As discussed above, the proposed development has a less-than-significant impact upon surface water quality. The project proponent will be preparing and implementing a SWPPP and a WQMP in conformance with its obligations under the City's water quality regulations, the MSW permit, and the Storm Water Permit. The discussion that follows briefly describes the elements of a master water quality approach for this project and the process for identifying BMPs for inclusion in the final WQMP and SWPPP. More detail on this process is provided in the Water Quality Assessment Technical Appendix (GeoSyntec, 2001). The first step is to develop a list of BMPs to be considered. This list will include a variety of BMPs that address source control and site planning, and treatment type controls. The second step is to select those BMPs that have been shown to be effective in controlling one or more of the pollutants of concern and that address the types of pollutant sources in the proposed development. Next, the site will be evaluated for environmental conditions and constraints that might limit BMP feasibility. In the last step, BMPs would be selected that assembled in a "treatment train" would enhance the effectiveness of the overall system of BMPs. This concept of treatment train is based on the desire to first remove gross pollutants (litter, debris, trash, and coarse sediment) from the runoff stream, followed by removal of finer sediment sizes, and if necessary dissolved constituents. The final selection will be made consistent with the feasibility criterion that capital costs and maintenance requirements are proportional in comparison with anticipated environmental benefits and the overall size of the project.

Cumulative Impacts

Surface Waters

Project Impacts

Overall, the proposed project is expected to improve surface water quality conditions in the watershed, as compared to existing conditions. The project would increase storm water runoff volumes in the watershed by increasing impervious cover at the site; however, as discussed in the previous sections, water quality of the runoff from the site is expected to improve over the existing, primarily agricultural, conditions. Those three constituents -- zinc, TKN and hydrocarbons -- whose concentrations and/or loading in runoff may increase with the proposed development are not expected to be significant and are anticipated to be controlled effectively through the use of project-specific BMPs and the PDF (in the case of zinc, implementation of the PDF will result in a decrease in loadings and concentrations compared to existing conditions). Dry weather flows are

expected to remain similar to current conditions, while nitrogen and pathogen levels in dry weather flows may decrease.

Regional BMPs such as the TMDL programs, the DAMP, the MSW Permit, the regional sediment basins, and the San Joaquin Marsh program have been designed under the assumption that the San Diego Creek watershed would continue to become more urbanized. The regional control measures anticipate a reduction in overall agricultural land uses, with their high levels of pollutant runoff, and an increase in urban uses, with an associated increase in runoff volumes. The regional control measures would absorb any cumulative adverse effects of the proposed development. To the extent that the project would improve water quality, that benefit would be shared by the watershed.

More specifically, the TMDL program is designed to identify all those constituents that adversely impact the beneficial uses of a particular water body, and then to identify the appropriate reduction in pollutant concentrations and/or loadings needed so that the water body can attain its beneficial uses as identified in the Basin Plan. As previously discussed in more detail, in no case where a TMDL-standard is applicable, would the proposed development be expected to increase pollutant loadings or concentrations. Furthermore, for sediment, nutrients and toxics, loadings and/or pollutant concentrations are expected to decrease with project implementation. For pathogens, concentrations are expected to remain about the same. Since the project is expected either to result in a decrease in pollutants or not to result in any significant change, the project would not have a significant cumulative impact on water quality, nor would the project adversely impact the beneficial uses of the relevant water bodies. In a number of cases, post-development runoff from the project site is expected to improve, thereby potentially improving water quality over current conditions.

Other projects in the area would be expected to be reviewed by local and regional jurisdictions regarding project approvals; therefore, they would presumably comply with the same regulatory surface water quality requirements as the proposed project.

Level of Significance

Stormwater

The proposed development project is expected to have a less than significant cumulative impact on the local water quality and the San Diego Creek watershed. With regard to hydrocarbons, any potential increase in concentration from the project site is expected to be less than significant given the low levels of hydrocarbons discharged from parking lots, and the evidence that to date, hydrocarbon discharges are not contributing to impairments or negatively impacting beneficial uses in the watershed. Similarly, with regard to zinc, any potential increase in loading from the project is expected to be less than significant given the minimal increase in loading, the fact that zinc does not appreciably bioaccumulate, and the fact that to date, there is no evidence that zinc is contributing to impairments or negatively impacting beneficial uses in the watershed. Moreover, implementation of the PDF will ensure that zinc loadings decrease in comparison to pre-development conditions.

Groundwater

Overall, the effect of the proposed project on the regional groundwater system is expected to be less than significant. The project would largely preserve as open space the deep aquifer recharge areas located in the foothills, which would allow groundwater recharge to continue in the most pervious areas. In the less pervious areas, although agricultural irrigation would cease, landscape irrigation would commence. As a consequence, shallow groundwater levels would be expected either to remain the same or to decrease slightly. The quality of the recharge would be expected to improve, since the high levels of nitrogen associated with agriculture would be expected to decrease. The project, therefore, would not have a significant cumulative impact on regional groundwater.

Flood Plains

The project would be required to complete the local and regional drainage improvements in compliance with the design criteria of the County of Orange. Potential impacts will be mitigated by either, (a) reducing peak storm water discharges to levels equal to or below pre-project levels, (b) making improvements to downstream drainage facilities so they have the capacity to convey the increased discharges, or (c) some combination of the two whereby peak flows are reduced, but not to levels equal to or below pre-project levels, and improvements are made to downstream facilities so they have the capacity to convey the reduced peak flows. The flood control improvements would be coordinated with the County of Orange and would be in substantial conformance with existing plans. The project, therefore, would not have a significant cumulative impact on flooding, erosion or siltation in the watershed.

4.8.4 MITIGATION MEASURES

Existing Regulations and Standard Conditions

- 8.1 Prior to the issuance of grading permits, the landowner or subsequent project applicant shall submit for approval to the State Water Resources Control Board, a Notice of Intent to be covered under the Storm Water Permit. Additionally, the project proponent shall prepare a SWPPP which will: 1) require implementation of Best Management Practices (BMPs) so as to prevent a net increase in sediment load in storm water discharges relative to preconstruction levels; 2) prohibit during the construction period discharges of storm water or non-storm water at levels which would cause or contribute to an exceedance of applicable water quality standards contained in the Basin Plan; 3) discuss in detail the BMPs planned for the project related to control of sediment and erosion, non-sediment pollutants, and potential pollutants in non-storm water discharges; 4) describe post-construction BMPs for the project; 5) explain the maintenance program for the project's BMPs; 6) during construction, require reporting of violations to the Regional Board; and 7) list the parties responsible for SWPPP implementation and BMP maintenance during and after grading. The project proponent shall implement the SWPPP and will modify the SWPPP as directed by the Storm Water Permit.

-
- 8.2 Prior to issuance of precise grading permits, the landowner or subsequent project applicant shall develop a WQMP in accordance with the requirements of the MSW Permit and the DAMP and shall submit the WQMP for review to the City. The City shall approve the WQMP prior to the granting of the precise grading permit for the proposed development. In accordance with the DAMP, the WQMP shall: 1) describe the routine and special post-construction BMPs to be used at the proposed development site (including both structural and non-structural measures); 2) describe responsibility for the initial implementation and long-term maintenance of the BMPs; 3) provide narrative with the graphic materials as necessary to specify the locations of the structural BMPs; and 4) certify that the project proponent will seek to have the WQMP carried out by all future successors or assigns to the property. Detailed information about process for identifying BMPs is included in the Water Quality Assessment Technical Appendix. Identifying BMPs is included in the Water Quality Assessment Technical Appendix.
- 8.3 If any construction activity falls within Caltrans Right of Way, an Encroachment Permit shall be required. The landowner or subsequent project applicant must submit a copy of the Storm Water Pollution Prevention Plan prior to construction. If a SWPPP is not required for the project, the landowner or subsequent project applicant shall prepare and submit a Water Pollution Management Program (WPMP) pursuant to Caltrans Standard Specifications and "Caltrans Storm Water Quality Handbook, Construction Contractors Guide and Specifications." All activities within Caltrans Right of Way must fully conform to the Caltrans Statewide NPDES Permit No. CAS000003 (Order No. 99-06-DWQ).
- 8.4 This subdivision necessitates the construction of public and/or private infrastructure improvements. Prior to the release of a final map by the City, the future applicant shall construct, or enter into an agreement and post security, in a form and amount acceptable to the City Engineer, guaranteeing the construction of the following public and/or private improvements in conformance with applicable City standards and the City's Capital Improvement Policy:
- Storm drain facilities, including detention basins, in accordance with the approved Drainage Concept Plan. (Standard Condition 1.1)
- 8.5 Prior to the approval of improvement plans for the Central Irvine Channel (Trabuco Channel) the applicant shall submit a study, for approval by the Director of Public Works, identifying the applicant's fair share responsibility in improving the channel. Additionally, the City shall use its best efforts to secure funding to pay for its fair share of required improvements. However, if the City is unable to obtain funding for all or a portion of its fair share, the applicant will be responsible for the completion of all required channel improvements, including the City's fair share. In the event that the City is unable to fund its fair share, the City and the applicant shall enter into an agreement to establish a mechanism by which the applicant will receive equivalent credit towards other public works projects.

-
- 8.6 Prior to the issuance of precise grading permits, the landowner or subsequent project applicant shall submit a groundwater survey of the affected portion of the site. The analysis shall be prepared by a geotechnical engineer versed in groundwater analysis and shall include the following information and analysis:
- a. Potential for perched groundwater intrusion into the shallow groundwater zone upon buildout.
 - b. Analysis for relief of groundwater buildup and properties of soil materials onsite.
 - c. Impact of groundwater potential on building and structural foundations.
 - d. Proposed mitigation to avoid potential for groundwater intrusion within five feet of the bottom of the footings. (Standard Condition 2.2)
- 8.7 Prior to the issuance of a precise grading permit, the landowner or subsequent project applicant shall furnish to the City Engineer documentation required by the Federal Emergency Management Agency (FEMA) for revision to the FIRM and Flood Insurance Study (FIS), including additional data as required by FEMA. The landowner or subsequent project applicant shall pay all preliminary and subsequent fees as required by FEMA. (Standard Condition 2.4)
- 8.8 Prior to the issuance of preliminary or precise grading permits, the landowner or subsequent project applicant shall provide the City Engineer with evidence that a Notice of Intent (NOI) has been filed with the State Water Resources Control Board. Such evidence shall consist of a copy of the NOI stamped by the State Water Resources Control Board or the Regional Water Quality Control Board, or a letter from either agency stating that the NOI has been filed. (Standard Condition 2.5)
- 8.9 Prior to the issuance of precise grading permits, the applicant [landowner] shall submit, and the Director of Community Development shall have approved, a Water Quality Management Plan (WQMP). The WQMP shall identify the Best Management Practices (BMPs) that will be used on the site to control predictable pollutant runoff. (Standard Condition 2.10)
- 8.10 This development includes land within a Special Flood Hazard Area (SFHA) subject to inundation according to the Flood Insurance Rate Map (FIRM). Prior to the issuance of building permits on any lot or parcel located wholly or partially within the SFHA, a National Flood Insurance Program (NFIP) Elevation Certificate shall be submitted in accordance with the requirements of the NFIP and shall have been reviewed and approved by the City Engineer. The elevation certificate shall be on a Federal Emergency Management Agency (FEMA) form. If a nonresidential building is being floodproofed, then a FEMA Floodproofing Certificate must be completed and submitted in addition to the elevation certificate. (Standard Condition 3.3)

Project Design Features/Special Development Requirements

The landowner will include as part of the project design the following feature that will improve the quality of storm water runoff from developed areas of the site:

- 8.11 As part of the drainage improvements for Planning Area 9, the existing Trabuco Retarding Basin will be modified to treat over a 24-hour period the volume of runoff produced by a 24-hour, 85th percentile storm event (runoff from 0.75 inch, 24-hour storm) over the 1226-acre Planning Area 9, which constitutes approximately 40 percent of the development area.
- 8.12 For the remaining 60 percent of the development area (those areas within Planning Areas 5B, 6 and 8A which are not tributary to the Trabuco Retarding Basin and which will be developed), BMPs (for example, BMPs that achieve similar performance per National BMP Database ratings as catch basin inserts) will be designed to infiltrate, filter or treat the volume of runoff produced by either (a) a 24-hour, 85th percentile storm event (runoff from 0.75 inch, 24-hour storm), or (b) the maximum flow rate of runoff produced by a rainfall intensity of 0.2 inch of rainfall per hour. These BMPs will be included in the WQMP and approved by the City in accordance with Mitigation Measure 8.2.

