



# City of Irvine – GENERAL PLAN UPDATE BACKGROUND REPORT

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SUBMITTED TO:

**CITY OF IRVINE**

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## Chapter 1. Introduction

The land that Irvine is built upon has a rich history, from centuries of indigenous civilizations to recorded history dating to the late 1700s, when Mexican-Spanish land grants created boundaries for what later became the Irvine Ranch. From the 1800s to the 1900s, the area was used for ranching, farming, and even military operations. In 1959, the University of California asked the Irvine Company for 1,000 acres to start a new campus. A master plan was drawn up for a city of 50,000 people surrounding the university, with land for industry, commercial centers, housing and recreational areas. By 1970, several residential neighborhoods and the Irvine Business Complex were completed.

The City of Irvine incorporated on December 28, 1971, and the City adopted its first general plan in 1973. With nearly 260,000 residents today and a wide variety of land uses, Irvine has evolved over the past 40-plus years into one of the nation’s largest planned urban communities, encompassing approximately 66 square miles. Nationally recognized education institutions, a safe and clean environment, an abundance of resident services, thousands of acres of parks and open space, and a prosperous business climate continually place Irvine among the top cities in the United States to live, work, and recreate.

The Irvine General Plan is a land use guide and a reflection of the community’s vision and values for the future. This background report documents previous land planning work as well as the current policy and regulatory environment that will influence the creation of the City’s new general plan. Essentially, this report is a “snapshot” of Irvine’s current trends and conditions. It provides City staff, decision-makers, and the public with context for making land use and policy decisions, and is intended to be objective and policy neutral.





## 1.1 What Is a General Plan?

California law requires each city to adopt a general plan to guide future growth and conservation relative to land use. A general plan serves as a jurisdiction’s “blueprint” for future planning decisions in the community. There are four important factors associated with the plan: it must be general, comprehensive, long-term, and consistent. These four factors are carried out in the plan in the following ways:

- **General:** The plan provides general, yet current, guidance for land use, environmental, economic, and social goals and policies as they relate to land use and development.
- **Comprehensive:** The plan addresses land influenced by the city’s planning decisions, including the areas within its boundaries and sphere of influence. Comprehensive also refers to a wide range of local and regional concerns, including social, economic, infrastructure, and natural resources.
- **Consistent:** Consistency must be addressed in two ways—internally throughout the plan and with other adopted documents. Goals, policies, text, maps, tables, etc., cannot be in conflict. The implementation tools of the general plan must be consistent with the general plan.
- **Long Term:** Using the city’s vision as a guide, the plan looks 20 years or more into the future. Integrated goals, policies, and implementation actions address near-term and long-term needs for the planning area.

Policies of the general plan should underlie most land use decisions. Subdivisions, capital improvements, development agreements, and other land use actions are required to be consistent with the adopted general plan. In addition, the general plan serves to: 1) identify the community’s land use, circulation, environmental, economic, and social goals and policies as they relate to land use; 2) provide a basis for local government decision-making, including decisions on development approval and actions; 3) provide citizens with opportunities to participate in the long-range planning process; and 4) inform citizens, developers, decision-makers, and other agencies about the ground rules guiding development within a particular jurisdiction.

## 1.2 Using the General Plan

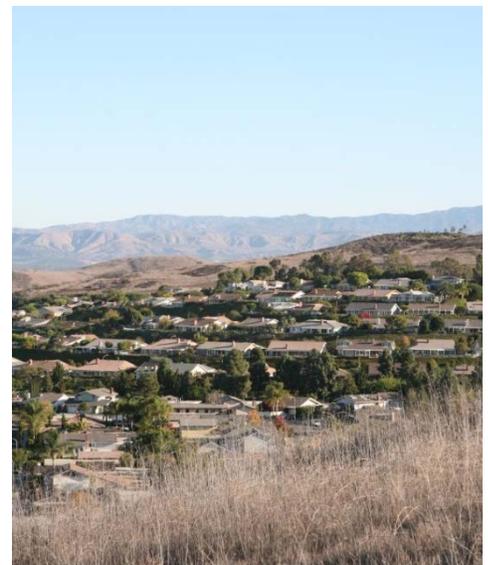
As a foundation for the future physical development of Irvine, government officials, such as the Planning Commission and City Council, as well as residents, property owners, and business owners, should familiarize themselves with the General Plan. Guided by Irvine’s vision, each element contains goals, policies, implementation actions, and maps or other figures. When considering a development or land use related project in the city, the General Plan is a good place to start.

General plans are required to address seven elements—land use, housing, circulation, conservation, open space, safety, and noise. These elements may be combined or organized to address the specific characteristics of a jurisdiction. Irvine’s existing General Plan includes these topics and others important to the community. Goals, policies, and implementation actions are the backbone of these elements and a blueprint for city officials to use for land use decisions.

## 1.3 Regional Setting

Irvine is centrally located in Orange County and bordered by a number of cities and unincorporated county areas. The city’s sphere of influence (land outside city boundaries that is influenced by and/or related to its planning) includes land between State Route 241 and Santiago Canyon (shown on Figure 1-2). The city is best described as part of the foothills region of the county. The landforms that create the foothills have influenced the way development has occurred in the city, with the majority of existing development in the central area and radiating north and south over time.

Irvine has experienced some of the highest rates of population and employment growth in the region. Over the past 24 years, the city’s annual population growth rate is 3 percent per year, whereas Orange County’s population has only seen a 1 percent annual increase. Irvine is a key regional job provider and has experienced growth, or stability, since the recession in 2008-2009, in every sector of its local economy. As of 2014, the Irvine holds 15 percent of all jobs in Orange County, offering 2.8 jobs per household—the highest in the county.<sup>1</sup>



Hillside overlooking Irvine

<sup>1</sup> PlaceWorks, 2014, using data from the CA Department of Finance.



## 1.4 Planning Boundaries and Areas



View of Jeffrey Open Space Trail

The City is divided into distinct Planning Areas (Figure 1-2). Each planning area has its own combination of land uses, creating a unique neighborhood character and sense of community. Residential neighborhoods are concentrated in the central area of the city, and open space is maintained to the north and south. In recent years, two of the City's commercial centers—the Irvine Business Complex (PA 36) and Irvine Spectrum (PA 33)—have begun to incorporate high density residential uses, bringing additional housing options to the City, especially for employees in both areas.

Another planning area in Irvine that is undergoing significant change is Planning Area 51, an area in eastern Irvine designated as the Orange County Great Park. Once home to the Marine Corps Air Station El Toro, through reuse planning this area holds what is planned to be a great metropolitan park of Orange County. In addition to parkland, development in this area includes diverse residential neighborhoods and commercial uses. The park and surrounding complementary land uses will continue to develop over the next 10-plus years.





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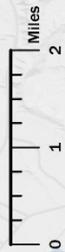
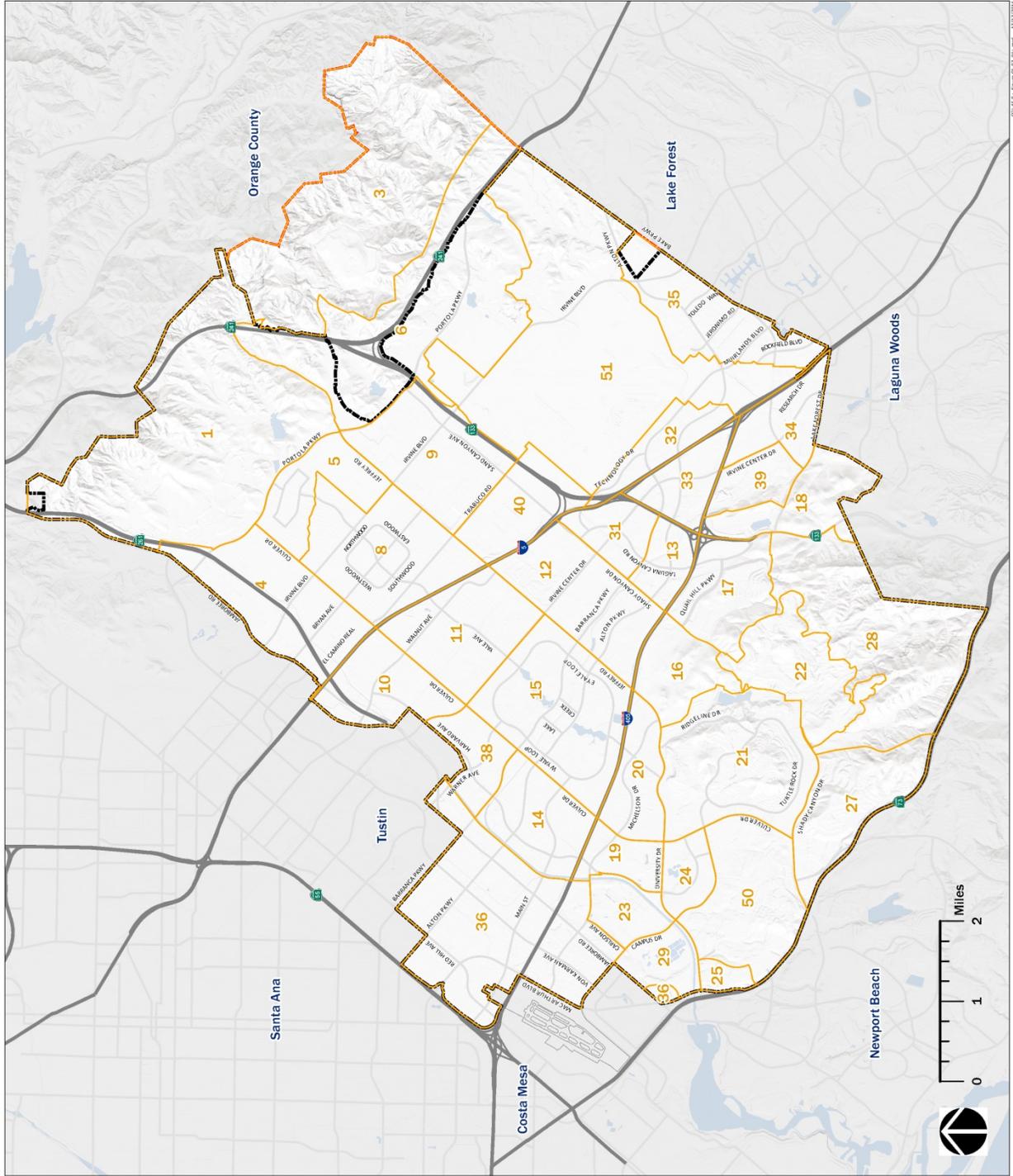
Figure 1-2

# PLANNING AREAS

## LEGEND

-  City Boundary
-  Sphere of Influence
-  Planning Areas
- PA 1 - Orchard Hills
- PA 3 - Limestone Canyon
- PA 4 - Lower Peters Canyon
- PA 5 - Northwood Point
- PA 6 - Portola Springs
- PA 8 - Northwood
- PA 9 - Woodbury
- PA 10 - Walnut
- PA 11 - El Camino Real
- PA 12 - Oakcreek
- PA 13 - Irvine Spectrum 4
- PA 14 - West Park
- PA 15 - Woodbridge
- PA 16 - Quail Hill - Open Space
- PA 17 - Quail Hill
- PA 18 - Laguna Altura
- PA 19 - Rancho San Joaquin
- PA 20 - University Park
- PA 21 - Turtle Rock
- PA 22 - Shady Canyon
- PA 23 - San Joaquin Marsh
- PA 24 - University Town Center
- PA 25 - University Research Center
- PA 27 - Turtle Ridge
- PA 28 - Bommer Canyon
- PA 29 - UCI - North Campus
- PA 31 - Irvine Spectrum 6
- PA 32 - Irvine Spectrum 3
- PA 33 - Irvine Spectrum Center
- PA 34 - Irvine Spectrum 5
- PA 35 - Irvine Spectrum 2
- PA 36 - Irvine Business Complex
- PA 38 - Westpark II
- PA 39 - Los Olivos
- PA 40 - Cypress Village
- PA 51 - Orange County Great Park

Source:  
City of Irvine, 2015





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## 1.5 Purpose and Organization of the Background Report

This background report is an informational document that will be used to inform the update of the City's General Plan and the environmental impact report. The background report contains an assessment of existing conditions as well as opportunities and constraints to be considered as the new General Plan is prepared. Information in this document was collected in collaboration with City staff, local and regional agencies; and existing City land use documents.

The background report is organized by topic area into 10 chapters, similar to the City's General Plan, and it covers the same topical information as the existing elements.

**Chapter 1, Introduction**, sets the foundation for the General Plan update. Topics include: what is a general plan, how to use the general plan, regional setting, planning boundaries and areas, and the purpose and organization of the background report.

**Chapter 2, Demographic and Economic Trends**, provides an analysis of demographic and economic conditions, regionally and locally, that affect Irvine. These trends will inform strategies and implementation measures that will be included in the updated General Plan.