Additional Mitigation Measures

- 8.13 The project is expected to have a less-than-significant impact on surface water quality, as discussed above, and accordingly no water quality mitigation measures are required under CEQA. The project proponent nonetheless proposes to include as part of the project a PDF to improve the quality of storm water runoff from developed areas of the site. Accordingly, as a monitoring device to ensure the PDF is implemented, the following identification of the PDF will be included in the Mitigation Monitoring Report for this project:
 - Prior to approval of the first tentative tract map or approval of the first grading permit, the project proponent shall submit for City review a plan depicting the Project Design Feature for the specific tentative tract map area, that will address water quality.
- 8.14 Prior to issuance of any building permit, the landowner or subsequent project applicant shall complete, and submit to the Department of Public Works, a hydrology and hydraulics report to ensure the final development conforms to the proposed drainage patterns and flow rates shown in the FCMPSDC. The final pad layout and street locations along with final onsite storm drain design shall be verified with more refined flow rates and pipeline layouts, to the satisfaction of the City Engineer.

-
- 8.14 The future project applicant shall participate on a fair-share basis in the construction of the improvements necessary, as determined by the City, to address area-wide deficiencies in the drainage system, in conjunction with the approval of the first final map for the project.
- 8.15 The landowner or subsequent project applicant shall participate on a fair-share basis in the construction of the improvements necessary, as determined by the City, to address deficiencies in the downstream drainage system, in conjunction with the approval of the first final map for the project.
- 8.16 Any runoff draining into Caltrans Right of Way from construction operations or from the resulting project must fully conform to the current discharge requirements of the Regional Water Quality Control Board to avoid impacting water quality. Measures must be incorporated to contain all vehicle loads and avoid any tracking of materials, which may fall or blow onto Caltrans roadways or facilities.

4.8.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the standard conditions listed above will reduce all potential hydrology and water quality impacts to a level of insignificance.

4.9 Land Use & Planning

4.9.1 ENVIRONMENTAL SETTING

The proposed project site is located just north and east of the City of Irvine, in the south/central portion of Orange County. More specifically, it is located at the northern edge of the City of Irvine's sphere of influence, generally bounded by Trabuco Road and MCAS El Toro to the south, Jeffrey Road and existing residential development to the west, and the Santiago Hills to the north. Surrounding land uses include permanent open space to the north, the residential communities of Northwood (Planning Area 8) and Northwood Point (Planning Area 5) to the west, and Planning Area 40 and the former MCAS El Toro to the south. The project site includes all of Planning Areas 3, 6, 9, and portions of Planning Areas 5 and 8. Please refer to previous Exhibit 2-3 for an illustration of the existing land uses located on and surrounding the project site. A description of existing land use conditions is presented below.

On-site Land Uses

The vast majority of the project site proposed for development consists of undeveloped open space, irrigated row crops, orchards and associated agriculture facilities. Portions of Planning Area 3 and Planning Area 6 are composed of hills, canyons and several flat areas covered by native and non-native grassland, disturbed areas (mostly dirt surface), shrubby vegetation and occasional rock outcroppings. Implementation District P is not within the Northern Sphere Area, but is required to be dedicated for open space purposes pursuant to existing agreements and City Zoning Code provisions upon development in Planning Area 9. It consists mostly of undeveloped land with some agricultural operations (avocado orchards).

Planning Area 3

Planning Area 3 is located within the Santiago Hills, consisting of moderately steep terrain comprised of numerous east-west trending canyons which originate near the top of the dominant north-south trending ridge. The majority of the site consists of open space and is characterized by steep hillside slopes, native vegetation, and distinctive rock outcroppings. The Frank Bowerman Landfill is located on the site and can be accessed by the Bee Canyon Access Road. Limited agricultural activities, mostly avocado orchards, are also conducted within Planning Area 3.

Planning Area 5B

Planning Area 5B is currently being utilized by agricultural fields (row crops), Hines Nursery and supporting structures. These structures are comprised of office buildings for the Hines Nursery and various greenhouses. There is a small concrete reservoir in the southwest corner, which collects surface water drainage from the Hines Nursery to the north. A row of eucalyptus trees runs across the southern portion of the site, separating the row crops in the south from the nursery to the north. A second row of eucalyptus runs from east to west, halfway across the property at the entrance to

the nursery. There is an IRWD pipeline running northwest to southeast from Hicks Canyon Wash to the entrance of the Hines Nursery.

Planning Area 6

Planning Area 6 is currently being utilized for agriculture and nurseries and can be divided into several agriculture regimes. The southern portion, with relatively flat ground, is currently being utilized as a nursery site or for row crops. Avocado and citrus groves predominate in the hillside-terrain portions of the site, with large eucalyptus tree windrows between the orchards. In addition, a green waste plant and a mulching plant are present in the southeast corner of the site. There is an old quarry, currently being used by an environmental company in the southern portion of the site.

There are several old, abandoned diversion berms and channels in the canyon areas, apparently built for flood control in the past. There is an old abandoned reservoir (the Lambert Reservoir) remaining in the central portion of the site. This reservoir has an earthen dam that was built prior to the 1930's. The use was a water source for agricultural irrigation. The reservoir was apparently in service until 1997, but does not have any water in it today. However, in the winter of 1999, a large water pipeline broke along Portola Parkway and the reservoir was partially filled with water for a short time.

Planning Area 8A

The site is currently used for agricultural production consisting of a variety of row crops. The site is bisected by a eucalyptus windrow.

Planning Area 9

The site is currently used for agricultural production consisting of a variety of row crops. The site is bisected by two eucalyptus windrows. The Valencia Growers packing house is located on the east side of Jeffrey Road between Bryan Avenue and Irvine Boulevard. In addition, a golf driving range/retention facility is located on the southwest corner of Planning Area 9.

Surrounding Land Uses

Surrounding land uses include the permanent open space to the north, and the residential communities of Northwood (Planning Area 8) and Northwood Point (Planning Area 5) to the west, as shown on Exhibit 2-3. Planning Area 40 and the former El Toro MCAS are located to the south of the site.

Adjacent to the Northern Sphere Area's northernmost boundary are thousands of acres of planned natural open space, which includes land within the Central /Coastal Subregion NCCP/HCP (please refer to Section 2.3.1, "Project Background" for a complete discussion).

Existing Irvine General Plan Designations

As shown on Table 2-1, land use designations under the Irvine General Plan for the project site include: Agriculture, Preservation, Recreation, Water Bodies, and Estate-Density Residential (up to one dwelling unit per gross acre). Under the existing City General Plan, a maximum of 263 Estate-Density Residential units has been allocated to the Northern Sphere Area within Planning Area 6. Natural open space areas to the north within Planning Area 3, containing Implementation Districts "C" through "F" are designated Preservation. The Jeffrey Road Open Space Spine transects the northwestern portion of the project. Although the General Plan Land Use Map indicates general land use designation boundaries, precise boundaries between development and preservation areas are established at the time that zone change and/or master plan applications are submitted.

Existing Orange County General Plan Designations

In the County of Orange General Plan, the majority of the project site including all of Planning Areas 5B, 8A, and 9 and portions of Planning Area 3 and 6 are designated (5) Open Space. Approximately 850 acres of Planning 6 located outside of the Nature Reserve of Orange County is are designated (1B) Suburban Residential Communities which allows for residential densities ranging between 0.5 and 18 dwelling units per acre. This would mean that if an average of 9 dwelling units per acre were built under the existing County General Plan designation, approximately 7,650 dwelling units could be built within Planning Area 6. A portion of Planning Area 3 consisting of the Bee Canyon Landfill Site is designated (4) Public Facilities with a (LS) Landfill Site Overlay.

Existing City Zoning Designations

Table 2-3 lists the existing zoning classifications within the project site which include: Development Reserve (covering the potential development area within the Northern Sphere Area), Exclusive Agriculture, and Conservation Open Space Reserve (covering those open space areas within the Northern Sphere Area that are designated for preservation by the City of Irvine General Plan). Also, the Bowerman Landfill located within Planning Area 3 is zoned Landfill Overlay. The Development Reserve zone is applied to land shown for future development in the City and is designed to allow very limited development to occur prior to establishing a planning-area-wide concept and specific zoning, such as the proposed project. Similarly, the Conservation Open Space Reserve is also considered a "holding zone" that is applied to land shown as future conservation and open space areas in the general plan and restricts ongoing land uses to a limited number of activities until permanent zoning is put into place.

Existing County Zoning Designations

The County of Orange zoning map designates the Northern Sphere Area as "A1 - General Agricultural." The A1 district is described in the County's Zoning Code as providing for agriculture, outdoor recreational uses, and those low-intensity uses which have a predominately open

space character. It is also intended that this district may be used as an interim zone in those areas which the General Plan may designate for more intensive urban uses in the future. Orange County Code Section 7-9-55.1.

Regional Comprehensive Plan and Guide

Orange County and the City of Irvine are located at the western edge of a six-county metropolitan region composed of Orange, Los Angeles, Ventura, Riverside, San Bernardino and Imperial Counties. The Southern California Association of Governments (SCAG) serves as the federally-recognized Metropolitan Planning Organization for this Southern California Region. Orange County and its jurisdictions constitute the Orange County subregion within the SCAG region. The Orange County subregion is governed by the Orange County Council of Governments (OCCOG).