**Chapter 3, Land Use**, reviews the present (2016) context for land use planning in Irvine. It includes a discussion of existing land uses and land use policies and regulations and is based upon both a detailed land use inventory and a review of current planning documents prepared by the local, regional, state, and federal agencies.

**Chapter 4, Housing**, reviews the current housing conditions in Irvine. It includes a discussion of the Regional Housing Needs Assessment allocation, housing needs based on demographic trends, affordable housing strategies, and a summary of the 2013-2021 Housing Element. (Note: Other than formatting for consistency with the updated General Plan, no changes to the certified Housing Element will occur.)

**Chapter 5, Circulation**, describes the existing transportation and circulation network in Irvine, including street and highway systems, transit systems, airport, railroad, and bicycle and pedestrian routes.



**Chapter 6, Public Facilities and Services**, describes the capacities and levels of service for public and private facilities, services, and utilities serving Irvine, including water, wastewater, stormwater, solid waste, utilities, law enforcement and fire protection, schools and libraries.

**Chapter 7, Safety and Seismic**, describes public health and safety hazards in Irvine, including geologic and seismic hazards, flood hazards, wildland fire, human-made hazards, airport safety, and air quality.

**Chapter 8, Conservation and Open Space**, describes the location and extent of existing natural and cultural resources in Irvine, including biological resources, cultural resources, water resources, energy and mineral resources, oil and gas resources, and agricultural resources.

**Chapter 9, Parks, Recreation, and Community Services**, describes the many park and other recreation resources in Irvine. This chapter also describes the primary community services for families, youth, and seniors provided by the City of Irvine and nonprofit organizations.

**Chapter 10, Noise**, identifies and examines the existing road, rail, aircraft, and major stationary noise sources in Irvine and how these noise sources impact neighboring land uses.

## 1.6 Format of the Background Report

Each chapter of the background report is organized into topical sections. Each section includes: an introduction that provides a brief description of the issues covered in the chapter; a summary of the federal, state, and local laws and regulations pertaining to each topic; a description of key existing conditions; and a conclusion that summarizes findings and constraints and opportunities. These considerations provide context for the next phase of the General Plan update.

## Chapter 2. Demographics and Economics

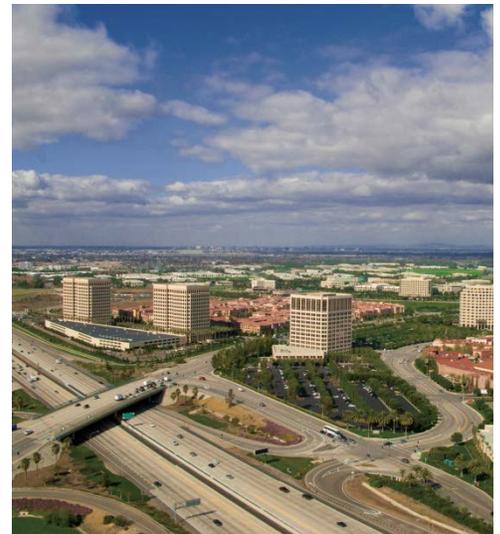
### 2.1 Introduction

Irvine is renowned for its local economy. As the hub of Orange County economic activity, the City of Irvine accounts for 49 of the top 100 publicly traded companies with headquarters in Orange County. Notably, those 49 Irvine companies comprise 86 percent of the total market valuation of the top 100 (Orange County Business Journal, 2015), providing a strong market for employment opportunities.

The importance of the local economy to Irvine’s success as a model community cannot be underestimated. As home to UC Irvine and with proximity to regional amenities and transportation facilities and access to a highly skilled workforce, Irvine has fostered the growth of an important technological and innovative job market. This job market continues to attract national headquarters of major corporations and a burgeoning services sector to support the community.

Irvine’s continued attention to economic development has reaped significant benefits in community quality of life. Continued investment in residential neighborhoods, commerce, and industry has yielded stable growth in local tax revenues. These tax revenues have been used to support further investments in infrastructure, parks and recreation, quality neighborhoods, and an abundance of community services. The high quality of life has, in turn, attracted further investments.

This chapter assesses the trends and implications of the City’s demographic makeup and shifts in economic and market conditions. It provides a basis to identify strategies and implementation measures to achieve the General Plan’s goals and support community discussions about change and preservation as part of the General Plan update. In turn, this information can guide land-use policy in the General Plan update and specific policies in the Economic Development Element.



Overlooking Irvine



## 2.2 Regulatory Setting

### 2.2.1 Existing Irvine General Plan

The existing Irvine General Plan addresses economic development as part of the Land Use Element. Objective A, Economic Development, states the objective is to promote viable commercial centers, successful manufacturing areas, and dynamic employment centers. The following policies support Objective A-2:

- Policy (a): Retain and attract manufacturing and industrial uses within designated business centers.
- Policy (b): Provide neighborhood retail and service centers within walking or biking distance of residential communities and employment centers.
- Policy (c): Provide community commercial centers to serve more than one planning area.
- Policy (d): Combine day and night uses in commercial centers by permitting shared use parking for off-peak activities (churches, movie theaters, etc.).
- Policy (e): Designate commercial centers in each planning area consistent with the size of the planning areas being served.
- Policy (f): Promote support and service retail uses within the business/industrial land use designations.
- Policy (g): Promote Irvine as a city of choice for business through development \of the following:
  - A proactive marketing plan.
  - Public/private partnerships to promote business relations.
  - Business outreach and assistance programs.
  - Affordable housing opportunities for Irvine employees.
  - Business incentives.
- Policy (h): Retain and attract businesses that meet the shopping and service needs of the community as well as create quality employment opportunities.

# DEMOGRAPHICS AND ECONOMICS

The Irvine Business Complex Element of the existing Irvine General Plan also contains a range of objectives, policies, and programs to address the economic development needs for this district in Irvine.

## 2.2.2 Economic Development Strategic Plan

Irvine's Strategic Plan for Economic Development implements and promotes the City Council's priorities. Irvine's Economic Vision is to enhance the vitality of Irvine's diversified, growing economy to maintain a well-balanced community characterized as an entrepreneur-friendly, innovative, and livable City. The Strategic Plan consists of four goals:

- Outreach/Relationship Building. Ensure continuous outreach and effectively engage the City's local business community.
- Messaging and Branding. Brand Irvine as a premier business destination.
- Responsiveness. Provide timely and effective professional and courteous service.
- Collaboration. Interact with local business by understanding their needs, emerging trends, and opportunities.

These goals are followed by specific implementation programs.



Irvine Office Development



## 2.3 Demographics

### 2.3.1 Existing Conditions

#### Note on Geography

The assessment in this section focuses on the City of Irvine. However, to provide context for the various demographic and economic conditions, the assessment often compares Irvine to a group of county subdivisions called “South Orange County.” The assessment includes census county divisions that are adjacent to or near Irvine and have similar characteristics. Specifically, the South Orange County group includes:

- South Coast CCD
- Irvine-Lake Forest CCD
- Mission Viejo CCD
- Central Coast CCD
- Silverado CCD

The primary source of demographics was the U.S. Census American Community Survey 5-Year Estimates, 2014.

The demographic assessment covers various social and demographic characteristics of the residents of Irvine. It addresses current trends and the possible influence on Irvine’s future growth, including population, age, race and ethnicity, and income.

#### 2.3.1.1 Population and Households

Irvine has experienced extensive growth since 1990, more than doubling in population and households. Over the past 25 years, Irvine’s population has grown more than 3 percent per year, while Orange County’s population has only seen a 1 percent annual increase. Orange County has a larger household size compared to the rest of the nation (3.0 vs 2.4 residents per household). Irvine has followed national trends more closely and has an average household size of 2.67. Table 2-1 presents a comparison of these trends

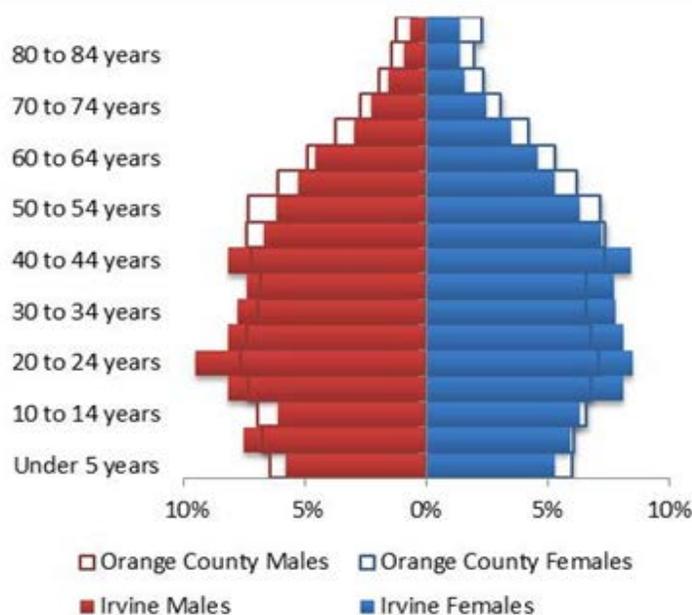
**Table 2-1**  
**Demographic Trends: Irvine and the Region, 1990-2014**

	Irvine	Comparison Jurisdictions	Orange County
<b>Population</b>			
1990	110,330		2,410,556
2000	143,072	518,397	2,846,289
2014	229,850	1,029,781	3,086,331
Annual Growth’00-14	3.44%	0.048	0.58%
<b>Households</b>			
1990	42,221		875,072
2000	51,199	333,253	935,287
2014	83,321	384,320	1,002,285
Annual Growth Rate	3.54%	0.014	.50%
<b>Average Household Size</b>			
1990	2.61		2.75
2000	2.66	2.63	3.00
2014	2.67	2.64	3.04

*Source: U.S. Census, 2000; 2014 ACS 5-year estimates.*

## 2.3.1.2. Age Characteristics

Irvine’s population is younger than the rest of Orange County. According to the 2010-2014 American Community Survey (ACS), Irvine’s median age was 34.0, slightly below the median age of 36.7 years in Orange County. Irvine has a larger young-professional population than much of Orange County, partly due to its proximity to job markets. Irvine also has a high concentration of young adults in the 20–24 age range, due in part to the nearly 25,000 undergraduate students attending UCI.



Source: 2014 American Community Survey

**Figure 2-1 Age Cohorts, Irvine and Comparison Jurisdictions, 2014**

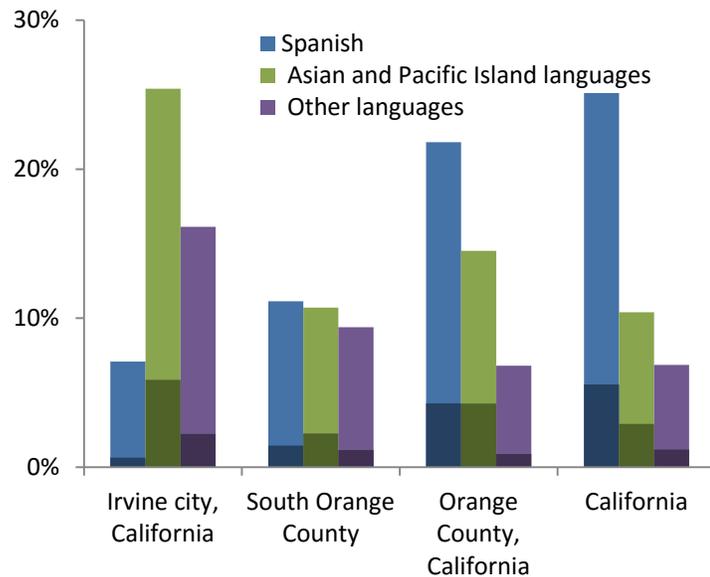
In Irvine and across the nation, two primary groups drive the local economy, but in very different ways. The baby boomer population aged 55 and older will continue to shape the economy, particularly with respect to health care expenditures in the future. Meanwhile the millennials, born from 1980 to 2000, includes individuals ages 25 to 44. This group is now larger than the baby boom generation and plays a stronger role in the labor and housing markets. This group will form the primary market for buying and renting housing in the future. This age cohort also has different preferences for expenditures.



### 2.3.1.3. Racial and Ethnic Diversity

Irvine is a city of great cultural and ethnic diversity. According to the 2010-2014 ACS, Caucasian and Asians make up the majority of residents, followed by Hispanics (10 percent) and all remaining groups (7 percent). Irvine’s foreign-born residents make up 37 percent of the population, and, of these, 57 percent are naturalized citizens. This includes countries such as Korea (15 percent), India (10 percent), Iran and China (9 percent each), and Taiwan (7 percent). The origin countries’ influence can be seen in preferences for certain residences, schools, retail locations, and more throughout Irvine.

Almost half of Irvine’s population speaks a language besides English. A similar proportion of people speak other languages throughout the county and state (43 and 42 percent). A greater concern occurs when households are linguistically isolated, meaning no one in the household over 14 years old speaks English “very well.” The language barrier can limit access to services, employment, and schooling. As shown in Figure 2-2, one in five Asian language households are linguistically isolated, followed by a combination of other languages and Hispanics.