SCAG has developed a Regional Comprehensive Plan and Guide (RCPG) to help coordinate transportation and infrastructure, open space and environmental planning with population, housing and employment growth within the multi-county region. The RCPG, adopted in 1995, presents policies addressing planning priorities for the region adopted by SCAG's governing board, the Regional Council. Some of these are "core" policies that implement state or federal mandates, while most of the policies are "ancillary" or "advisory only" guidance for local jurisdictions and public agencies.

SCAG's RCPG includes a package of policies related to growth and development that seek to coordinate infrastructure with projected population and housing growth. In general, SCAG policies encourage job and housing opportunities to be balanced at the county or Regional Statistical Area (both much larger than the project level). SCAG policies also encourage job growth to be concentrated near transit services and transit nodes, and existing freeways, HOV lanes and toll roads. Given the expansive scope of and general nature of the RCPG, not all of these policies apply to every project.

4.9.2 ENVIRONMENTAL IMPACTS

Thresholds of Significance

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact on land use if it would:

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

-
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Based upon the Initial Study, it was determined that the proposed project would not physically divide an established community so this issue is not addressed in the DEIR. The Initial Study also determined that the project would not have a significant land use impact with respect to presenting a conflict with an applicable habitat conservation plan or natural community conservation plan. An extensive discussion of the project's relationship to the adopted NCCP/HCP is contained in Section 4.4, "Biological Resources."

Applicable Land Use Plans, Policies or Regulations

City of Irvine General Plan, Land Use Element

The goal of the City of Irvine's General Plan Land Use Element is to "Promote land use patterns which maintain safe residential neighborhoods, bolster economic prosperity, preserve open space, and enhance the overall quality of life in Irvine." Seven objectives are identified in the Land Use Element which range from preserving the City's identity to promoting economic development and creating a visually attractive City. The project's consistency with the following three objectives that help avoid, minimize or mitigate land use effects is the focus of this consistency analysis:

Objective A3, Open Space Areas: Encourage land use development that preserves the beauty of the natural environment.

Objective A4, Balanced Land Uses: Manage growth to ensure balanced residential and nonresidential development throughout the City.

Objective A-6, Land Use Compatibility: Achieve harmonious land use patterns throughout the City.

Objective A3, Open Space Areas: Encourage land use development that preserves the beauty of the natural environment

The proposed project provides for the dedication and/or preservation of over 4,615 acres of open space within Planning Area 3, portions of Planning Area 6 and Implementation District P. Approximately 1,600 acres of open space in Implementation Districts P, Q and R will be dedicated when development occurs within identified corresponding development areas (see Table 2-4). With the exception of Implementation District P (consisting of 748 acres), these lands will be designated Preservation by the proposed General Plan Amendment and Zone Change and will be annexed to the City. This dedication provides for the continued implementation of the City's Phased Dedication and Compensating Development Opportunities Program consistent with Policy (a) of Objective A-3. The dedicated lands are located entirely within the Reserve established by the NCCP/HCP. These 1,600 acres are in addition to the 3,015 acres of open space already dedicated in the Northern Sphere

Area (all located within Planning Area 3), but which are included in the proposed project's General Plan Amendment, Zone Change and eventual annexation to the City.

The proposed project is consistent with and furthers this land use objective through its dedication and preservation of 4,615 acres of open space that will be retained in its natural condition.

Objective A4, Balanced Land Uses: Manage growth to ensure balanced residential and nonresidential development throughout the City.

The proposed project consists of a General Plan Amendment and Zone Change to allow for development of a maximum of 12,350 dwelling units, 575,000 sq. ft. of Multi-Use development, 175,000 sq. ft. of Community Commercial uses, 51 acres of Commercial Recreation, 6,566,000 sq. ft. of Medical and Science uses, and 13 acres of Institutional uses, community and neighborhood parks, and a minimum of four elementary/middle schools within the Northern Sphere Area in the City of Irvine. The proposed land use plan allows for the development of a range of housing opportunities consisting of 12,350 Medium (0-10 d.u./ac) and Medium-High Density (0-25 d.u./ac) units comprised of attached and detached single-family homes, attached residential dwellings and apartments.

The proposed project would increase the amount of development intensity by 7,316,000 square feet of Multi-Use, Community Commercial, and Medical and Science uses as a result of the change in General Plan designations. Objective A-4, Policy (a) reads as follows: "Ensure that land uses enable the City to provide necessary municipal services by: Implementing and monitoring Statistical Tables A-1 and A-2." The project proposes an amendment to Tables A-1 and A-2 to eliminate the inconsistency between the proposed development intensity and the existing development intensity. A General Plan Amendment has also been requested to amend Table A-1 "Maximum Intensity Standards by Planning Area" in the Land Use Element of the General Plan to transfer 12,087 previously undeveloped dwelling units from other areas of the City to the Northern Sphere Area. This will allow for a maximum of 12,350 Medium Density dwelling units within the Northern Sphere Area. These units were previously allocated to other planning areas and the NCCP/HCP density bank as follows: 1,220 units from Planning Area 2, 955 units from Planning Area 5A, 804 units from Planning Area 8, 1,825 units from Planning Area 11, 858 units from Planning Area 12, 2,537 units from Planning Area 15, and 3,888 units from the NCCP/HCP density bank. As allowed under the Irvine General Plan and in accordance with the Protocol Agreement, the landowner has requested that these units be shifted from these areas to the Northern Sphere Area.

The proposed project was reviewed for consistency with the policies of Objective A-4, was found to be consistent with all applicable policies, including Objective A-4, Policy (c):

Achieve a land use balance through the following methods:

- Coordination of land use and circulation patterns to ensure adequate circulation capacity and infrastructure.

-
- Promotion of a diversity of housing types and affordability to meeting the development objectives of the Housing Element.
 - Designation of sufficient institutional land to meet the needs of each planning area.
 - Provision of adequate housing opportunities to support employment growth
 - Preservation of open space area.

The project site is located in the vicinity of several major roadways. Trabuco Road, designated as a Primary Highway (a divided highway of four through lanes) on the City of Irvine General Plan Master Plan of Arterial Highways (MPAH), forms the site's southern border, with Jeffrey Road, a 6-Lane Major Highway, bordering the project to the west. Portola Parkway, classified as a Primary Highway and Irvine Boulevard, a Major Highway, run through the project site. Sand Canyon Road is designated as a Major Six-Lane Highway south of Irvine Boulevard and is designated as a Primary Highway north of Irvine Boulevard. The Foothill Transportation Corridor (SR-241) traverses the northern portion of the site. The Laguna (SR-133) Freeway, a Transportation Corridor, forms Planning Area 9's eastern border.

The project proposes a General Plan Amendment to amend the Circulation Element to reduce Jeffrey Road from a 6-Lane Major Highway to a 4-Lane Primary Arterial north of Portola and to delete an unnamed, continuous north-south roadway located between Jeffrey Road and Sand Canyon Avenue to achieve consistency with the County's Master Plan of Arterial Highways (MPAH). One of the main purposes of the change is to achieve consistency with the MPAH. In addition, the project proposes to consider an amendment to change the acceptable level of service (LOS) to LOS "E" for certain identified intersections within the Irvine Spectrum area and those areas within the project site that are designated for similar uses, as shown on previous Exhibit 2-6, such as Research and Industrial (Spectrum Expansion Area). With the continued implementation of trip reduction programs in the Irvine Spectrum, and the limitation of this change to intersections in the Spectrum and Spectrum Expansion Area that do not lie adjacent to residential areas, the project is coordinating its proposed land uses with circulations patterns and improvements.

The project proposes the development of 12,350 dwelling units which will include both Medium Density and Medium-High Density residential development to provide a diversity of housing types. The project also is proposing to meet the Affordable Housing Needs goal of 15% of the actual number of units built within each Planning Area by utilizing a combination of new on-site construction and off-site affordable housing credits. Satisfying the objectives of the Housing Element is also furthered by the requirement that the project proponent submit an affordable housing program for review and approval by the Director of Community Development prior to issuance of the first residential building permit within each Planning Area.

In furtherance of providing sufficient institutional land, the project includes 13 acres of Institutional zoned land within Planning Areas 6 and 9. Development authorized by the proposed General Plan Amendment and Zone Change would provide for the development of four new elementary/middle schools.

The proposed project amends existing land use designations to permit the development of new employment centers which would induce employment growth and population growth. The project also proposes the development of 12,350 residential units which are a result of transferring unused units from other areas of the City to the Northern Sphere in addition to the existing residential entitlement in Planning Area 6 to satisfy the City's need for new housing opportunities. The balance of jobs and housing provided under the proposed project is consistent with Objective A-4, Policy(c) that encourages the provision of adequate housing opportunities to support employment growth.

The final method to achieve land use balance cited in Policy (c) is the preservation of open space areas. As noted previously, the project provides for the dedication and/or preservation of 4,615 acres of open space within the project site, including the dedication of Implementation District "P."

In summary, the project provides a balanced set of land uses that addresses the housing, employment, circulation and open space objectives of Land Use Element Objective A-4.

Objective A-6, Land Use Compatibility: Achieve harmonious land use patterns throughout the City.

Land use relates both to the physical use (or non-use) of property and the public policies that govern that use. Land use impacts, therefore, include both an assessment of the project's relationship to the physical environment and those proximal land uses located within the general project site (i.e., land use compatibility) and the regulatory environment in which the project is proposed (i.e., consistency). With respect to land use compatibility, the physical relationship between land uses and potential impacts produced by their implementation is considered. Since similar land uses are generally assumed to be compatible, the placement of similar uses adjacent to one another generally would not result in significant issues of land use incompatibility. Different types of land uses, however, could potentially produce different operational characteristics, e.g., noise, traffic, and could create issues of incompatibility. Issues of land use compatibility will be assessed in accordance with City General Plan, Land Use Element Objective A-6, Policy (a):

"Ensure, through the discretionary review process, the public health, safety, and welfare of sensitive receptors/land uses when locating such uses in close proximity to the following land uses:

- Uses which handle, generate, and/or transport hazardous substances (as defined by federal and state regulations).
- Uses which create excessive noise and dust.
- Uses which create excessive dust.
- Uses which create other land use conflicts

At the same time ensure that the proposed sensitive receptor land use will not have an impact on the continued operation and/or expansion of the following land uses [including]: Manufacturing uses and Research and development uses."

For purposes of this land use consistency analysis, the City General Plan definition of sensitive receptor is used: “Land uses considered to be sensitive receptors include residential, schools, childcare centers, acute care hospitals, and long-term health care facilities.”

The proposed project represents a significant change in on-site land uses. The existing agricultural lands will be replaced by 12,350 dwelling units, 575,000 sq. ft. of Multi-Use development, 175,000 sq. ft. of Community Commercial uses, 51 acres of Commercial Recreation, 6,566,000 sq. ft. of Medical and Science uses, and 13 acres of Institutional uses, community and neighborhood parks, and a minimum of four elementary/middle schools. However, approximately 4,615 acres will be left in a natural condition as open space preservation areas. The compatibility of the proposed uses in each Planning Area with adjacent uses or existing on-site property interests is assessed as follows:

Compatibility with Existing On-site Easements

A number of utility easements traverse the project site. However, no habitable structures will be constructed within any easement, although grading may occur within the easements per the written approval of the easement holder. No significant impacts on land use compatibility issues are anticipated. In addition, all easements shall be shown on future parcel maps and tentative tract maps.