Source: 2014 American Community Survey.

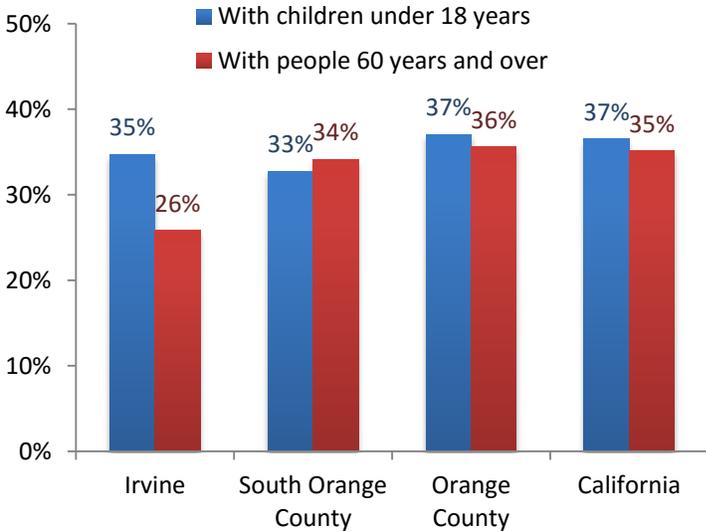
Note: The bars represent language spoken at home; dark areas represent linguistically isolated households.

**Figure 2-2 Language Spoken at Home and Linguistic Isolation, Irvine and Comparison Jurisdictions, 2014**

## 2.3.14. Household Type

The composition of households plays a role in determining demand for age-specific public facilities and services. According to the 2010-2014 ACS, approximately two-thirds of households are family households, which include persons married with children, married with no children, and other families. Nonfamily households total 35 percent and typically include unrelated individuals living in the same housing unit. Single person households make up the majority of this group.

The ages of people living in households are also important. As seen below, 35 percent of Irvine households have children under 18 years old, which is comparable to the comparison areas. Irvine has considerably fewer households with residents over 60 years old than comparative areas; the reason for this pattern is not clear. This matches with the smaller household size mentioned previously. Figure 2-3 compares the types of households by ages with other jurisdictions.



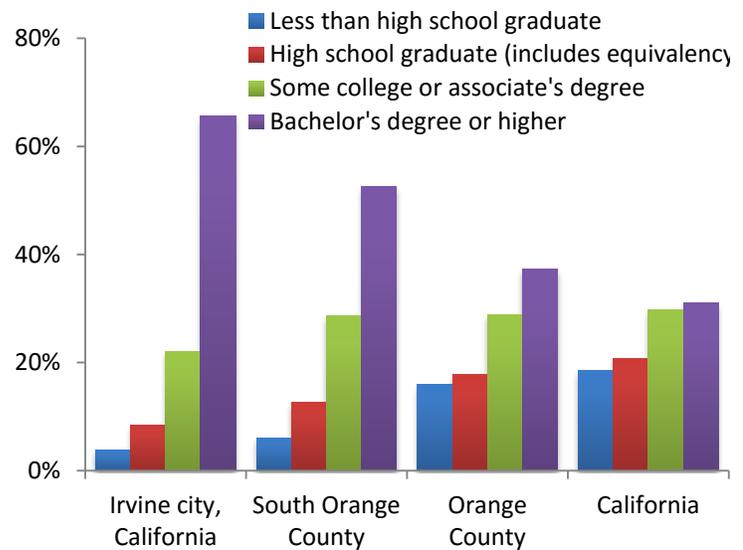
Source: 2014 American Community Survey.

**Figure 2-3 Percentages of Types of Households by Ages: Irvine and Comparison Jurisdictions, 2014**



### 2.3.15. Education

Irvine has long been committed to encouraging a culture of educational excellence. Irvine’s population is very well educated compared to the region and state of California. According to the 2010-2014 ACS, almost two-thirds of adults over the age 25 have a bachelor’s degree, while only 4 percent do not have a high school diploma. As shown in Figure 2-4, Irvine’s educational levels far exceed the county and state of California.



Source: 2014 American Community Survey.

**Figure 2-4 Educational Attainment for Adults 25 years and older, Irvine and Comparison Jurisdictions, 2014**

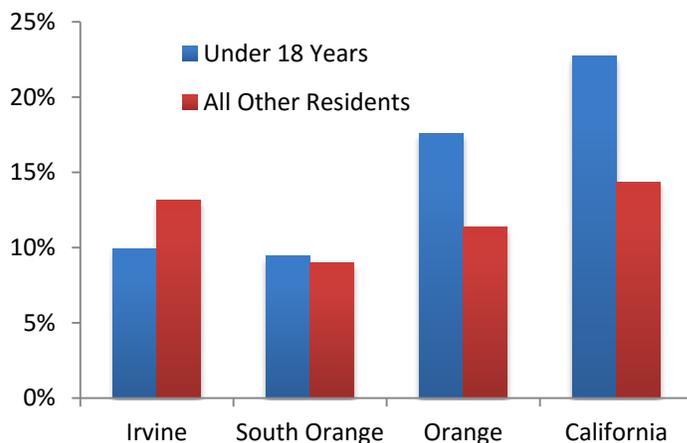
Irvine’s education levels support the affluence and employment characteristics of its population, as discussed later in this chapter. The City’s high educational attainment rates are due to the presence of three universities (UC Irvine, Irvine Valley College, Concordia) and many other branch campuses, an excellent elementary and secondary school system that has some of the highest graduation rates and academic achievement levels in the nation, and a highly skilled workforce. Residents and community foundations also provide significant financial support to maintain excellence in the local public school systems.

## 2.3.1.6. Household Income and Poverty

From 2000 to 2014, Irvine’s median household income rose from approximately \$72,000 to \$92,000. As of 2014, Irvine has the 17th highest median household income of all California cities with a population of 60,000 people or more. Its median income is almost \$20,000 higher than the rest of Orange County (\$76,000) and \$30,000 higher than California (\$61,500). This is due to the educational levels of residents, high price of housing that can only be afforded by higher income earners, and the higher income earning jobs held by residents.

Although the median household income is quite high, there is still a substantial number of residents (12.4 percent) earning lower incomes or living in poverty. Irvine’s poverty rate is slightly higher than South Orange County and almost as high as the poverty rate for California. Looking closer, however, the poverty rate is skewed by the significant number of college students; nearly 50 percent of Irvine’s residents who earn income below the poverty rate are in college/graduate school. Four out of ten college students have incomes below the poverty limit.

Figure 2-5 shows the poverty rate for children and all residents in Irvine and the comparison regions. As mentioned above, although students make up nearly half the population of people in poverty, the poverty rate among children is still of concern.



Source: 2014 American Community Survey.

**Figure 2-5 Proportion of Residents Living in Poverty, Irvine and Comparison Jurisdictions, 2014**

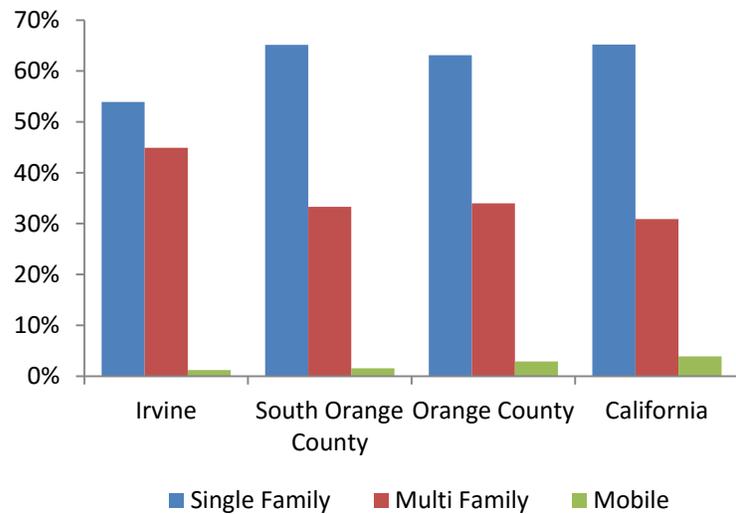


### 2.3.17. Housing

As shown in Figure 2-6, Irvine’s housing stock is predominantly single family lower density; more than half (54 percent) of Irvine’s housing is single family. In contrast, single-family residential uses in south Orange County and the state of California comprise about 65 percent of housing units, and Orange County’s is slightly less at 63 percent. Irvine has the largest share of multiple-family housing, at approximately 45 percent. Smaller proportions of multiple-family housing are found in South Orange County, Orange County, and California as well.



Lambert Ranch



Source: 2014 American Community Survey.

**Figure 2-6 Proportion of Housing Stock by Type: Irvine and Comparison Jurisdictions, 2014**

Based on existing land use designations in the general plan, the City of Irvine is planning for approximately an equal amount of single-family and multiple-housing products to be built in the future. Given the wide range of allowable densities within certain general plan designations, however, the precise breakdown will not be known until a future date. Assuming current trends continue, the City will remain predominantly single-family residential, with higher density residential products (e.g., apartments and condominiums) focused in certain areas.

## 2.3.1.8. Housing Cost and Affordability

Irvine’s housing is some of the most expensive in the region. The median home value for owner-occupied units is \$662,200 according to the ACS 2014 five-year estimates, which is almost 25 percent above the Orange County median home value of \$532,300. High home values typically correlate with high rents, and this is true in Irvine. Irvine’s median gross rent is \$1,863, 22 percent above Orange County at \$1,522. For additional information on housing characteristics, please refer to the housing section of this background report.

With respect to housing overpayment, about 58 percent of Irvine’s homeowners with a mortgage can afford housing, slightly more than the 54 percent in Orange County and California. Irvine also has the fewest homeowners (16 percent) with “severe” housing overpayment, slightly less than the 19 percent in Orange County and California. Roughly 40 percent of Irvine’s renter households can afford housing, equal to Orange County and California (41 percent).

Housing overpayment is typically most concentrated among renters, who generally have less income and are more impacted by rising rents. About 55 percent of Irvine’s renter households overpay for housing, and half of those severely overpay for housing. This is higher than in Orange County and California as a whole, where approximately 45 percent of renters overpay for housing. Table 2-2 compares housing affordability in Irvine and comparison jurisdictions.

**Table 2-2  
Housing Overpayment**

Level of Over-payment	Irvine		Orange County		California	
	Renters	Owners <sup>1</sup>	Renters	Owners <sup>1</sup>	Renters	Owners <sup>1</sup>
None	40%	58%	40%	54%	41%	54%
Moderate <sup>2</sup>	27%	26%	27%	26%	26%	26%
Severe <sup>3</sup>	28%	16%	28%	19%	28%	19%
Not computed	5%	1%	5%	1%	5%	1%

Source: 2014 American Community Survey and the U.S. Census.

1. Refers to overpayment for homeowners with a mortgage
2. Moderate overpayment refers to a housing cost burden of 30 to 49% of income
3. Severe overpayment refers to a housing cost burden of 50% or more of income



## 2.4 Economic Conditions

Economic performance is essential to the growth and development of the regional economy and the City of Irvine. Regions with expanding economies generate jobs that attract a workforce from other areas and retain a higher proportion of the current workforce. Regions with stagnant or declining economies do not attract as many people looking for jobs and instead generate out-migration of those looking for better wages and jobs, thereby reducing housing demand and home values.

Economic performance is also important for funding public facilities and services. Because non-residential land uses typically generate more municipal revenues than costs in public services, they provide needed funds to pay for public facilities and services for the City's residents. Given the link between public services and tax revenues, this underscores the importance of economic development in the general plan and a strong economic development program at City Hall.

This section looks at the makeup and health of the local economy and assesses the potential for economic development in Irvine. It addresses the strengths and weaknesses in the job market and retail market, and their potential influence on future economic behavior. It also looks at the municipal financial health based on current trends.

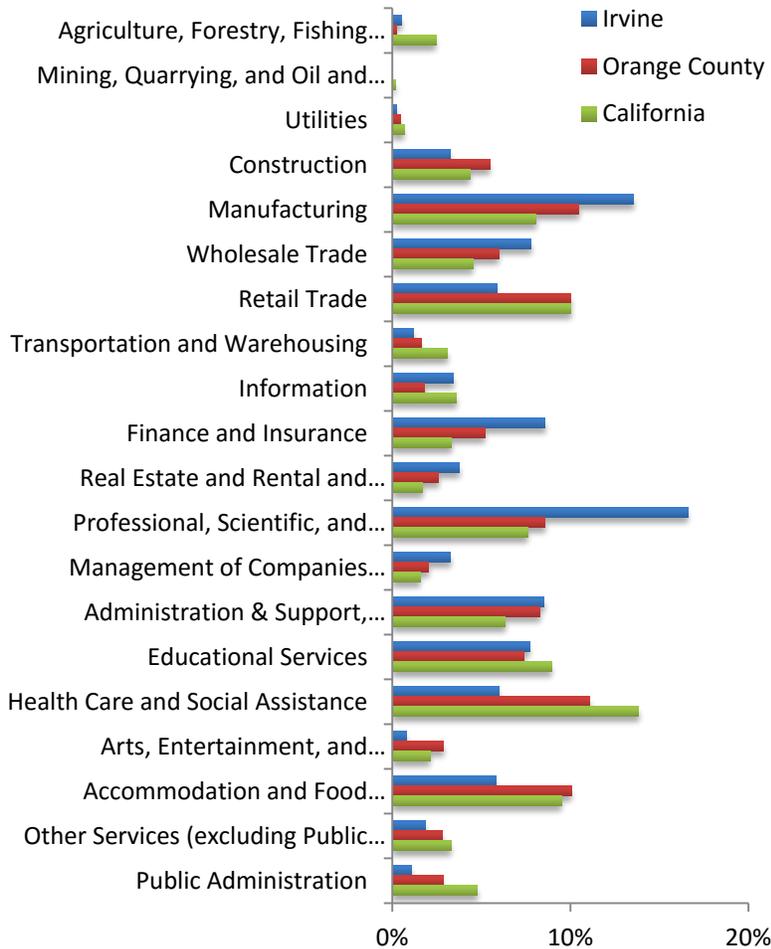
### 2.4.1 Economic Structure

To understand the structure of a local economy, economists most often look at the number of jobs in each of the major economic sectors. Because sectors differ in the value of their products, employment is considered an indicator of the relative economic activity and the relative importance of each sector in the local and regional economy. Therefore, this section provides a description and general assessment of employment by sector in Irvine relative to comparison markets.

Since the recession in 2008-09, Irvine has experienced only growth or stability in every sector of its economy. This is a remarkable trend compared to the region. Today, Irvine is a job-rich community, offering 2.8 jobs per household compared to other main job providers in the county like Anaheim (1.8 jobs per household) and Santa Ana (2.2 jobs per household). Irvine provides 15 percent of the jobs in Orange County, with Anaheim and Santa Ana providing 11 and 12 percent, respectively.

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Over the last 10 years, the Public Administration sector jobs have increased 300 percent. Other growth sectors include Health Care and Social Assistance (149 percent), Information (54 percent), and Professional, Scientific, and Technical Services (45 percent). Figure 2-7 shows the percentage of total jobs in each economic sector for Irvine, Orange County, and California as of 2014, the most recent year data are available. Of particular note, Irvine’s professional, science, and technical services sector provides 17 percent of all jobs in the City, more than double the share for the county and state (9 and 8 percent).



Source: 2014 U.S. Census LEHD program.

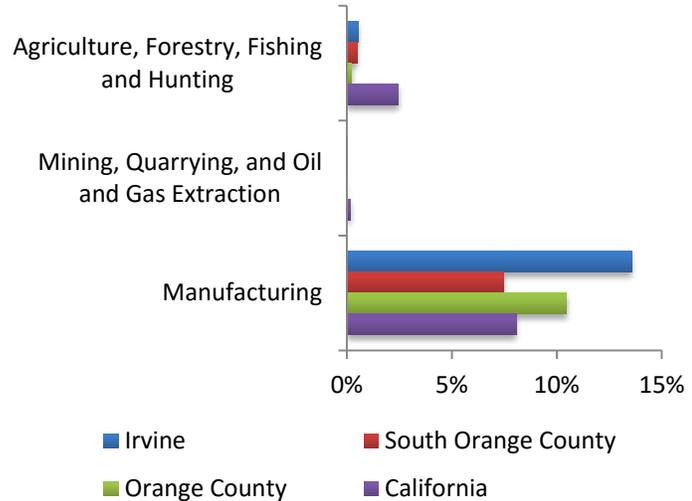
**Figure 2-7 Share of Total Employment by Economic Sector, Irvine and Comparison Jurisdictions, 2014**



### 2.4.1.1 Base Goods-Producing Sectors

The base goods-producing economic sectors produce commodities and goods, which are often exported out of the local and regional economy. Specific sectors in this group are: agriculture, forestry, fishing, and hunting; mining, quarrying, oil and gas exploration; and manufacturing. For all purposes, Irvine has long transitioned from its agricultural economy. Moreover, although historically gas and oil exploration occurred in Irvine, there are no longer any active mining, quarrying, oil, and gas extraction operations in the community.

However, unlike other parts of the region and California, Irvine retains a strong manufacturing and technology sector. Large corporations are located in the Irvine Business Complex, Irvine Technology Center, and Industrial Complex. This group of sectors accounts for 14 percent of the jobs in Irvine, slightly higher than in Orange County (11 percent) and double that of California (7 percent). Figure 2-8 shows the relative share of jobs in these sectors in Irvine and in each of the comparison areas.



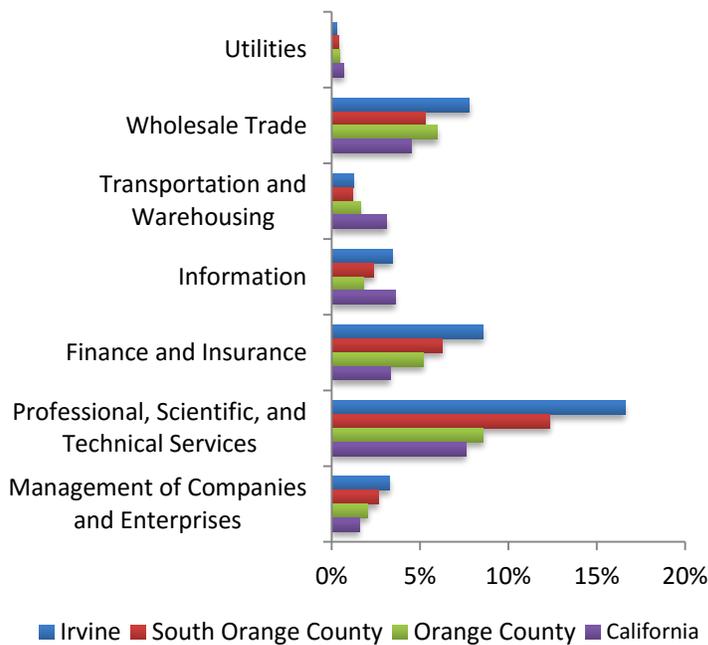
Source: 2014 U.S. Census LEHD program.

**Figure 2-8 Jobs in Base Goods-Producing Sectors as a Share of Total Jobs, Irvine and Comparison Jurisdictions, 2014**

## 2.4.1.2. Base Services

Irvine’s economy is driven largely by employment in base services. Businesses in the base service-producing sectors tend to sell their services outside of the local and regional economy. This group of sectors accounts for 41 percent of the jobs in Irvine, more than the sectors’ share of jobs in Orange County, 26 percent, and the state of California, 24 percent. Figure 2-9 shows the relative number of jobs in these sectors in Irvine, the county, the state, and comparison region.

Two subgroupings are within this group of economic sectors. The first subgroup is utilities, wholesale trade, transportation, and warehousing. The second subgroup is knowledge-based businesses, those which rely on a well-educated work force and tend to pay above average wages. This subgroup includes the following employment opportunities: information; finance and insurance; professional, scientific, and technical services; and management of companies and enterprises.



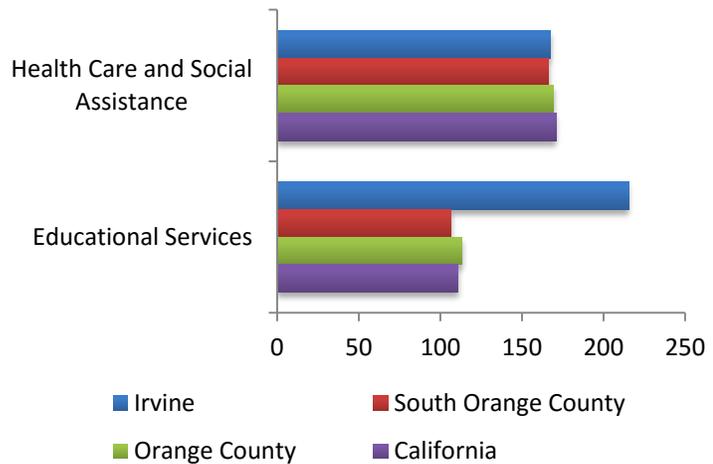
Source: 2014 U.S. Census LEHD program.

**Figure 2-9 Jobs in Base Service-Producing Sectors as a Share of Total jobs, Irvine and Comparison Jurisdictions, 2014**



### 2.4.13. Health and Education

The health and education sector of Irvine’s economy includes a broad range of services—public and private education, K-12 and higher, and medical, dental, and social services. As shown in Figure 2-10, the health and education group of sectors accounts for 383 jobs per 1,000 households in Irvine, which is substantially higher than South Orange County (177), Orange County (283), and California (282).



Source: 2014 U.S. Census LEHD program; 2014 American Community Survey.

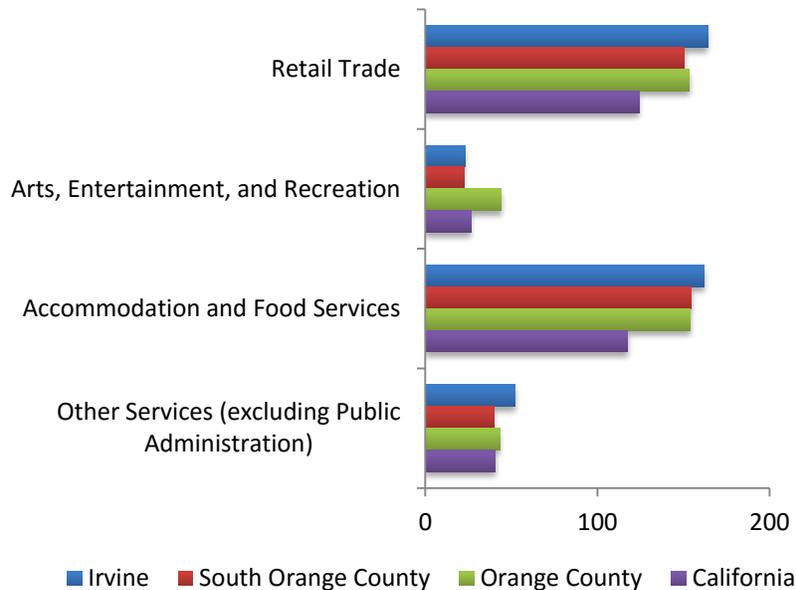
**Figure 2-10 Employment per 1,000 Households in Education and Health Care, Irvine and Comparison Jurisdictions, 2014**

Although the latest employment data goes back to 2014, there is indication that both sectors have significantly grown in employment. Over the past several years, Hoag Medical Center has opened nine urgent care clinics, many in Irvine, over the past 2 years. Irvine Unified School District is also planning to open about six new schools to accommodate growth in Irvine, including the recently opened Portola High. Moreover, UCI has begun construction of a high-tech classroom building, called the Anteater Learning Pavilion, to accommodate UCI’s burgeoning student population. Occupancy is expected by spring 2018.

## 2.4.14. Local Serving

This group of businesses represents those typically found in shopping and commercial districts and includes the following sectors: retail trade; arts, entertainment, and recreation; accommodation and food services; and other services (excluding public administration). As with education and health care, the analysis focuses on the number of jobs per 1,000 residents because these businesses primarily serve local demand.

The local-serving sectors in Irvine provide approximately 401 jobs per 1,000 residents in Irvine, more than the rate in Orange County, 395, and across the state, 309. Irvine’s strength in local-serving sectors is in retail trade, accommodation, and food services.



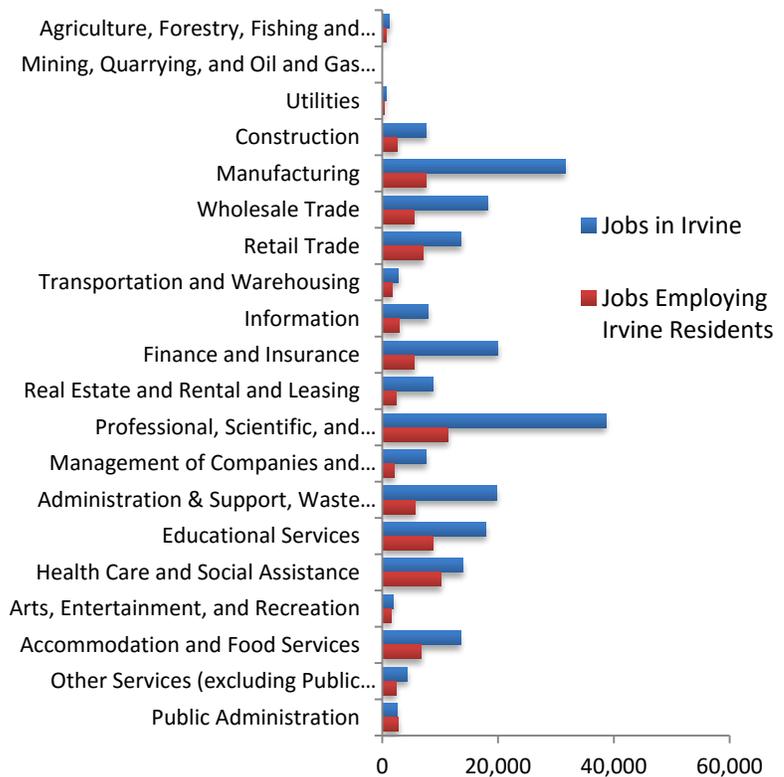
Source: U.S. Census; ACS, 2014.