Project Compatibility with Surrounding Land Uses

The nearest existing land uses include open space to the north, the City of Lake Forest to the east, the former MCAS El Toro and Spectrum 8 to the south, and the residential communities of Northwood (Planning Area 8) and Northwood Point (Planning Area 5) to the west. Government office buildings, parking lots and landscaped setbacks are located on Trabuco Road within the former MCAS El Toro. Land use compatibility issues with respect to each planning area is discussed below, with a focus on similarities or differences in types and timing of ongoing activities and the presence/absence of direct access or other physical connections between those existing uses and future uses within the project site.

With regard to general issues of compatibility, project implementation will increase traffic volumes and associated noise levels and light and glare on several roadways including Jeffrey Road, Trabuco Road, Irvine Boulevard, Portola Parkway, Sand Canyon Avenue, the Eastern (SR-133) Transportation Corridor, and the Foothill (SR-241) Transportation Corridor. However, as detailed throughout this document, project-related noise impacts have been mitigated to a level of insignificance and mitigation measures for project-related traffic impacts have been identified to reduce these impacts to acceptable levels. Light and glare impacts were not determined to be significant. In addition, the projected traffic volumes are well within the roadway classifications identified in the City's Circulation Element. Traffic volumes will increase. However, local air quality will be improved at project-buildout due to regional air quality improvements. Therefore, the proposed project is considered environmentally compatible with the surrounding land uses. The compatibility of the proposed project's land uses with existing surrounding uses is discussed below.

Compatibility of Planning Area 3/Implementation District “P” with the Surrounding Area

Planning Area 3 is surrounded by and partially located within Limestone Canyon Regional Park to the north and west, Planning Area 6 to the south, and the community of Foothill Ranch and open space to the east. Implementation District “P” within Planning Area 2 is surrounded by open space to the north and west, agricultural uses and Siphon Reservoir to the south, and Planning Area 6 to the east. The approximately 4,615 acres within Planning Area 3 (Implementation Districts “C,” “D,” “E” and “F”), Planning Area 6 (Implementation District “Q” and “R”), and Implementation District “P” will be left in a natural condition as preservation and open space, respectively, so as to assure compatibility with the Limestone Canyon Regional Park. The land use directly to the south of Planning Area 3 (known as Implementation Districts “Q” and “R”) in Planning Area 6 is also proposed for preservation so land use compatibility is assured. As a result, no significant land use compatibility impacts between the open space land uses within Planning Area 3 and surrounding land uses are anticipated.

Compatibility of Planning Area 5B with the Surrounding Area

Planning Area 5B is surrounded by the residential community of Northwood Point and future residential development within Planning Area 2 to the north, the residential community of Northwood to the west and south, and Planning Area 9 within the Northern Sphere Area to the east. Northwood Point (Planning Area 5) is a residential community composed of a mixture of single family detached and attached housing units, at a variety of residential densities and 150,000 square feet of commercial. Northwood (Planning Area 8) is a residential community composed of a mixture of single family detached and attached housing units, at a variety of residential densities. Neighborhoods of Low and Medium Residential Density are located adjacent to the northern border of Planning Area 5B within the Northern Sphere Area. There is a potential for land use conflicts associated with increased traffic, noise, and light and glare between the existing communities of Northwood and Northwood Point and the proposed residential development. However, residential densities uses within Planning Area 5B will be similar to the existing residential neighborhoods within Northwood and Northwood Point. Therefore, traffic patterns and types of vehicles would be similar, and weekday, evening and weekend activities would be similar. In addition, no direct access between the existing and future communities is proposed although Hicks Canyon Road may be extended into Planning Area 5B to serve the proposed Middle School site. As a result, no significant land use compatibility impacts are anticipated.

Compatibility of Planning Area 6 with the Surrounding Area

Planning Area 6 is surrounded by Planning Area 3 to the north, the community of Foothill Ranch to the east, and Planning Area 9 and the MCAS El Toro Base to the south. Over half of its western border lies adjacent to Implementation District “P” which is a part of Planning Area 2, but will be dedicated in connection with development authorized under this project. That portion of Planning Area 6 that lies adjacent to Planning Area 3 will be dedicated as NCCP/Reserve open space. The

proposed development areas in Planning Area 6 are separated from the open space areas in Planning Area 6 by SR 241 and SR-133.

The MCAS El Toro Base served as a military base until its closure in 1999. The City of Irvine approved a General Plan and Zone Change for MCAS El Toro (Planning Area 51) known as “Millennium Plan II.” Maximum development of the Millennium Plan II project would include approximately 15,733,000 square feet on 4,738 acres of land, including approximately 3,261 dwelling units. Development of the site is expected to occur over a 20-year period. The Millennium Plan II project site would provide a variety of land uses including high-technology businesses, residences, commercial uses, entertainment, and recreation. The proposed land uses for portions of Planning Area 6 in the Northern Sphere area surrounding El Toro on the north and west consist of Research/Industrial and is considered compatible with the proposed uses within Millennium II. The proposed land use nearest the residential community of Foothill Ranch is open space so no conflicts with existing residential uses would occur. Also, open space areas exist on the east side of Planning Area 6. As a result, no significant land use compatibility impacts are anticipated.

Compatibility of Planning Area 8A with the Surrounding Area

Planning Area 8A is surrounded by and included within the residential community of Northwood to the north and west. Jeffrey Road and Planning Area 9 are located to the east. A future retail/commercial area is planned within Planning Area 40 to the south. Northwood (Planning Area 8) is a residential community composed of a mixture of single family detached and attached housing units, at a variety of residential densities. There is a potential for land use conflicts associated with increased traffic, noise, and light and glare between the existing communities of Northwood and the proposed residential development. However, residential densities uses within Planning Area 8A will be similar to the existing residential neighborhoods within Northwood. Therefore, traffic patterns and types of vehicles would be similar, and weekday, evening and weekend activities would be similar. In addition, no direct access between the existing and future communities is proposed. As a result, no significant land use compatibility impacts are anticipated.

Compatibility of Planning Area 9 with the Surrounding Area

Planning Area 9 is surrounded by Planning Area 6 to the north, the residential communities of Northwood and Northwood Point to the west, Planning Area 40/Spectrum 8 to the south, and the MCAS El Toro Base to the east. Spectrum 8 involves the development of 10,212,352 square feet of General Industrial and Medical and Science land uses and consists of 730 acres within a portion of Planning Area 9 southwest of Trabuco Road.

As discussed previously, the City of Irvine approved a General Plan Amendment and Zone Change for MCAS El Toro (Planning Area 51) known as “Millennium Plan II.” The Millennium Plan II project site would provide a variety of land uses including high-technology businesses, residences, commercial uses, entertainment, and recreation. The proposed land uses for portions of Planning Area 9 in the Northern Sphere area surrounding El Toro on the north and west consist

Research/Industrial and is considered compatible with the proposed uses within Millennium II. As a result, no significant impacts are anticipated between existing development and proposed land uses.

This analysis also addresses internal compatibility of land uses within the proposed project. As shown on the proposed Land Use Plan (see previous Exhibit 2-5), Research/Industrial land uses are proposed adjacent to residential development within Planning Area 9 which could potentially create issues of incompatibility. These uses will be separated by roadways and circulation will be designed to reduce the opportunity for commercial traffic to use residential streets. In addition, appropriate buffering such as walls, landscaping, berms and/or grade separation is proposed to be incorporated into project design to minimize potential issues of land use compatibility. With incorporation of these measures which are described in Project Design Features/Special Development Requirements section below, this potential incompatibility impact is reduced to a level of less than significant.

City of Irvine General Plan, Other Elements

In addition to the Land Use Element, the City's General Plan includes twelve other elements. These elements were described in Section 3., "Environmental Setting." The proposed project's consistency with these other elements are discussed below.

Circulation Element: This section addresses Circulation Objectives and Policies that avoid or minimize an environmental effect. Objective B-1 of the City's Circulation Element addresses Roadway Development as follows: "Plan, provide and maintain an integrated vehicular circulation system to accommodate projected local and regional needs." Policy (a) encourages the use of the Circulation, Land Use and Growth Management Element to determine roadway sizing and phasing. As discussed above, under Objective A-4, Policy(c), the proposed project coordinates its land use and circulation system to ensure that the appropriately sized roadways are built in conjunction with phased development. Policy (b) to Objective B-1 specifies the use of the Master Plan of Arterial Highways for the purpose of detailed planning of the circulation network. The project proposes an amendment to the Circulation Element to achieve consistency with the MPAH. Policy (c) addresses appropriate levels of service. The project proposes an amendment to the General Plan to change the level of service for certain intersections within the Spectrum to LOS "E," as a further extension of the current Policy(c) which considers LOS "E" acceptable within the Irvine Business Complex and Irvine Center. Policy (d) provides for the evaluation of incremental additions to the City's roadway system through use of the City's transportation model.

The goal of Objective B-2 is to develop a vehicular roadway system consistent with high standards of transportation engineering safety and sensitivity to adjoining land uses. A detailed discussion of the circulation measures proposed by the project and the measures proposed to minimize noise impacts to adjoining land uses is in the Noise and Traffic/Transportation sections of this DEIR.

Housing Element: The City of Irvine is a job-rich area. The proposed project will allow for the development of 12,350 dwelling units near major commercial and employment centers. The

proposed project is consistent with the Housing Element and the Southern California Association of Government's Regional Comprehensive Plan and Guide, as discussed below.

The goal of affordable housing development is based on objectives established for each planning area, as part of the discretionary review process. The project proposes the development of 12,350 dwelling units which will include both Medium Density and Medium-High Density residential development to provide a diversity of housing types. The project also is proposing to meet the Affordable Housing Needs goal of 15% of the actual number of units built within each Planning Area by utilizing a combination of new on-site construction and off-site affordable housing credits. Satisfying the objectives of the Housing Element is also furthered by the requirement that the project proponent submit an affordable housing program for review and approval by the Director of Community Development prior to issuance of the first residential building permit within each Planning Area.

Seismic Element: The majority of the Northern Sphere Area is designated as SRA-2 (Denser Soils/Deeper Groundwater) including Planning Areas 5B, 8A, and 9. Planning Area 6 is designated as SRA-3 (Alluvium/Shallow Bedrock), with small portions of the site designated as SRA-4 (Highlands Over 20 Percent Slope). The open space areas within Planning Area 3 are designated as SRA-4 (Highlands Over 20 Percent Slope) and SRA-5 (Less Stable Geologic Formations). Objective D-1 encourages the consideration of potential environmental hazards in the General Plan, and Objective D-2 requires appropriate measures to protect public health and safety and to respond to seismic hazards in all public and private developments. As described in Section 4.3, mitigation measures have been developed to stabilize all historic landslides within or adjacent to proposed development, and to ensure that proposed residential and commercial development is developed in accordance with Uniform Building Code requirements, Alquist-Priolo Special Study Zone requirements and City standard conditions to ensure that seismic hazards are minimized. As a result, the proposed project is consistent with the Seismic Element.

Cultural Resources Element: The City of Irvine General Plan identifies several Historical/Archaeological Landmarks within the proposed project site, including the Lambert Reservoir, Portola Campsite and the Tomato Springs area within Planning Area 6. The Sinks in Planning Area 3 was identified as a Landform Site, but as no development is proposed in Planning Area 3, the project is consistent with protection of this landform. Objective E-1 is to "Identify and obtain information on the existence and significance of historical, archaeological, and paleontological sites and encourage land use planning which incorporates this information." Objective E-2 is to "Evaluate surveyed sites for their present and potential cultural, educational, recreational, and scientific value to the community and the region, and determine their proper disposition prior to the approval of any project which could adversely affect them." Section 4.5 describes the site specific surveys that have been completed for these areas to identify the historical, archaeological and paleontological resources that are or may be present on site in furtherance of Objective E-1. In furtherance of Objective E-2, Section 4.5 identifies mitigation measures to ensure that proper evaluation is conducted for all identified sites prior to site disturbing activities which could adversely affect them.

Noise Element: Objective F-1 is to “Ensure that City residents are not exposed to mobile noise levels in excess of the CNEL Interior and Exterior Noise Standards (Table F-1), and Single Event Noise Standard.” Objective F-2 is to “Ensure that City residents are not exposed to stationary noise levels in excess of the City Noise Ordinance standards.” A Noise Study was prepared for the proposed project which utilized the CNEL interior and exterior noise standards in order to assess project impacts consistent with this objective. As discussed in Section 4.10, soundwalls or other similar sound attenuation will be constructed throughout the project site adjacent to existing and proposed residential uses, where necessary, which will maintain the City’s indoor and outdoor noise standard for residential uses. With respect to Objective F-2, mitigation measures identified in Section 4.10 require compliance with Policies (a) and (b) to ensure that appropriate noise attenuation measures are incorporated into construction activities.

Public Facilities Element: The proposed project does not conflict with any provisions contained in the Public Facilities Element. Objective G-1 is to coordinate planning and development of public facilities with the private sector, UCI and appropriate school districts. The General Plan Amendment and Zone Change identify 13 acres for Institutional uses in Planning Areas 6 and 9 and includes future development of four elementary/middle schools.

Integrated Waste Management Element: Objective H-1 is to cooperate in guiding the development and improvement of a solid waste disposal system. Although the majority of the policies are directed to public agency efforts, the proposed project is consistent with Policy (g) which requires, to the extent necessary to comply with state law, solid waste reduction and recycling efforts for residential, commercial, industrial, institutional and recreational land uses to reduce the amount of waste disposed at landfills. The City requires as a standard condition that new development show on the site plans the location of receptacles to accumulate on-site generated solid waste for recycling purposes. Off-site materials recovery is also permitted at the discretion of the Director of Community Development. Finally, plans that minimize the amount of “green wastes” generated by the project landscaping will be required. Objective H-2 is to control the siting of solid waste disposal facilities to minimize impact on adjacent or existing planned land uses. The Frank Bowerman Landfill is located in Planning Area 3 within the project site. No development is proposed for this Planning Area which avoids placing new uses adjacent to this existing landfill. Objective H-3 is to control waste water and stormwater runoff in a manner to minimize impact on adjacent land uses. The project proposes a number of water quality features to manage stormwater runoff from the project site including detention basins and other similar features in furtherance of Policy (b) which encourages the development of surface drainage systems in new development and Policy (c) which requires that a NPDES permit be obtained, if necessary, and that Best Management Practices be implemented to control urban pollutant runoff. A detailed discussion of the project’s water quality and runoff management features and its compliance with State water quality requirements is presented in Section 4.8, Hydrology and Water Quality.

Energy Element: Objective I-1 is to maximize energy efficiency through land use and transportation planning. The proposed project provides employment centers close to new residential development to minimize the amount of vehicle miles traveled. In addition, the project proposes employment

centers in an area adjacent to transportation corridors and other transportation facilities. Objective I-2 does not apply to new development and Objective I-3 pertains to City facilities. The project is consistent with the Energy Element.

Safety Element: All of Planning Area 3, Implementation District “P,” and a portion of Planning Area 6 within the Northern Sphere Area are designated with a “High Fire Severity Rating.” As discussed in Section 4.7, mitigation measures have been developed to reduce the fire hazard in the area to a level of insignificance. This would be consistent with Policy (c) of Objective J-1 to minimize exposure risk to wildlife and structure fires. Section 4.6, Geology and Soils addresses the means by which site-specific geologic studies will be prepared prior to development to specify the measures to address identified areas of slope instability or landslide potential consistent with Policy (b) of Objective J-1. Consistent with Objective J-2, Disaster Response, the project will be adequately served by policy and fire service (Policy (a) and (c)) and will ensure adequate emergency ingress and egress consistent with Policy (b). Although a small portions of the site within Planning Areas 6, 9 and 8A are located within a “Flood Hazard Area,” project-related drainage improvements will protect future structures from potential flood hazards (see Section 4.8). Therefore, the proposed project is considered consistent with the adopted Safety Element.

Parks and Recreation Element: The City of Irvine park dedication requirement of five acres of parkland per 1,000 persons will be satisfied by the proposed dedication of approximately 174 acres of parkland, comprised of community park(s) and additional neighborhood parks. The total parkland requirement for the project based on an estimated population of 34,843 persons (see Section 4.11) is 174 acres of unimproved parkland. Parkland credit may be given if the park acreage is improved. Since the amount of parkland to be dedicated within the proposed project meets the City’s parkland dedication requirement, the project is consistent with Objectives K-1, K-2 and K-3 of the Parks and Recreation Element.

Conservation and Open Space Element: The proposed project includes the phased dedication of approximately 4,615 acres within the Northern Sphere Area, in accordance with the proposed zoning. These lands would be included in the NCCP/HCP and preserved and managed for their biological habitat values. This is consistent with Objective L-2 to maintain and preserve areas with significant and diverse biotic communities and Objective I-3 concerning NCCP/HCP implementation areas. The presence of riparian habitat within the project site is discussed in Section 4.4, Biological Resources, and the project’s measures to minimize impacts to riparian habitat is consistent with Policy (e) and (g) of this Objective which encourages the preservation and enhancement of riparian habitat as well as Policies (e) and (i) of Objective L-8. Objective L-4 is to minimize the danger to life and property from geophysical hazards. The discussion of the geological conditions on the project site proposed for development is contained in Section 4.6, Geology and Soils. The measures identified in that section to address conditions such as unstable soils, liquefaction, steep slopes and floodways that may be present on the project site is consistent with and furthers this objective. The dedication and/or preservation of 4,615 acres of open space, the majority of which is located in the hillside areas of the City’s sphere furthers Objective L-5, and Policies (g) and (j) of Objective L-8 (“Maintain and preserve large, contiguous areas which contain

significant multiple hazards and resources.”) Objective L-10 is to protect and preserve agriculture as a viable land use within areas designated agriculture on the Conservation and Open Space Element and Land Use Element diagrams. The project would result in the conversion of approximately 3,100 acres of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland to non-agricultural uses. In addition, the proposed development area is currently zoned "Exclusive Agriculture." Therefore, the project is inconsistent with Policy (a) and will require an amendment to Objective L-10 and Policy (a) to eliminate the conflict. However, the proposed project is consistent with the Policy (k) of the General Plan. The areas which are proposed to be converted from agricultural uses to urban uses by the project are being converted in accordance with Policy (k) of Objective L-10 of the Conservation and Open Space Element and the Protocol Agreement. The Protocol Agreement and proposed project maintain the level of residential development provided for in the existing General Plan and enable the City to meet its jobs to housing balance objectives without sacrificing the City's standards for the intensity of development.

Growth Management Element: A significant portion of the Growth Management Element is directed at ensuring that City land use and transportation planning policy is coordinated with state, regional and local growth management efforts, and that land use and transportation planning is integrated to provide adequate transportation systems. The proposed project provides for the phased development of portions of the City's Northern Sphere Area. The project traffic study, which is analyzed in Section 4.14, Traffic/Transportation, assesses the circulation improvements that will be required as each phase of development is implemented to ensure proper coordination between land use development and transportation planning. As described in Section 4.14, mitigation measures have been developed so that the proposed project does not cause any intersection to exceed acceptable levels of service or perform no worse than the level of service for the no project condition. The project also combines residential, commercial, research and industrial, recreation, institutional, and open space uses as more fully described in Section 2. This mix of uses and the phasing of project development is consistent with Objective M-6 to promote balanced growth of residential and nonresidential land uses and supporting public facilities and services. The project is therefore considered consistent with the Growth Management Element.

Consistency With County General Plan

The project site is currently within the City's Sphere of Influence, but is within the jurisdiction of the County of Orange. The DEIR assesses the development that could occur under the County's General Plan in Section 6.0, Alternatives.

The proposed project would result in the annexation of the project site to the City. This consistency discussion focuses on those portions of the project site that lie adjacent to areas within the County's jurisdiction.

The Orange County General Plan designates the MCAS El Toro within the Public Facilities (4) land use category which include major facilities built and maintained for public use. The County's General Plan sets forth policies for the reuse planning process and for land decisions for MCAS El

Toro for development of a civilian use airport on that site. Both Planning Areas 6 and 9 border the MCAS El Toro. Planning Area 6 lies to the north and Planning Area 9 is to the west. The project proposes no residential uses immediately adjacent to MCAS El Toro. Medical and Science and Industrial zoned areas are proposed for development on those portions of Planning Areas 6 and 9 immediately adjacent to MCAS El Toro. The DEIR includes analysis of air quality, noise and traffic impacts should a civilian airport be constructed there.

A portion of the Departure Safety Zone (DSZ) recommended for runways 16R and 16L in OCXEIR No. 573 falls within the Northern Sphere Area, as shown on Exhibit 4-43. The precise land use implications of this overlap are unknown, given that the current Airport Environs Land Use Plan (AELUP) reflects the operation of MCAS El Toro and the County-adopted OCX mitigation measure calls for an updated AELUP reflecting OCX conditions prior to use of the facility for commercial aviation. Further, the current AELUP states that “the Airport Land Use Commission for Orange County shall designate accident potential zones around civil airports on the basis of study and evaluation of each airport’s accident history and operational characteristics.” John Wayne Airport, for example, has no comparable DSZ because none could be justified with the available data.