**Figure 2-11 Employment per 1,000 Households in Local-Serving Sectors, Irvine and Comparison Jurisdictions, 2014**



## 2.4.2 Employment of Irvine Residents

As of 2014, about 87,743 Irvine residents were employed,<sup>1</sup> and 25 percent of those worked in Irvine. This is quite notable given that most cities retain around 15 percent of their employed residents. In all sectors, Irvine has more jobs available than residents working in that sector. This suggests that new or expanding businesses in any sector will likely have to attract workers from elsewhere. Shown in Figure 2-12, the largest number of Irvine residents are employed in scientific, technical services, and manufacturing.



Source: 2014 U.S. Census LEHD program.

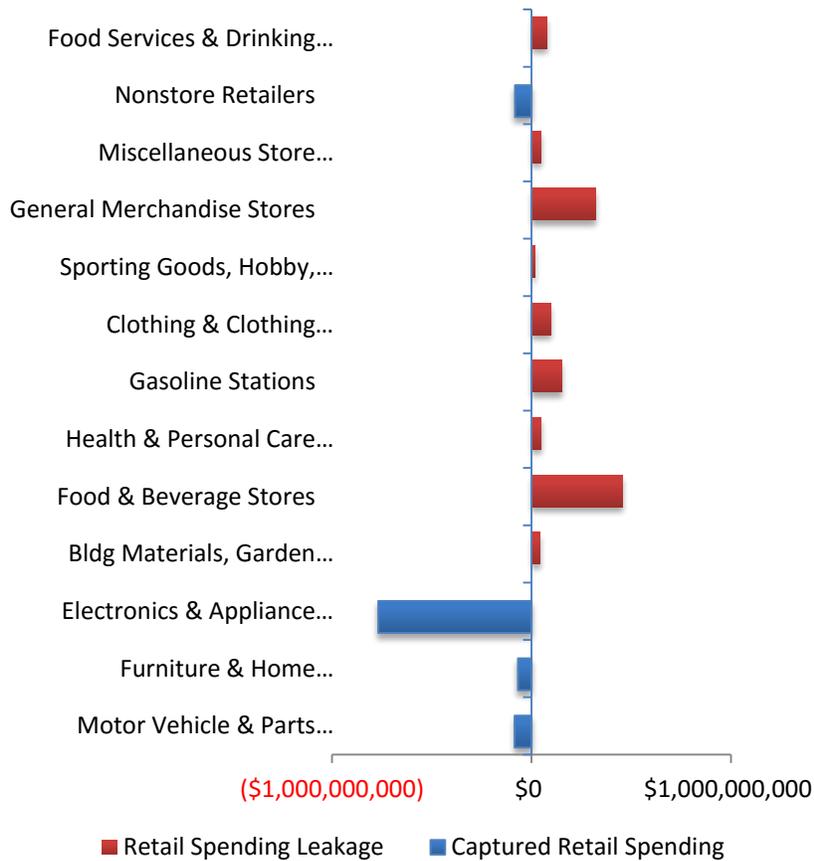
**Figure 2-12 Comparison of Residents Employed in Irvine by Sector versus Total Jobs by Sector in Irvine, 2014**

<sup>1</sup> The Census Bureau’s ACS 2014 will show a higher number of employed people than LEHD. Beginning in 2006, group quarters population was included in the ACS, inflating total employment figures. In addition, the ACS is self-reported while LEHD data is based on EDD records. These factors and other differences in survey methods lead to different total employment figures, especially in cities with a high group-quarter population.

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## 2.4.3 Retail Sales

Taxable retail sales are significant in Irvine due to its presence as a major jobs center with well-paid residents and major shopping centers. In 2014/2015, Irvine recorded approximately \$4.3 billion in taxable sales (Board of Equalization, 2014/2015). As shown in Figure 2-13, Irvine captures a significant amount of retail spending in the food services and drinking sector. Irvine’s retail spending leakage in other areas—such as building materials and garden supplies, food and beverage stores, and health and personal care stores—is indicative of a demand for goods offered by those stores but not provided within Irvine.



Source: Esri Business Analyst.

**Figure 2-13** Retail Spending by Industry Sector, Irvine, 2015



## 2.5 Fiscal Conditions

Over the last 15 years, Irvine’s revenue and expenditure per household has trended slightly downward. This trend, however, does not necessarily indicate an overall decrease in revenues or service levels. Indeed, inflation-adjusted revenues per household in 2015 were equal to 2000 (\$4,384 per household in 2000 versus \$4,388 in 2015). Expenditure levels, as described below, have varied more, but the overall balance of expenditures and revenue has remained.

Since 2000, over half of the fiscal years recorded budget surpluses. The fiscal years that ran deficits followed recessions. The years before the 2008-09 recession, 2006 and 2007, had very high municipal revenues. Fees paid by developers to create infrastructure for new development contributed largely to the high municipal revenues. Not surprising, expenditures were high as the City spent the funds on infrastructure. That fact notwithstanding, a straight-line trend projection shows revenues remaining above expenditures through 2020.

Sales tax, property tax, and hotel occupancy tax are the main sources of revenue for the city today and will continue to be important. All of these correlate with growth in population, jobs, income, tourism, and property values. Property tax, a major source of income, has been decreasing per household because more households are in multi-family residences; in 2000, 64 percent of households were single family, while in 2015, 56 percent were single family. Multi-family housing is cheaper per household and so creates less property tax revenue.

Expenditures stabilize to some extent once a city develops and major infrastructure systems are in place and maintenance is programmed into a capital improvement and replacement plan. Public safety, public works, community services, and general government are the largest consistent expenditures, and have remained consistent in Irvine. Probably one of the larger unique expenditures at this current juncture for Irvine is the Orange County Great Park, but this is a temporary expenditure as the Great Park continues its construction.

The City also keeps a contingency reserve equal to 20 percent of the adopted budget, and plans to have its unfunded pension liability at 98 percent funded by 2023. These measures will allow Irvine to maintain fiscal stability well into the future, all other things being equal.

## 2.6 Opportunities and Constraints

Over the last decade, Irvine has experienced significant housing, population, and employment growth. Past trends may not necessarily continue, and the community may choose a new path for growth. Through the General Plan update, the City will face new opportunities and constraints to consider for the future.

### 2.6.1 Opportunities

**Changing Market Demand.** Irvine's high growth rate will likely continue as growth continues in all of Southern California; the California Department of Finance forecasts that Southern California will add 2.9 million residents from 2015 to 2035. With its central location, good access to the regional transportation system, a significant job base, and renowned education system, Irvine will continue to see a high demand for housing and greater infill as larger vacant sites decline.

**Younger Population.** Irvine has a relatively young population, due in part to the presence of UC Irvine. These facts underscore a continued increase in demand for rental housing. If trends continue, approximately half of Irvine's total housing will be multifamily. Given the higher immigrant population, the City could consider the need for multigenerational housing. Developers are beginning to design new housing products to specifically accommodate several generations.

**Household Income.** Households in Irvine have relatively higher household incomes than households in the rest of Orange County and Southern California. With higher incomes, residents have the potential to generate more sales tax revenues and are more able to afford user fees for public services. Expansions of retail and other methods could be used to help capture more revenue from taxable sales.

**Educational and Health Services.** Irvine's economy has historically provided fewer jobs in the health care sector than comparison areas. This fact has dramatically changed with expansions and increased employment at Hoag, Kaiser, and other health care providers. Moreover, employment in education has increased and should continue with projects at UCI, planned primary and secondary schools, and potential expansion of other schools in Irvine. Education and health care should continue as a growth opportunity as the City builds out.



## 2.6.2 Constraints

**Retail Demand.** Irvine is a regional retail destination. The Market Place and the Irvine Spectrum already attract customers from other cities. However, Irvine is still vulnerable to threats—new retail developments in adjacent cities and e-commerce. To remain competitive in the regional marketplace, Irvine should encourage more experience-oriented shopping, such as entertainment, dining, food, and beverage. Just providing the same retail chains in the same strip-center or shopping-mall environment that is available in other areas will not be sustainable over the next 20 years. Retail destinations in Irvine will need to serve niche markets that are underserved elsewhere and provide social experiences that cannot be replicated on the internet.

**Limited Land Supply.** With limited developable land, the City will need to look critically at its remaining land assets and establish General Plan strategies to maximize long-term value. This challenge and constraint are common to all communities approaching buildout in the foreseeable future. This may involve reconsidering potential sites for reimaging, conversion to mixed uses, or intensification where such land use changes benefit Irvine and the surrounding neighborhoods. However, housing demand will continue to compete for remaining land.

**Jobs-Housing Imbalance.** A high number of people commute into Irvine for work, and housing costs in the City are higher than the regional average. Providing an adequate supply of housing that is affordable to those with an average and even above average salary is a significant challenge. The imbalance of number of jobs to affordable housing will continue to constrain economic growth as longer commutes limit productivity and cause heavy traffic congestion.

**Irvine Business Complex.** An area of special interest is the Irvine Business Complex (IBC). This area contains 40 percent of the jobs in Irvine, but about 3,500 households. The IBC is very different than the rest of Irvine in terms of jobs-housing imbalance and land use. The unique commercial, housing, and industrial needs of the IBC represent an opportunity for growth, but the scarce amount of land and traffic allowances limit this growth. A separate, forthcoming report addresses the issues and opportunities available in the IBC.

# Chapter 3.

## Land Use

### 3.1 Introduction

The land use pattern in Irvine is unlike that in most Southern California cities. Rather than a collection of indistinguishable subdivisions connected by commercial strip-lined arterial corridors, the City is a carefully curated collection of villages, most organized around a school, park, public facility, or shopping center and comprising a balanced mix of uses. These neighborhoods are accessed by a highly connective web of major arterial streets. The City's unique land use pattern is due to its master-planned nature—one landowner planned most of the City.

Beginning in the 1960s, the Irvine Company began developing tracts of land formerly used for ranching and agriculture. The timing and design of each new planning area were planned with the overall design of the City in mind and with the intention of preserving a high quality of life and character. Irvine's land use pattern is distinguished by "planning areas," defined as large districts that are generally master planned. The City's planning areas are linked by streets and a series of off-road hiking, riding, and bicycling paths. This planning area framework is a product of the original vision for the City, developed by its first planners in 1973.

Within these planning areas, Irvine is designed as a series of villages, each enhanced to lend individuality, uniqueness, and a "sense of place." The adoption of the City's second general plan in 1982 reinforced the continued development of villages. Each village was designed around a common theme and included residential, commercial, industrial, and agricultural land uses. They were built in a phased plan that encouraged compact urban form, which has minimized the costs of providing utilities and streets, preserved open space, and promoted City unity.

This chapter describes the City's built environment, its general planning and zoning districts, and the regulatory background that continues to shape the development of Irvine.



## 3.2 Regulatory Setting

### 3.2.1 General Plan Law

California Government Code Section 65300 regulates the substantive requirements of general plans. As stated in Chapter 1, *Introduction*, state law requires each city to adopt a general plan “for the physical development of the ... city, and any land outside its boundaries which bears relation to its planning.” The California Supreme Court has called the general plan the “constitution for future development.” The general plan expresses a community’s development goals and embodies public policy relative to the distribution of future land use, public and private.

State law requires that the plan take a long-term perspective (typically 15 to 25 years). The general plan projects conditions and needs into the future and establishes long-term policy for day-to-day decision making. Policies of the general plan should underlie most land use decisions. Subdivisions, capital improvements, development agreements, and other land use actions must be consistent with the general plan. In general law cities, zoning and specific plans must conform to the general plan. Irvine, however is a “charter law” city, which means that the local government is guided by its own adopted charter document.

General plans must maintain internal consistency; no policy conflicts can exist, either textual or diagrammatic, between the components of a general plan. The internal consistency requirement has five dimensions:

- **Equal Status among Elements.** All elements of the general plan have equal legal status.
- **Consistency between Elements.** All general plan elements, whether mandatory or optional, must be consistent with one another.
- **Consistency within Elements.** Each element’s data, analyses, goals, policies, and implementation programs must be consistent with and complement one another.
- **Area Plan Consistency.** All principles, goals, objectives, policies, and plan proposals in an area or community plan must be consistent with the overall general plan.
- **Text and Diagram Consistency.** The general plan’s text and its accompanying diagrams must be in agreement.