For the purpose of this assessment, therefore, it is presumed that the AELUP would reflect the direction of OCX EIR No. 573 and the guidelines found in the 1993 Airport Land Use Planning Handbook which state that development within Departure Safety Zones would be allowed subject to the following criteria:

Density of Use: Nonresidential land uses should be limited to activities which attract relatively few people to a given area. Shopping centers, eating establishments, meeting halls, multi-story office buildings and labor-intensive manufacturing plants are examples of uses which should be prohibited. Measured on the density-of-use scale, the maximum concentrations of people generally should be no more than 40 to 60 per acre.

Residential Land Uses: Residential uses, if not deemed unacceptable because of noise, should be limited to very low densities – 10 acres or more per dwelling unit. In this proximity to an urban airport, low density effectively precludes residential development.

Special Functions: Special function land uses (schools, storage of flammable materials, etc.) should be prohibited.

The portion of the project site within the DSZ is proposed to be zoned Medical & Science, which does not allow residential uses. The zoning district is intended to foster low-density industrial development, with ancillary commercial support uses. The Irvine General Plan establishes an employee population standard for this zoning category use at 1.9 employees per 1,000 square feet of development which would result in concentrations of less than 45 employees per acre (assuming .5 FAR). Given these facts, no significant land use compatibility impacts are anticipated related to the potential Departure Safety Zone.

Exhibit 4-43 Proposed Departure Safety Zone (DSZ) for OCX

The County's Limestone-Whiting Wilderness Park lies to the north of Planning Area 3. As Planning Area 3 is proposed to be preserved as open space, no land use compatibility impacts to the County Park is anticipated.

Other elements of the County's General Plan as they pertain to the proposed project are discussed in Section 3.

Consistency With Regional Comprehensive Plan and Guide Policies

The Draft EIR presents information establishing that the proposed project is consistent with ten core RCPG policies relevant to the proposed project. Therefore, on the project is consistent with regional plans and policies. Further, the Draft EIR establishes that the project meets the letter or the intent of the majority of ancillary/advisory only policies that SCAG encourages be considered in its comments. The consistency of the proposed project with each of the applicable regional policies is described below:

The Growth Management Chapter (GMC) of the Regional Comprehensive Plan and Guide (RCPG) contains a number of policies that are particularly applicable to the proposed project.

a. *Core Regional Plan Policies*

- 3.01 *The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review.*

Consistency Analysis. The proposed project responds to two sets of projections for the Orange County subregion: SCAG's 2001 Regional Forecast and OCP-2000. The proposed project was developed within the framework of OCP-2000 and local plans and policies. In order to evaluate how the proposed project fits with the regional projections, it is necessary to examine how OCP-2000 fits with regional projections.

OCP-2000 projections are developed as the Orange County component of SCAG's Regional Projections, per a Memorandum of Understanding between SCAG and the Orange County Council of Governments. The charts below summarize and compare SCAG's adopted 2001 forecast for the Orange County subregion, as well as its advisory disaggregation of this forecast for the City of Irvine, with corresponding OCP-2000 projections.

OCP-2000 projections for 2025 are similar but not identical to the 2001 SCAG regional population, housing and employment projections adopted as part of the 2001 Regional Transportation Plan. Both OCP-2000 and SCAG projections reflect local plans and policies. However, SCAG opted to use 1998 housing estimates provided by Orange County cities rather than more current housing projections incorporated

into OCP-2000, and to modify the distribution of jobs to reflect regional aviation and transportation policies contained in the 2001 Regional Transportation Plan. Thus, the adopted 2001 Regional Forecast is a variation on local plans and policies.

SCAG's 2001 Regional Forecast is adopted at the County level. In addition, SCAG prepares advisory City forecasts. SCAG recommends that proposed projects be compared with these advisory City forecasts.

Proposed Project Employment Compared to Projections

SCAG's adopted employment forecast for Orange County remains the same as OCP-2000. SCAG's advisory employment forecast for the City of Irvine varies from OCP-2000 between 2000 and 2020, but matches by 2025.

The proposed project results in 15,973 net new jobs. This represents 15.5% of the City of Irvine's 2000-2025 growth projected by SCAG. Since the proposed project falls below OCP-2000 projections for 2025, and since OCP-2000 employment projections are consistent with the regional projections, the proposed project is also consistent with the 2001 Regional Forecast.

Proposed Project Housing Compared to Projections

SCAG's adopted housing forecast for Orange County is 68,299 units lower than OCP-2000 for 2000, and 158,346 units lower in 2025. However, it is important to note that SCAG's forecast includes a 4% vacancy factor. Controlling for this assumption, the difference between the two housing forecasts drops to 31,910 units in 2000. By 2025, the difference diminishes to 5,050 units, a difference of less than 1% which is insignificant.

SCAG's advisory housing forecast for the City of Irvine is 6,581 units lower than the OCP-2000 projection for the City in 2000. This baseline difference diminishes over time to a 3,562 units difference between the two projections in 2025. The OCP-2000 household projection for 2000 is 53,750, which corresponds almost exactly to the 2000 Census housing count of 53,711 units. In contrast, the SCAG 2001 Regional Forecast is 6,542 below the actual 2000 census housing count. When the two forecasts are controlled for the 4% vacancy factor assumption, their differences diminish to only 946 units in 2025, a 1.4% difference in the build-out year for the project. This is an insignificant difference.

The proposed project results in the development of 12,350 housing units reflected in the City of Irvine General Plan. This represents 65% of the City of Irvine's 2000-2025 growth projected by SCAG. Although it is consistent with the "local plans and policies" referenced in SCAG's policy, the proposed project exceeds OCP-2000

forecasts. Since SCAG housing projections for the City of Irvine are below OCP-2000, the project would likely contribute to an exceedance of 2001 Regional Housing Projections for the City of Irvine. This likely exceedance results partly from technical forecasting differences.

Note, however, that the project's contribution to housing units in excess of the 2001 Regional Forecast for the City of Irvine helps address SCAG goals that encourage housing growth in jobs-rich areas, and increased housing production to meet housing need targets. These factors are addressed in detail in the following discussions for SCAG policies 3.04, 3.11, 3.12, 3.14, 3.15, and 3.16.

Proposed Project Population Compared to Projections.

SCAG's Orange County population forecast for 2020 and 2025 are the same as OCP-2000, while the figures for 2000, 2005, 2010, and 2015 vary as a consequence of altering the OCP-2000 employment and housing input from local jurisdictions. In addition, SCAG's 2000 population and housing projection varies from 2000 U.S. Census results. OCP-2000 estimates for 2000 compare closely with the 2000 U.S. Census, while SCAG's population and housing estimates are more divergent.

SCAG's advisory population projections for the City of Irvine are consistent with the City's OCP-2000 projections for both 2000 and 2025.

The proposed project results in 34,843 new residents by 2025, which is 68% of SCAG's 2000-2025 population growth projection for the City of Irvine. The proposed project exceeds OCP-2000 projections. Since OCP-2000 is consistent with SCAG's projections for the project's build-out year of 2025, the proposed project is also likely to contribute to an exceedance of the regional projections.

Consistency with Regional Projections

The proposed project is partially consistent with SCAG's 2001 Regional Projections. The project is consistent with SCAG's advisory employment projections for the City of Irvine. Because the project exceeds OCP-2000 population and housing projections, which are higher for the City of Irvine in 2025, the proposed project is also likely to exceed SCAG's advisory regional projection for the City. The proposed project is likely to exceed SCAG advisory City forecasts as a result of technical forecasting differences, including baseline disagreements, as well as a result of efforts to meet competing SCAG goals for jobs/housing balance and increased housing production.

SCAG 2001 Baseline Forecast for Orange County Subregion					
	2005	2010	2015	2020	2025
Population	3,006,094	3,270,699	3,165,400	3,343,824	3,416,037
Households	966,587	1,001,220	1,034,445	1,050,352	1,068,031
Employment	1,667,788	1,796,726	1,897,730	1,975,072	2,043,660
<i>Source: Southern California Association of Government, September 2001.</i>					

OCP-2000 Forecast for Orange County Subregion					
	2005	2010	2015	2020	2025
Population	3,031,440	3,168,942	3,270,677	3,342,829	3,416,037
Households	1,018,873	1,056,882	1,080,430	1,096,824	1,115,823
Employment	1,667,788	1,796,726	1,897,350	1,975,074	2,043,665
<i>Source: Southern California Association of Governments, September 2001.</i>					
<i>Note: Comparisons of SCAG's housing forecast with OCP's projection of dwelling units need to acknowledge the 4% vacancy rate included in SCAG's figures.</i>					

Advisory SCAG 2001 Baseline Forecast Advisory Disaggregation for City of Irvine					
	2005	2010	2015	2020	2025
Population	151,077	168,490	179,367	187,189	194,916
Households	51,374	57,510	60,701	62,888	65,321
Employment	189,644	214,329	233,809	248,919	261,308
<i>Source: Southern California Association of Governments, September 2001.</i>					

Adopted OCP-2000 Forecast for City of Irvine					
	2005	2010	2015	2020	2025
Population	173,182	179,836	182,933	192,836	194,913
Households	63,200	64,904	66,686	68,439	68,883
Employment	209,464	227,879	248,731	252,940	261,309
<i>Source: Southern California Association of Governments, September 2001.</i> <i>Note: Comparisons of SCAG's housing forecast with OCP's projection of dwelling units need to acknowledge the 4% vacancy rate included in SCAG's figures.</i>					

Northern Sphere Area Forecasts					
	2005	2010	2015	2020	2025
Population	0	9,872	N/A	N/A	34,833
Households	0	3,500	N/A	N/A	12,350
Employment	0	0	N/A	N/A	19,535
<i>Source: Austin Foust Associates, August 2001.</i> <i>N/A - Not available</i>					

Project in Comparison with Advisory 2025 Regional Forecast for City of Irvine					
	Project	SCAG 2000	SCAG 2025	Project % of 2025	Project % of 2000-2025
Population	34,843	143,842	194,916	18%	68%
Households*	12,350	47,169*	65,321*	18%	65%
Employment	15,973	158,663	261,308	6%	17%
<i>Source: Southern California Association of Governments, September 2001.</i> <i>Note: Comparisons of SCAG's housing forecast with OCP's projection of dwelling units need to acknowledge the 4% vacancy rate included in SCAG's figures.</i>					

3.03 *The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.*

Consistency Analysis: The project includes development of 12,350 residential units, 575,000 square feet of multi-use facilities, 175,000 square feet of Community Commercial facilities, 51 acres of Commercial Recreational uses, 6,566,000 square feet of Medical and Science facilities, 13 acres of Institutional facilities, approximately 4,615 acres of open space, and a minimum of four elementary/middle schools. These uses will be phased in between 2002 and 2025.

Existing and planned public facilities, utility systems, and transportation systems consistent with SCAG's regional plans will be available to serve the site. A traffic study has been prepared for the proposed project which indicates that existing arterials can be improved to serve the proposed project within acceptable levels of service or perform no worse than level of service for the no project condition. In addition, the Irvine Ranch Water District has indicated that they have planned for the development of the proposed project and are capable of providing sewer and water service to the site. On-site improvements will be completed as part of the construction of the proposed project. The project is consistent with this core policy.