### 3.3 Existing Land Use

Existing land uses in Irvine are shown in Table 3-1. These are “on the ground” land uses that currently occupy parcels as of 2014—not the “planned” land uses identified in the current general plan (see Table 3-3 for existing general plan land use designations) or uses permitted on the parcels by the zoning ordinance (see Table 3-5). Existing land uses are based upon information collected periodically from the Southern California Association of Governments for use in determining demographic projections for the Regional Transportation Plan.

In Irvine, existing land uses, current general plan land use designations, and zoning are generally highly correlated. For example, single-family residential subdivisions are generally in Low Density or Medium Density land use designations and in (2.2) Low Density Residential or (2.3) Medium Density Residential zoning districts. However, discrepancies do exist. For example, a parcel that is currently vacant or used for agricultural purposes may be designated for more urbanized land uses, such as residential or commercial uses.

**Table 3-1  
Existing Land Use Summary**

Land Use	Acres	Percent of Total Area
<b>Conservation and Open Space</b>		
Agriculture	1,323	2.8
Open Space and Recreation	7,570	16.0
Great Park	3,048	6.4
Water	57	0.1
<b>Residential</b>		
Rural Single Family Residential	2	<0.1
Single Family Residential	3,655	7.7
Multi-family Residential	1,437	3.0
Multi-family Townhome/Condo	1,779	3.8
Mobile Home Residential	43	0.1
<b>Commercial</b>		
Commercial Retail	638	1.3
Commercial Lodging	57	0.1
Commercial Other	144	0.3
Regional Shopping Center	220	0.5



**Table 3-1  
Existing Land Use Summary**

Land Use	Acres	Percent of Total Area
<b>Business/Industrial</b>		
Commercial Office	2,830	6.0
Light Industrial	1,298	2.7
Heavy Industrial	12	<0.1
Wholesaling and Warehousing	93	0.2
<b>Institutional</b>		
Community Facilities	19	<0.1
Public Facilities	80	0.2
Religious Facilities	180	0.4
Medical and Special Care Facility	69	0.1
Education	1,777	3.8
Special Use Facility	96	0.2
<b>Other</b>		
Transportation, Communication, & Utilities	1,318	2.8
Right-of-Way	7,223	15.2
Easement	2,550	5.4
Flood Control Channel	488	1.0
Under Construction	843	1.8
Vacant	8,519	18.0
<b>Total:</b>	<b>47,367</b>	<b>100%</b>

*Source: Southern California Association of Governments, 2014.*

*Note: These land uses are continually changing based on SCAG surveys and building activity in the community. The land uses shown here are estimates and may not reflect the exact uses of land in Irvine.*

Table 3-1 shows the City’s great diversity of land uses. While Irvine is known for being a highly desirable place to live with its village-like neighborhoods and great parks and open spaces, the considerable acreage used for businesses, offices, industrial parks, and research facilities—approximately 4,200 acres—also makes it a desirable community for employers. A significant amount of land is currently under construction for residential uses.

## 3.3.1 Planning Framework

Irvine’s land use pattern is distinguished by its 37 “planning areas” (PAs), defined as large districts that are generally master planned. These planning areas are distinguished by distinct employment centers, institutional areas, residential neighborhoods, and an interwoven series of parks and open spaces. Key features of the community are below.

### 3.3.1.1 Employment and Activity Centers

Irvine’s major shopping destinations, educational institutions, medical facilities, industrial parks, and other employment centers are concentrated along Irvine’s main transportation corridors. These nodes are important engines of the City’s and greater region’s economy.

#### Irvine Business Complex, Spectrum, Technology Center, and Industrial Complex

The City offers three primary employment centers. The Irvine Business Complex (PA 36) is home to retail, commercial, office, and light industry. However, multifamily housing has been introduced in the past twenty years—largely oriented to Jamboree Road—in an effort to transition the area into a vibrant mixed use district. Eastern Irvine is anchored by the Irvine Spectrum Center (PA 33), a large outdoor shopping and entertainment center surrounded by office towers, office parks, high-density residences, and hotels. To the northeast, the Irvine Technology Center (PA 32) offers office parks, research and technology campuses, and big-box retail. East of the Great Park is the Irvine Industrial Complex (PA 35), an area dominated by office parks and light industry.

#### Neighborhood Commercial

Although Irvine’s landscape is defined by its major employment centers, neighborhood commercial opportunities are equally valued by residents. It is these centers that provide a range of services desired by residents living within a village. In some cases, the land uses are restaurants and grocery stores; in others, the predominant land use may be smaller professional offices or health care. Neighborhood commercial may be located at the intersection of several roadways or located along a corridor. In either case, these commercial uses lend a character to each village and are valued by residents.



Neighborhood commercial uses



### 3.3.1.2 Institutional Uses: UC Irvine

Irvine is home to UCI, a world-renowned educational institution. The area including and surrounding UCI is devoted to education, research, health care, and commerce. Many of these land uses are part of the university. Surrounding neighborhoods are home to many students, faculty, and staff from UC Irvine and Concordia University. For additional information about the impact of Irvine's universities, colleges, and other major public institutions, see Chapter 6, *Public Facilities and Services*. UCI's land use plan is governed by its Long Range Development Plan, last approved by the UCI Board of Regents in 2007, which guides the long term development of the campus through 2025.



Turtle Ridge Neighborhood

### 3.3.1.3 Residential Neighborhoods

As noted above, the City of Irvine is made up of numerous planning areas, most of which are residential-oriented, village-like neighborhoods that define the character of the community. These neighborhoods are largely concentrated in a north-south corridor that spans the central third of the City. They include a substantial number of detached, single-family residential neighborhoods, but also areas with clustered small-lot single-family housing and multifamily residential communities. Lower density residential areas are primarily at the City's northern and southern edges. New neighborhoods are also being built in the northern areas of Irvine and around the Great Park.

### 3.3.1.4 Parks and Open Space

Parks and open space comprise one third of all land in Irvine and are an important and valued part of Irvine's character and quality of life. Between its high number of well-maintained active recreational facilities and natural open space areas, Irvine provides exceptional access and opportunities for outdoor activity. Neighborhood and community-scale parks are evenly distributed throughout the City. Larger city parks include Bill Barber Park and Heritage Park, among others. County regional parks include Mason Park and the Orange County Great Park. Irvine has also set aside considerable land for permanent open space for passive recreational purposes and habitat protection. Chapter 8, *Open Space and Conservation* and Chapter 9, *Parks and Recreation*, describe these park and open space assets in greater depth.



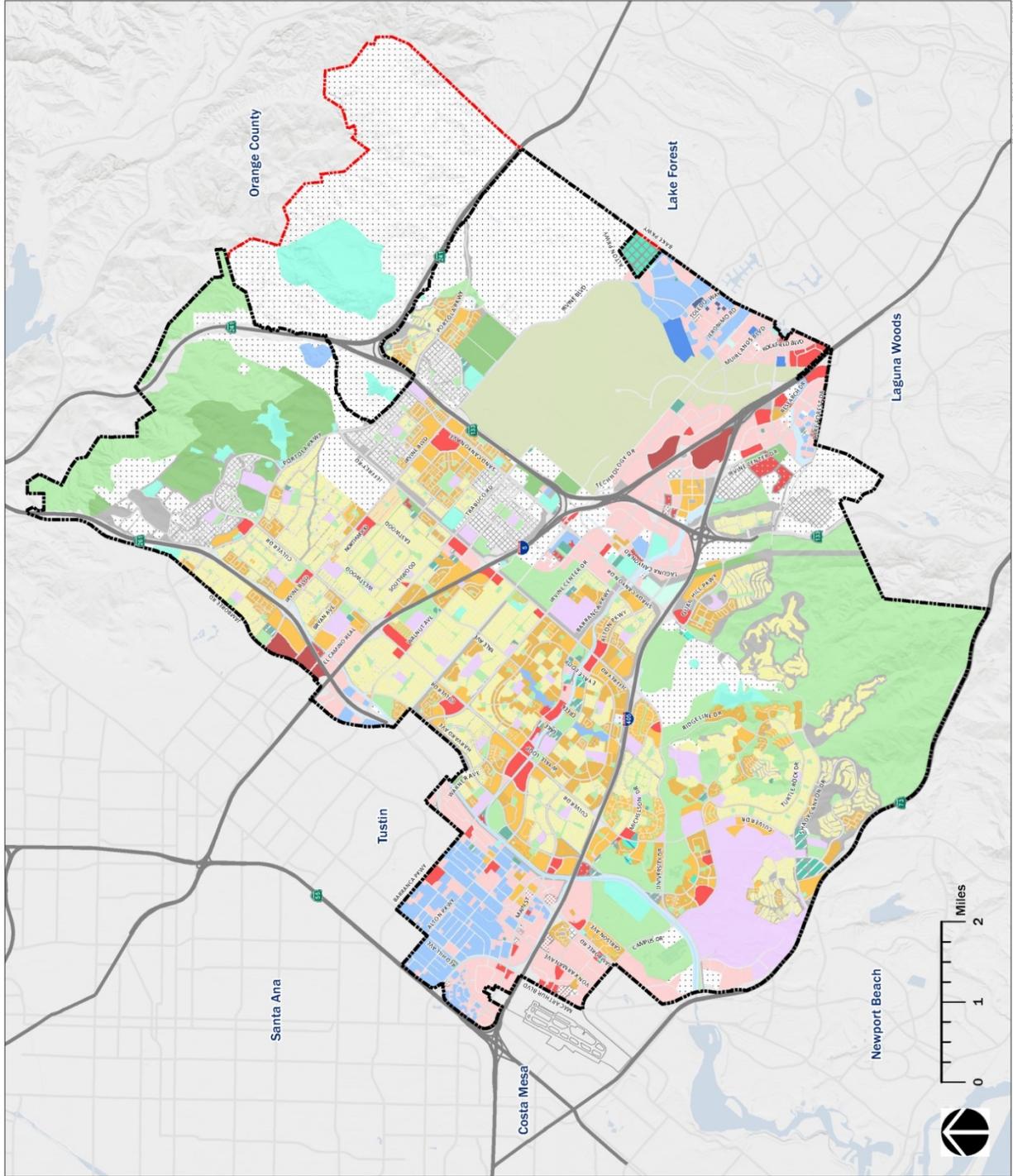
Woodbridge Neighborhood

Figure 3-1

# EXISTING LAND USE

## LEGEND

- Residential**
- RSFR - Rural Single Family Residential
- SFR - Single Family Residential
- MHR - Mobile Home Residential
- MFR - Multi-Family Residential
- MFT - Townhome/Condo
- Commercial**
- CO - Commercial Office
- CL - Commercial Lodging
- CR - Commercial Retail
- OC - Commercial Other
- RSC - Regional Shopping Center
- Facilities**
- TCU - Transportation, Communication, And Utilities
- MCI - Medical Care Institutions
- PF - Public Facilities
- SCF - Special Care Facility
- SUF - Special Use Facilities
- RF - Religious Facilities
- CF - Community Facilities
- Education**
- EDU - Education
- Industrial**
- LI - Light Industrial
- HI - Heavy Industrial
- WW - Wholesaling And Warehousing
- Open Space / Agriculture**
- GP - Great Park
- AG - Agriculture
- OS/R - Open Space and Recreation
- Misc**
- FC - Flood Control Channel
- W - Water
- ROW - Right-of-Way
- ESMT - Easement
- V - Vacant Undeveloped
- UC - Under Construction
- City Boundary
- Sphere of Influence



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### 3.4 Existing General Plan

The regulatory context for the general plan is described in Chapter 1, *Introduction*, of this background report.

#### 3.4.1 General Plan Elements

The existing Irvine General Plan was adopted on March 9, 1999, and consists of 14 topical elements, as listed in Table 3-2. These include the 7 state-mandated elements—conservation and open space were combined—and additional elements that the City developed to address topics that are important in Irvine.

**Table 3-2**  
Existing Irvine General Plan Elements

Required Elements	Additional Elements
<ul style="list-style-type: none"> <li>• Land Use</li> <li>• Circulation</li> <li>• Housing</li> <li>• Noise</li> <li>• Safety</li> <li>• Conservation and Open Space</li> </ul>	<ul style="list-style-type: none"> <li>• Seismic</li> <li>• Cultural Resources</li> <li>• Public Facilities and Services</li> <li>• Integrated Waste Management</li> <li>• Energy</li> <li>• Parks and Recreation</li> <li>• Growth Management</li> <li>• Irvine Business Complex</li> </ul>

The purpose of each element is described below:

- **Land Use.** The land use element seeks to protect and enhance the quality of life in the community. Land use policies determine how land is developed; they also guide and resolve land use issues and constraints. The land use element includes a land use plan that maps where specific land uses are desired.
- **Circulation.** The circulation element describes Irvine’s existing circulation system, including air traffic, roads, trails, and public transit. It also identifies trends and policies relating to the development of a balanced, multimodal circulation system.
- **Housing.** The housing element is intended to provide for safe and decent housing for all economic segments of the City. The element reflects state regulatory requirements pertaining to



the provision of affordable housing, including its share of the region's housing growth (see Chapter 4, *Housing*, for more information). In addition to identifying housing needs in Irvine related to income, family status, job status, and family size, the element identifies detailed programs to meet these needs.

- **Seismic.** The seismic element identifies seismic hazards such as earthquake faults and unstable soils. Its goals, policies, and programs are interrelated with those in the safety element and are aimed at minimizing the loss of life, disruption of goods and services, and destruction of property associated with earthquakes.
- **Cultural Resources.** This element recognizes the importance of historical, archaeological, and paleontological resources in Irvine and establishes a process for their early identification, consideration, and where appropriate, preservation.
- **Noise.** The noise element addresses unwanted noise that is annoying or unsafe. Policies aim to minimize noise impacts, including noise generated by aircraft, railroads, automobiles, and stationary sources. Emphasis is devoted to the relationship between noise and land use compatibility.
- **Public Facilities and Services.** This element memorializes the City's goal to provide "a full range of necessary public facilities and services that are convenient to users, economical, reinforce City and community identity, and reflect the participation of citizens." The element includes guidelines and standards for public services, and those provided by other agencies, such as fire, library, and school services.
- **Integrated Waste Management.** Integrated waste management is the system for reducing, collecting, recycling, and disposing of municipal and hazardous waste products. The policies in this element encourage reduction of solid waste generation and increased recycling.
- **Energy.** The energy element promotes energy conservation and the use of renewable energy sources in Irvine. The element provides a basis for the City's long-range energy

planning, including measures aimed at reducing overall consumption of electricity and natural gas. Policies promote alternative modes of transportation, retrofitting of energy inefficient buildings, and streamlining of City operations.

- **Safety.** This element provides guidelines to protect the community from fire, flood, geological, and aircraft hazards. Policies are designed to minimize safety risks associated with these hazards and ensure that adequate response resources are available should a disaster occur.
- **Parks and Recreation.** The parks and recreation element addresses the City's goal of providing park and recreational opportunities to all residents. The element identifies the City's park space standards for new development and identifies policies that implement the City's park dedication ordinance.
- **Conservation and Open Space.** This element aims to maintain and preserve natural open spaces in the City. It includes an inventory of existing open space areas, identifies policies that protect sensitive wildlife habitat, and outlines participation in the Orange County Natural Communities Conservation Plan/Habitat Conservation Plan. Special attention is devoted to recreational areas, agricultural resources, and water sources.
- **Growth Management.** This element is designed to ensure that development is planned in tandem with circulation and public facilities. The element is partially in response to a 1990 countywide traffic improvement and growth management ordinance. Policies address phasing of development, balance between residential and nonresidential uses, and relationship between transportation infrastructure and land use.
- **Irvine Business Complex.** This element formally establishes goals and objectives for development consistent with the IBC Vision Plan and Mixed Use Overlay Zone planning process conducted by the City between 2005 and 2010. Policies address the integration of housing into an area historically used for only nonresidential land uses. The needs of new residents are addressed, such as those related to transportation and open space, as is the need for context-sensitive design.



### 3.4.2 Existing General Plan Land Designations

Irvine’s General Plan allows a wide diversity of land uses, appropriate for a large urban community. Table 3-3 lists uses of land in Irvine according to the July 2015 Supplement of the Irvine General Plan.

**Table 3-3  
Existing General Plan Land Use Designations**

Designation	Acres	% of Total Acreage, Not counting ROW
<b>Conservation and Open Space</b>		
Agriculture	709	1.6
Commercial Recreation	60	0.1
Orange County Great Park	4,519	10.0
Preservation	11,022	24.3
Recreation	2,959	6.5
Water Bodies	206	0.5
<b>Residential</b>		
Estate Density (0-2 units/acre)	1,046	2.3
Low Density (0-5 units/acre)	3,109	6.8
Medium Density (0-10 units/acre)	8,429	18.6
Medium High Density (0-25 units/acre)	2,675	5.9
High Density (0-40 units/acre)	208	0.5
<b>Commercial/Business/Industrial</b>		
Neighborhood Commercial	150	0.3
Community Commercial	867	1.9
Regional Commercial	545	1.2
Research/Industrial	3,154	6.9
Urban/Industrial	2,764	6.1
Multi-use	481	1.1
<b>Institutional</b>		
Educational	2083	4.6
Public Facilities	366	0.8
Military	36	0.1
<b>Total</b>	<b>45,388</b>	<b>100%</b>
Freeway/Toll Road ROW	2,024	
<b>Total</b>	<b>47,412</b>	<b>100%</b>

Source: City of Irvine General Plan, Supplement 9, August 2015.

## 3.4.2.1 Existing Land Use Descriptions

### Conservation and Open Space

- **Agriculture.** This designation identifies land utilized for commercial nurseries and for the production of food, including the growing of crops or grazing of animals on natural prime or improved pasture land. These include Tanaka Farms, commercial nurseries, and other sites.
- **Commercial Recreation.** This land use category includes recreational and leisure time activities such as amusement parks and miniature golf courses.
- **Orange County Great Park.** This category allows development of the Orange County Great Park and other cultural and institutional uses at the former MCAS El Toro site. This includes habitat preservation; conservation and open space; parks and recreation; education, institutional, and other public-oriented land uses; and opportunities for agriculture, research and development, commercial, transit-oriented, and housing.
- **Preservation.** This designation identifies lands that contain visually significant ridgelines, biotic communities of high value, geologic constraints, and cultural resources that are desirable for permanent preservation. They have also been amassed in a manner that, overall, is more protective of natural resources than could be achieved incrementally with individual projects. Scientific research, transition zones, flood control facilities, and other similar uses are allowed in this category.
- **Recreation.** This designation contains uses primarily for active recreation that is enjoyed by the immediate and surrounding communities. City-owned parks, regional parks, golf courses, and other similar uses are allowed in this category.
- **Water Bodies.** This designation identifies public and privately owned reservoirs and lakes that provide water resources and opportunities to develop water-related recreation activities. Irvine has several dams and reservoirs, many of which are owned by the Irvine Ranch Water District.



Orange County Great Park



## Residential

- **Estate Density (0–1 units/acre).** This level of density is intended for the development of large detached single-family homes in the hillside areas of the City.
- **Low Density (0–5 units/acre).** This level of density is intended for the development of attached and conventional detached housing and other appropriate uses, such as schools and parks, compatible with single-family neighborhoods.
- **Medium Density (0–10 units/acre).** This level of density is intended for attached and conventional detached housing and other types of residential uses that have open space characteristics similar to single-family neighborhoods.
- **Medium-High Density (0–25 units/acre).** This level of density is intended for the development of multifamily housing with on-site recreation areas for common use.
- **High Density (0–40 units/acre).** This level of density is intended for the development of multifamily housing with on-site recreation areas for common use.

## Commercial and Multi-use

- **Neighborhood Commercial.** This land use category provides convenience shopping opportunities such as dry cleaners, grocery stores, barber shops, restaurants, and similar types of uses for the surrounding planning area.
- **Community Commercial.** This category includes automobile service, retail, professional offices, commercial recreation, service businesses, and similar types of uses. Research and development uses are conditionally permissible if compatible with surrounding land uses.
- **Regional Commercial.** This category includes land uses intended to serve a broad population base with a wide variety of services. Businesses in this designation include major department stores, specialty shops, professional offices, hotels and motels, and institutional and government uses.

- **Multi-use.** This includes uses that are high intensity and urban in character. Typical uses include medium to high density residential, commercial, institutional, and offices.

## Business and Industrial

- **Research/Industrial.** This category includes uses intended for the manufacturing, research and development, storage, and distribution of materials or products; administrative, professional, and business offices associated with manufacturing uses; and employee-oriented retail services.
- **Urban/Industrial.** This land use category provides for offices, industry, and support commercial mixed with high-density housing and a variety of activities. Typical uses are professional/medical offices, industrial manufacturing, research and development, support service retail, restaurants, multifamily housing, and hotel/motels. The IBC element of the general plan outlines the framework for future development of the IBC as a mixed-use community.

## Institutional

- **Educational Facilities.** This land use category includes public and private schools and support facilities from kindergarten through college/university. Dormitory uses associated with college/university facilities are allowed under this designation.
- **Public Facilities.** This land use category includes government, public, quasi-public, and community-owned facilities. It also includes uses that may be privately owned but are nonprofit and generally open to the public. Typical uses would be post offices, libraries, museums, places of worship, child care centers, fire facilities, police stations, government buildings, nonprofit housing, utilities, and other related uses.

## Military

- **Military.** The Military land use category currently shown on the land use element map shall be retained in the general plan until such time as the City's planning efforts establish new and compatible land uses for MCAS Tustin.



### 3.4.2.2 Geographic Distribution of Land Use Designations

Irvine’s land use pattern is predominantly the product of long-term, large-scale master planning. As a result, existing land uses are generally consistent with the general plan. The geographic distribution of general plan designations are described below and shown in Figure 3-2.



Spectrum Village Mixed-Use

- **Conservation and Open Space.** Other than neighborhood and community parks, Conservation and Open Space designations are largely applied to the edges of Irvine. The largest of these areas designated for preservation include foothills of the Santa Ana Mountains (PA 1 and PA 3), the Orange County Great Park (PA 51), and large portions of the San Joaquin Hills (PA 28). Areas designated for recreation are distributed relatively evenly throughout Irvine, while the Agriculture designation is concentrated in Orchard Hills (PA 1) and near the Great Park.
- **Residential Uses.** Residential uses are dominated by Medium Density (0–10 acres) housing. The lowest density category, Estate Density Residential, is limited to Shady Canyon (PA 22), and Low Density Residential is primarily concentrated in Orchard Hills (PA 1), Turtle Rock (PA 21), and Hidden Canyon (PA 18 South). Medium High Density designations are relatively evenly distributed throughout the City, as are the few areas designated for High Density Residential.
- **Mixed Uses.** The Multi-use designation was established for “uses which are high intensity and urban” in acres scattered throughout Irvine. The largest area designated Multi-use is on either side of the Eastern Transportation Corridor (SR-133) in PA 40 adjacent to the western edge of the Orange County Great Park, and smaller multi-use area pockets exist along the Alton and Barranca Parkway corridors.
- **Commercial.** The land use plan designates parcels throughout the City for Neighborhood Commercial uses and Community Commercial uses. These areas are strategically placed near all residential areas. The Regional Commercial designation is concentrated in the area that contains the Irvine Spectrum (PA 33) and the area that contains the Irvine Marketplace shopping

center adjacent to Tustin (PA 4). It should be noted that commercial uses are allowed in other land use designations.

- **Business/Industrial.** Two industrial designations allow a wide range of uses, including office, light industrial, manufacturing, research and development, and commercial uses. The Research/Industrial designation is applied to over 3,000 acres concentrated in the southeastern quadrant of the City near the Irvine Spectrum. The Urban/Industrial designation covers the 2,600-acre Irvine Business Complex (PA 36). Unlike the other industrial designation, this designation allows residential uses.
- **Institutional.** The institutional designation allows educational institutions and other public institutions. Locations for schools are distributed throughout the City, often at the center of neighborhoods. Other Educational Institutions include UC Irvine (PA 50), Concordia University (PA 21), and Irvine Valley College (PA 12). Parcels designated for Public Facilities include the Irvine Civic Center (PA 14), Michelson Water Reclamation Plant (PA 23), and a Southern California Edison facility in PA 31.
- **Orange County Great Park.** This general plan includes uses intended to provide for the development of regionally significant conservation and open space, parks and recreation, educational facilities, and other public-oriented land uses, integrated with other privately developed, multi-use, residential, commercial, and industrial properties at the former Marine Corps Air Station El Toro site.
- **Military.** Only a few parcels in Irvine are designated for Military uses. They are adjacent to the Peters Canyon Channel and are remnants of the former MCAS-Tustin. These parcels are vacant, under development, or used for nonmilitary purposes such as educational institutions.
- **Transportation.** Irvine is crossed by major transportation corridors—the San Diego Freeway (I-405), Santa Ana Freeway (I-5), Eastern Transportation Corridor (SR-133/SR-162), and Foothill Transportation Corridor (SR-241). The land use plan acknowledges the sizable acreage devoted to these corridors by designating them for transportation uses.



University of California, Irvine



I-405 at Jamboree Road



### 3.4.2.3 Overlay Designations

In addition to the broad land use categories discussed above, the general plan land use plan places some areas within “overlay” designations.



Shady Canyon Trail

- Golf Course Overlay (Zoning District 1.8). This category provides the opportunity for golf courses within any residential land use category underlying the Golf Course Overlay.
- Landfill Overlay (Zoning District 1.7). The district provides regulations for the operation and post-closure development of Class III solid waste sites within specific areas underlying the Development Reserve—Landfill Overlay
- Hillside Overlay District. The district provides regulations for the development of areas which, due to their topography, require special consideration to substantially maintain natural character, environmental, and aesthetic values
- NCCP Overlay and Reserve Linkage. This area allows for areas protected under the Central/Coastal Orange County Natural Communities Conservation Plan/Habitat Conservation Plan that are designed to protect sensitive habitat and species.