The 1998 Regional Transportation Plan (RTP) also has policies, all of which are core, that pertain to the project. The RTP links the RCPG goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations. Among the relevant policies in the RTP are the following:

4.01 *Transportation investments shall mitigate environmental impacts to an acceptable level.*

SCAG has adopted the following Regional Performance Indicators and associated objectives in support of this policy:

Mobility - Transportation Systems should meet the public need for improved access, and for safe, comfortable, convenient and economical movements of people and goods.

Accessibility - Transportation Systems should ensure the ease with which opportunities are reached. Transportation and land use measures should be employed to ensure minimal time and cost.

Environment - Transportation Systems should sustain development and preservation of the existing system and the environment. (All Trips)

Reliability - Reasonable and dependable levels of service by mode. (All Trips)

Safety - Transportation Systems should provide minimal, risk, accident, death and injury. (All Trips)

Livable Communities - Transportation Systems should facilitate Livable Communities in which all residents have access to all opportunities with minimal travel time. (All Trips)

Equity - The benefits of transportation investments should be equitably distributed among all ethnic, age and income groups. (All trips)

Cost-Effectiveness - Maximize return on transportation investment. (All Trips)

Consistency Analysis: The proposed project addresses this policy and SCAG's performance measures for Mobility, Accessibility, Environment, and Livable Communities in several ways. First, as stated in Section 4.14 of the Draft EIR, all intersections in the project vicinity will operate at acceptable levels of service and perform no worse than levels of service for the no project condition with proposed improvements and mitigation. Second, the project is located adjacent to the Santa Ana Freeway (I-5) and the Foothill and Eastern Transportation Corridor toll roads, all with available capacity. Third, the project is located near existing major employment centers including the Irvine Business Center and the Irvine Spectrum, providing direct access to major employment and activity centers. This intensification maximizes the use of existing urbanized areas and increases opportunities for alternatives to the single-occupant vehicle, both of which minimize emission and congestion impacts. Fourth, the proposed project provides a wide range of housing opportunities which will be available to a variety of income groups. By providing housing within a job-rich subregion, the project will also increase opportunities to shorten or eliminate trips and the associated congestion and air quality impacts. In addition, the project is in proximity to rail service with a metrolink stop in the existing Spectrum area.

4.02 *Transportation investments shall mitigate environmental impacts to an acceptable level.*

Consistency Analysis: The Draft EIR in Section 4.14 (Transportation and Circulation), identifies various transportation impacts and details measures to mitigate these impacts. Roadway and intersection improvements, adjacent to and in the vicinity of the proposed project, are identified in the Draft EIR to mitigate

adverse traffic impacts of the proposed project. Project-specific transportation improvements will be constructed prior to issuance of building permits. The project is consistent with this core RCPG policy.

4.04 Transportation Control Measures shall be a priority.

Various Transportation Control Measures are set forth in the South Coast Air Quality Management District AQMP as set forth in the subsequent two year segment of the Regional Transportation Improvement Program), including:

High Occupancy Vehicle projects and pricing alternatives, park and ride lots and intermodal facilities.

Transit improvements, urban freeway system management improvements, smart corridors TSM programs, railroad consolidation programs, CMP-based demand management strategies, vanpool programs, telecommunication facilities, demonstration programs, and bicycle and pedestrian facilities.

Marketing information services for employers and activity centers to encourage shared rides and transit use, and transit pass centers.

Consistency Analysis: Transportation Control Measures (TCMs) consist of regionally significant transportation projects in the first two years of the Regional Transportation Improvement Program. The proposed project supports SCAG's policy by addressing two relevant categories of TCMs : 1) High Occupancy Vehicle projects and pricing alternatives, park and ride lots and intermodal facilities; and 2) transit improvements, urban freeway system management improvements, smart corridors, TSM programs, railroad consolidation programs, CMP-based demand management strategies, vanpool programs, telecommunication facilities, demonstration programs, and bicycle and pedestrian facilities

The Draft EIR describes how the project will increase densities around the Foothill and Eastern Transportation Corridor toll roads, thereby increasing utilization of these priced alternatives to HOV lanes. The Foothill and Eastern Transportation Corridors are TCMs within SCAG's 2001 RTP and the applicable 1997 Air Quality Management Plan. Increased utilization of the toll roads will relieve congestion and related emissions.

The DEIR also identifies mitigation measures which will enhance provision of TCMs such as transit improvements and bicycle and pedestrian facilities, which will extend the local transit system and encourage its use. The proposed project supports provision of TCMs and is consistent with this policy

-
- 4.07 *Projects proposed for the Regional Transportation Improvement Program (RTIP) that do not indicate a reasonable phasing of construction between segments will not be approved.*

Consistency Analysis: The proposed project does not interfere with provision of any new transportation projects included in the RTIP. Consistent with the intent of this policy, project-specific transportation improvements will be constructed prior to issuance of building permits.

The Air Quality Chapter (AQC) core actions that are generally applicable to the project are as follows:

- 5.11 *Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflicts.*

Consistency Analysis: The Draft EIR addresses the matter of regional transportation and air quality modeling consistency in Section 4.3 (Air Quality). Regional transportation/air quality impacts are mitigated by increased accessibility to priced transportation alternatives, transit improvements, pedestrian and bicycle improvements, and housing opportunities in the jobs-rich subregion. The project is consistent with this core RCPG policy.

The Water Quality Chapter (WQC) core recommendations and policy options relate to the two water quality goals: to restore and maintain the chemical, physical and biological integrity of the nation's water; and, to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of all waters. The core recommendations and policy options that are particularly applicable to project include the following:

- 11.02 *Encourage "watershed management" programs and strategies, recognizing the primary role of local government in such efforts.*

Consistency Analysis: The Draft EIR section 4.8 addresses the subject of water, including analysis and references to the appropriate "watershed management" strategies and mitigation measures that have been incorporated in the project. The project is consistent with this core RCPG policy.

- 11.05 *Support regional efforts to identify and cooperatively plan for wetlands to facilitate both sustaining the amount and quality of wetlands in the region.*

Consistency Analysis: Section 4.4 of the Draft EIR acknowledges the unavoidable loss of some wetlands. However, mitigation measures have been developed to

protect, preserve, and restore significant wetland resources. The establishment of the preserves and open space to sustain these lands is consistent with this policy.

- 11.07 *Encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water and wastewater discharges. Current administrative impediments to increased use of wastewater should be addressed.*

Consistency Analysis: Reclaimed water will be utilized for parks and landscaping. The project is consistent with this core RCPG policy.

b. Ancillary (Advisory-only) Regional Plan Policies

- 3.04 *Encourage local jurisdictions' efforts to achieve a balance between the types of jobs they seek to attract and housing prices.*

Consistency Analysis: The proposed project consists of a wide range of housing types for a variety of income classifications. The proposed project will provide 12,350 housing units. Approximately 50% of the proposed units are anticipated to be single family detached units, and 50% to be condominium and apartment units. The project will help achieve the workforce housing goals of the City of Irvine's 2000-2005 Housing Element of the General Plan, which is designed to achieve SCAG-prepared Regional Housing Need Assessment Targets. The project is consistent with the intent of this ancillary RCPG policy.

- 3.05 *Encourage patterns of urban development and land use which reduce costs on infrastructure construction and make better use of existing facilities.*

Consistency Analysis: The proposed project locates development adjacent to existing urban areas, allowing optimal use of existing facilities, and orderly expansion where necessary. The Draft EIR in Section 4.14, includes discussion of utilities and service systems. Information is provided on the location of existing gas and water mains, sewer lines, and electrical service. It describes the future "backbone system" for the proposed development of the currently near-vacant area. Since the existing infrastructure will be more fully utilized, the project is generally supportive of this ancillary RCPG policy.

- 3.09 *Support local jurisdictions' efforts to minimize the cost of infrastructure and public service delivery, and efforts to seek new sources of funding for development and the provision of services.*

Consistency Analysis: As discussed in Section 4.14 and 4.15 of the Draft EIR, water, sewer and transportation infrastructure necessary to serve the proposed project

is readily available adjacent to the site. This proximity and available capacity minimizes the cost of extending service into the Northern Sphere Area. The proposed project also includes the provision of schools, parks, and transportation improvements. Funding arrangements have been and will be made to insure that these improvements are accomplished in a cost-effective manner. Therefore, the project is fully supportive of this RCPG ancillary policy.

- 3.10 *Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.*

Consistency Analysis: The proposed project includes a General Plan Amendment and Zone Change for a 8,491 acre project. Annexation of this area will be phased over time; however, the entire project is being analyzed at one time. This approach to processing the proposed project is consistent with this advisory policy.

- 3.11 *Support provisions and incentives created by local jurisdictions to attract housing growth in job rich subregions and job growth in housing rich subregions.*

Consistency Analysis: As discussed in Section 4.10, the Draft EIR does address the matter of proposed housing growth in a jobs rich subregion. The project is located in the jobs-rich Orange County subregion. The project will create approximately 15,973 net new jobs, all of which can be accommodated by subregional and City growth assumptions. Further, the project will add 12,350 housing units consistent with the spirit of this advisory policy. The proposed project achieves a jobs/housing ratio of 1.44. Although the subregion and City are expected to continue to be jobs rich in the future due to their attractive characteristics for business and economic forces in the region, the proposed project helps them to become less jobs-rich than they would otherwise be. Therefore, the project is supportive of this ancillary RCPG policy.

- 3.12 *Encourage existing or proposed local jurisdictions' programs aimed at designing land uses which encourage the use of transit and thus reduce the need for roadway expansion, reduce the number of auto trips and vehicle miles traveled, and create opportunities for residents to walk and bike.*

Consistency Analysis: The Draft EIR section 4.3 (Air Quality), requires as mitigation: (1) the interconnection of residential areas with schools and parks by a system of sidewalks and bike lanes; (2) coordination with Orange County Transportation Authority for a bus turnout adjacent to the project; (3) the project area is annexable to Spectrumotion. The project is supportive of this ancillary RCPG policy.

-
- 3.13 *Encourage local jurisdictions plans that maximize the use of existing urbanized areas accessible to transit through infill and redevelopment.*

Consistency Analysis: The project is surrounded by existing development to the east and west. By developing immediately adjacent to an existing urbanized area, the project enhances the options for non-motorized access throughout the larger area. Section 4.3 of the Draft EIR requires two mitigation measures which insure that the project will be adequately served by transit and interconnected by pedestrian sidewalks, bikeways, and transit routes to surrounding urbanized areas and local activity centers. Therefore, the project is supportive of this ancillary policy.

- 3.14 *Support local plans to increase density of future development located at strategic points along the regional commuter rail, transit systems, and activity centers.*

Consistency Analysis: The proposed project would be accessible to the proposed Centerline light rail project. Both of these potential future projects are included in the Regional Transportation Plan. Residents and employees of the project will be able to access regional commuter rail at the Irvine Multimodal Transportation Center. The southern portion of the project site is located approximately 2.5 miles from the Transportation Center.

Further, the project would result in additional population density served by the Foothill and Eastern Transportation Corridors, which will lead to more efficient use of these toll facilities designed to relieve congestion on heavily trafficked free routes serving Orange County. The proposed project constitutes a major activity center itself. The southern portion of the project site is immediately adjacent to the Irvine Spectrum activity center, and is located approximately six miles the Irvine Business Complex activity center. This proximity enhances the opportunities for transit accessibility. Therefore, the proposed project is consistent with this advisory regional policy.

- 3.15 *Support local jurisdictions strategies to establish mixed-use clusters and other transit-oriented developments around transit stations and along transit corridors.*

Consistency Analysis: Regional commuter rail within the City of Irvine is available at the Irvine Multimodal Transportation Center located approximately 2.5 miles from the southern portion of the project site. Regional vehicular traffic is provided by the I-5 Freeway and the Foothill and Eastern Transportation Corridors (SR-241, and SR-133). The proposed project consists of mixed-use clusters which has the potential of supporting future transit uses. The project is therefore supportive of this ancillary policy.

-
- 3.16 *Encourage developments in and around activity centers, transportation corridors, underutilized infrastructure systems, and areas needing recycling and redevelopment.*

Consistency analysis: Per SCAG's policy, the proposed project is located adjacent to the Foothill and Eastern Transportation Corridors (SR-241 and SR-133), public toll roads. With major links opened in 1998, the facilities are continuing to ramp up to full capacity. The proposed project will use some of the available capacity. This use of the existing toll road infrastructure will have benefits throughout the County, as the toll road relieves congestion on competing free routes. SCAG's RTP supports the development of toll corridors as an innovative means of providing mobility and reducing congestion. Payment of fees and toll revenue provides additional funding sources for build out of the transportation corridor system.

The proposed project is strategically located in proximity to major employment and activity centers including the adjacent Irvine Spectrum, and the nearby Irvine Business Center. The project is supportive of this regional policy.

- 3.17 *Support and encourage settlement patterns which contain a range of urban densities.*

Consistency Analysis: The proposed project will include single family detached, condominium and apartment units, as well as commercial, retail and institutional uses. These urban uses will be constructed in a variety of densities suited to their purpose. The project is supportive of this ancillary policy.

- 3.18 *Encourage planned development in locations least likely to cause adverse environmental impact.*

Consistency Analysis: The Draft EIR in Table 1-1 acknowledges that all environmental impacts will be mitigated to below a level of significance, with the exception of air quality impact and agricultural impacts. The most environmentally significant portions of the property have been included within the 4,615 acre open space dedication area. The project is supportive of this ancillary RCPG policy.

- 3.19 *SCAG shall support policies and actions that preserve open space areas identified in local, state and federal plans.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. The project is supportive of this ancillary RCPG policy.

-
- 3.20 *Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and lands containing unique and endangered plants and animals.*

Consistency Analysis: Section 4.4, "Biological Resources," acknowledges that the project will include the unavoidable loss of some coastal sage scrub, riparian habitats and other native plant communities and wildlife habitat. However, mitigation measures have been developed to protect and preserve significant resources including wetland restoration, and set-asides of open space and preserves totaling approximately 4,615 acres. Taking into account both project impacts and mitigation, this project supports this ancillary RCPG policy.

- 3.21 *SCAG shall encourage the implementation of measures aimed at preservation and protection of recorded and unrecorded cultural sites and archeological sites.*

Consistency Analysis: Section 4.5 (Cultural Resources) includes a discussion of the relationship of the project to this SCAG policy. The project is supportive of this ancillary RCPG policy.

- 3.22 *SCAG shall discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic areas.*

Consistency Analysis: The Draft EIR acknowledges that the issues addressed by this policy are appropriately considered and mitigated. The project is supportive of this ancillary RCPG policy.

- 3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

Consistency Analysis: Various sections of the Draft EIR appropriately address the relationship of the project to this SCAG policy. The project is supportive of this ancillary RCPG policy.

- 3.24 *Encourage efforts of local jurisdictions in the implementation of programs that increase the supply and quality of housing and provide affordable housing as evaluated in the Regional Housing Needs Assessment.*

The proposed project contributes substantially to the City of Irvine's Housing Element goal of providing more housing for workers within the City. The project provides a range of housing unit types to meet the needs of different types of workers

employed in the City. 12,350 housing units in the proposed project will help meet the City's fair share housing allocation through 2025. The proposed project supports this ancillary policy.

- 3.27 *Support local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.*

Consistency Analysis: The Draft EIR in Section 4.12 (Public Services) appropriately addresses the relationship of the project to this SCAG policy. The project is supportive of this ancillary RCPG policy.

- 9.01 *Provide adequate land resources to meet the outdoor recreation needs of the present and future residents in the region and to promote tourism in the region.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. In addition, an additional 174 acres of parkland will be developed as a result of project implementation. The project is supportive of this ancillary RCPG policy.

- 9.02 *Increase the accessibility to open space lands for outdoor recreation.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. In addition, an additional 174 acres of parkland will be developed as a result of project implementation. The project is supportive of this ancillary RCPG policy.

- 9.03 *Promote self-sustaining regional recreation resources and facilities.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. In addition, an additional 174 acres of parkland will be developed as a result of project implementation. The project is supportive of this ancillary RCPG policy.

- 9.04 *Maintain open space for adequate protection of lives and properties against natural and man-made hazards.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. Preservation of these areas will protect lives and properties against natural and man-made hazards by avoiding development within the steeper slopes and high fire hazard areas within the project site. The project is supportive of this ancillary RCPG policy.

-
- 9.05 *Minimize potentially hazardous developments in hillsides, canyons, areas susceptible to flooding, earthquakes, wildfire, and other known hazards, and areas with limited access for emergency equipment.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. Preservation of these areas will protect lives and properties against natural and man-made hazards by avoiding development within the steeper slopes and high fire hazard areas within the project site. The project is supportive of this ancillary RCPG policy.

- 9.06 *Minimize public expenditure for infrastructure and facilities to support urban type uses in areas where public health and safety could not be guaranteed.*

Consistency Analysis: Throughout the Draft EIR discussions occur regarding the 4,615 acres that will be dedicated as permanent open space. Preservation of these areas will protect lives and properties against natural and man-made hazards by avoiding development within the steeper slopes and high fire hazard areas within the project site. The project is supportive of this ancillary RCPG policy.

- 9.07 *Maintain adequate viable resource production lands, particularly lands devoted to commercial agriculture and mining operations.*

Consistency Analysis: The proposed project will eliminate approximately 3,100 acres currently in agricultural production. The proposed project is not supportive of this ancillary/advisory only policy. However, as discussed in Section 4.2 “Agricultural Resources,” continued agricultural uses are not feasible.

- 9.08 *Develop well-managed viable ecosystems or known habitats of rare, threatened and endangered species, including wetlands.*

Consistency Analysis: The Draft EIR’s Biology section acknowledges that the project will include the unavoidable loss of some coastal sage scrub, riparian habitats and other native plant communities and wildlife habitat. However, mitigation measures have been developed to protect and preserve significant resources including wetland restoration, and set-asides of open space and preserves totaling approximately 4,615 acres. Taking into account both project impacts and mitigation, this project supports this ancillary RCPG policy.

The Draft EIR presents information establishing that the proposed project is consistent with nine core RCPG policies relevant to the proposed project. The tenth core policy regarding RTIP projects is not applicable to the proposed project. Further, the Draft EIR establishes that the project fully

complies with or meets the intent of the majority of SCAG's ancillary/advisory policies. Therefore, no significant impacts are anticipated.

Cumulative Impacts

Cumulative development in accordance with the General Plan will continue to convert undeveloped land to urban uses. Other projects located within project area include Planning Areas 17, 27, 51 (Millennium Plan II), and Spectrum Housing. These land use changes have already been anticipated and are included in the Irvine General Plan. None of these projects would require the disruption or division of the physical arrangement of an existing community. In addition, as a result of General Plan Amendment 16, large areas of the City are to be preserved as permanent open space in accordance with the Conservation and Open Space Phased Dedications Districts program. As such, cumulative land use impacts are not considered significant.

General Plan Buildout with Millennium Plan II

Currently, there are two development scenarios proposed for the former MCAS El Toro: 1) the Millennium Plan II; and, 2) Orange County International Airport (OCX) (see below). The Millennium Plan II consists of a mixed use development located immediately south and east the project site. However, areas adjacent to the Millennium Plan II are proposed for Medical and Science uses consistent with the uses proposed in Millennium Plan II. As a result, no significant land use compatibility impacts on Northern Sphere Area are anticipated, although traffic volumes on the adjacent roadways including Jeffrey Road, Trabuco Road, Irvine Boulevard, Portola Parkway, Sand Canyon Avenue, the Eastern (SR-133) Transportation Corridor, and the Foothill (SR-241) Transportation Corridor are likely to increase.

General Plan Buildout with OCX

Potential land use compatibility impacts associated with OCX would include increased traffic on surrounding roadways and aircraft noise. However, proposed residential land uses are located outside the proposed 65 CNEL noise contour for OCX (see Section 4.10, "Noise"). In addition, the proposed land use plan is consistent with the proposed Departure Safety Zone (DSZ), as discussed above. Therefore, no significant land use compatibility impacts are anticipated under either development scenario, although traffic, air, and noise impacts would be greater under the airport development scenario.

Probable Future Projects

An initiative known as "The Orange County Central Park and Nature Preserve Initiative" (Great Park Plan) has been proposed for the former El Toro Marine Corps Air Station (MCAS). This Initiative amends the Orange County General Plan to authorize the closed Marine Corps Air Station El Toro ("El Toro") to be used for non-aviation uses, including a multi-purpose central park, open space, nature preserve, universities and schools, cultural facilities, and other interim and long-term

uses described therein. Areas within the Northern Sphere Area adjacent to the Great Park Plan are proposed for Medical and Science land uses, which are consistent with the land uses proposed for the Great Park Plan.

4.9.3 MITIGATION MEASURES

Existing Regulations and Standard Conditions

The City of Irvine has a number of existing codes and policies which are implemented through the regular subdivision process which will serve to mitigate the impacts of the proposed project. Although they are often updated from time to time, current codes and policies relating to land use are as follows:

- 9.1 The proposed project shall be designed in accordance with all relevant development standards and regulations set forth by the adopted Zone Change.

Project Design Features/Special Development Requirements

Project design features and special development requirements related to land use are contained in proposed zoning documents on file with the City.

Additional Mitigation Measures

- 9.2 Each tentative tract map ("B" Map) shall incorporate appropriate buffers as determined by the adopted zoning between residential neighborhoods and Medical and Science uses within Planning Area 9 including walls, landscaping, and/or berms.

4.9.4 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project is consistent with both the adopted City of Irvine General Plan and surrounding land uses; therefore, no significant impacts are anticipated. Potential land use compatibility conflicts relating to existing on-site land uses and easements have been mitigated to a level of insignificance.