Overlay designations acknowledge that, even if the underlying designation is appropriate for that area, special consideration should be given to local conditions. For example, the long-term plan for the Frank R. Bowerman Landfill is open space; but until the facility closes, it is meant to be used for solid waste disposal. Two overlay designations in Irvine relate to the Natural Community Conservation Planning program. The affected areas are planned for open space preservation but also function as critical habitat for protected species. The Golf Course Overlay indicates that the Shady Canyon Planning Area is appropriate for Estate Density residential uses interspersed with fairways.

Figure 3-2 maps the current General Plan land use designations.

Figure 3-2

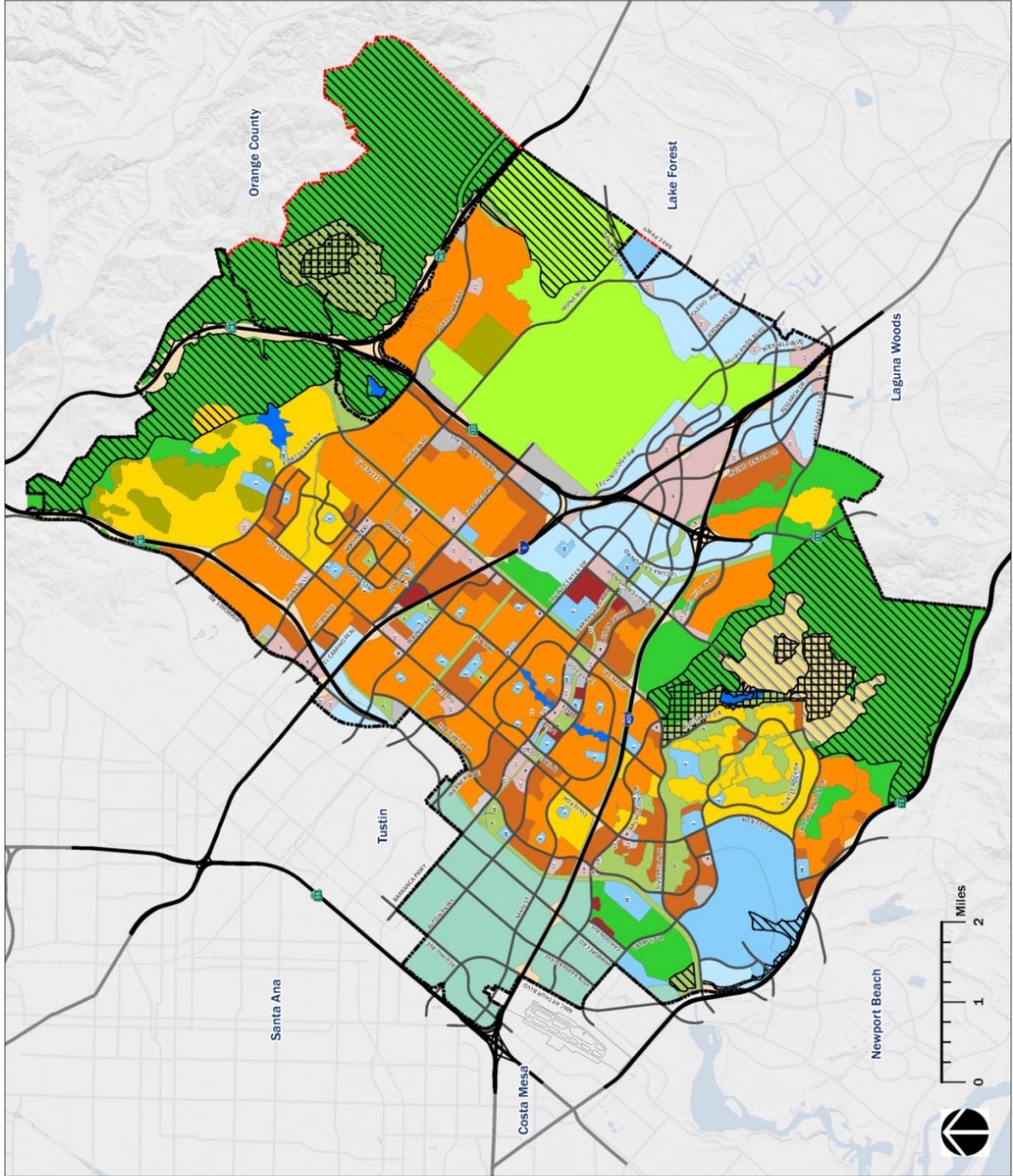
# EXISTING GENERAL PLAN LAND USE DIAGRAM

## LEGEND

MILITARY <sup>(1)(2)</sup>	CONSERVATION OPEN SPACE	Agriculture	Residential Estate <sup>(4)</sup>	Business/Industrial Research and Industrial <sup>(4)</sup>	Institutional Educational Facilities <sup>(2)(3)(4)</sup>
MULTI-USE <sup>(1)(2)</sup>	Preservation	Recreation	Low Density <sup>(4)</sup>	Urban and Industrial <sup>(1)(2)</sup>	Public Facilities <sup>(4)</sup>
Orange County Great Park	Water Bodies	Golf Course Overlay	Medium Density <sup>(4)</sup>	Landfill Overlay	Sphere of Influence
<b>COMMERCIAL</b>	NCCP Reserve	NCCP Special Linkage	High Density <sup>(4)</sup>	Military	
Neighborhood Commercial <sup>(4)</sup>					
Community Commercial <sup>(4)</sup>					
Regional Commercial <sup>(4)</sup>					
Commercial Recreational <sup>(4)</sup>					
<b>BUSINESS/INDUSTRIAL</b>					
Research and Industrial <sup>(4)</sup>					
Urban and Industrial <sup>(1)(2)</sup>					
<b>INSTITUTIONAL</b>					
Educational Facilities <sup>(2)(3)(4)</sup>					
Public Facilities <sup>(4)</sup>					

- Notes:
- (1) Land Use authority and corresponding regulatory activities are the responsibilities of the government agencies which own this land.
  - (2) These government agencies are subject to the General Plan requirements contained within the California Government Code sections 65401 and 65402.
  - (3) These Land Use categories also allow residential developments noted in the General Plan text.
  - (4) The Land Use Element Table A-1 establishes and regulates land use building intensity standards. Building intensity standards are allocated by Planning Area.

Source:  
City of Irvine, 2015





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### 3.4.2.4 Buildout Projections of 2015 General Plan

Buildout refers to the total amount of development, existing and future, that could occur in Irvine based on the land use standards and regulations of Supplement 9 to the Irvine General Plan, including maximum residential densities, and the number of acres in a land use designation. Table 3-4 summarizes buildout of the existing general plan.

**Table 3-4  
Buildout of 2015 Irvine General Plan**

Designation	Units	Building Square feet
<b>Residential</b>		
Estate Density (0–2 du/acre)	400	–
Low Density (0–5 du/acre)	10,528	–
Medium Density (0–10 du /acre)	44,512	–
Medium High Density (0–25 du/acre)	33,298	–
High Density (0–40 du/acre)	8,456	–
<b>Multi-Use</b>	8,851	5,740,123
<b>Institutional</b>		
Public Facility	805	4,502,708
Educational Facility		13,012,758
Orange County Great Park	9,500	1,233,000
<b>Industrial</b>		
Urban/Industrial	10,875	48,787,662
Research/Industrial	–	48,728,616
<b>Commercial</b>		
Community Commercial	–	9,213,550
Neighborhood Commercial	–	1,307,370 <sup>1</sup>
Regional Commercial	4,477	8,820,682
Commercial Recreation	–	255,980
<b>Total:</b>	<b>131,702</b>	<b>140,309,449</b>
<b>Additive Building Capacity</b>		
N/A	4,912	1,461,824
<b>Total with Additive:</b>	<b>136,614</b>	<b>141,771,273</b>

Source: Source: City of Irvine General Plan, Supplement 9, August 2015.

<sup>1</sup> The existing general plan shows an additional unallocated 60,000 square feet under the Neighborhood Commercial designation. However, this building space does not increase the maximum building caps for each planning area.



As shown in Chapter 2.0 of this report, Irvine had 90,562 housing units as of 2014. This means that approximately 70 percent of the housing units allowed in the City under the existing general plan have been built. Although notable opportunities for new development capacity remain in Irvine—such as the Great Park Neighborhoods and redevelopment in the IBC—the City is nearing physical buildout. In particular, areas planned for commercial and industrial uses—except a few areas on the periphery of the Great Park site—are almost entirely developed. Once Orchard Hills (PA 1), the Great Park Neighborhoods (PA 51), and the eastern half of Northwood Point (PA 5) are fully developed, most large vacant areas designated for residential uses will be built out.

Using household sizes specified in Supplement 9 of the Irvine General Plan (July 2015) and existing EIRs, the City’s population at buildout is estimated at 312,000. Table 3-5 details population projections.

**Table 3-5  
Estimated Population at Existing General Plan Buildout**

Designation	Units	Residents per Unit	Estimated Population
Estate Density	400	3.10	1,240
Low Density	10,528	2.90	30,531
Medium Density	44,512	2.75	122,408
Medium High Density	33,298	2.25	74,921
High Density	8,456	1.46	12,346
Multi-Use	8,851	1.46	12,922
Institutional	805	1.46	1,175
Urban Industrial	10,875	1.46	15,878
Regional Commercial	4,477	1.46	6,536
Orange County GP <sup>1</sup>	9,500	2.5	23,750
Additive Units	4,903	2.1	10,296
<b>Total:</b>			<b>312,003</b>

Source: Source: City of Irvine General Plan, Supplement 9, August 2015.

<sup>1</sup> Estimated population and household size based on the Draft Great Park Neighborhoods Second Supplemental EIR, July 2012.

<sup>2</sup> This estimate does not include student population from UC Irvine.

### 3.5 Existing Zoning

The City’s zoning ordinance regulates the type, scale, and design of development allowed on a given parcel. While the zoning ordinance includes regulations that apply to all of Irvine, many provisions are related to specific zoning districts. Irvine is a “charter law” city and is guided by its own adopted charter document. This is different from a “general law” city, where the jurisdiction must follow state laws and procedures in all situations. Charter cities have more discretion over local land use issues; Irvine’s zoning is exempt from state requirements for consistency with the City’s general plan.

Irvine’s zoning categories are generally more specific than general plan land use designations, as shown in the greater number of commercial and business/industrial zones. These allow development standards to be more tailored to specific areas of the City. In addition, zoning acreage calculations are based on net acreage, while General Plan calculations are based on gross acreage, which includes adjacent rights-of-way

Table 3-6 lists the zoning districts, associated acreages within each zoning district, and the relative percentage of the City’s total land area.

**Table 3-6  
Existing Zoning**

Zone	Name	Acres	% of Total
<b>Conservation and Open Space</b>			
1.1	Exclusive Agriculture	619.9	1.5
1.2	Development Reserve	89.8	0.2
1.3	Conservation/Open Space Reserve	1,308.0	3.2
1.4	Preservation	11,730.4	28.4
1.5	Recreation	2,030.5	4.9
1.6	Water Bodies	211.4	0.5
1.9	Orange County Great Park	946.6	2.3
<b>Residential</b>			
2.1	Estate Density	1,044.5	2.5
2.2	Low Density	4,412.7	10.7
2.3	Medium Density	5,352.3	13.0
2.4	Medium-High Density	2143.2	5.2
2.5	High Density	21.2	0.1



**Table 3-6  
Existing Zoning**

Zone	Name	Acres	% of Total
<b>Multi-use</b>			
3.1	Multi-use	448.5	1.1
<b>Commercial</b>			
4.1	Neighborhood Commercial	151.7	0.4
4.2	Community Commercial	569.6	1.4
4.3	Vehicle Related Commercial	50.1	0.1
4.4	Commercial Recreation	72.4	0.2
4.5	IBC Regional Commercial	55.0	0.1
4.6	IBC Retail/Office Commercial	32.0	0.1
4.7	IBC Urban Commercial	137.5	0.3
4.8	IBC Garden Commercial	139.0	0.3
4.9	LPC Regional Commercial	85.4	0.2
<b>Business/Industrial</b>			
5.0	IBC Mixed Use	55.3	0.1
5.1	IBC Multi-Use	2023.7	4.9
5.2	IBC Industrial	92.5	0.2
5.3	IBC Residential	102.7	0.2
5.4	General Industrial	1,673.0	4.1
5.5	Medical and Science	886.8	2.2
<b>Institutional</b>			
6.1	Institutional	2383.2	5.8
<b>Military</b>			
7.1	Military	0.0	0.0
<b>Other</b>			
8.1	Trails & Transit Oriented Development	2261	5.5
<b>Total:</b>		<b>41,238.3</b>	<b>100%</b>

Source: City of Irvine Zoning Ordinance, 2015

Note: Zoning does not apply to freeway rights-of-way or the City's sphere of influence. This explains the difference in total acreage between Tables 3-3 and 3-6.

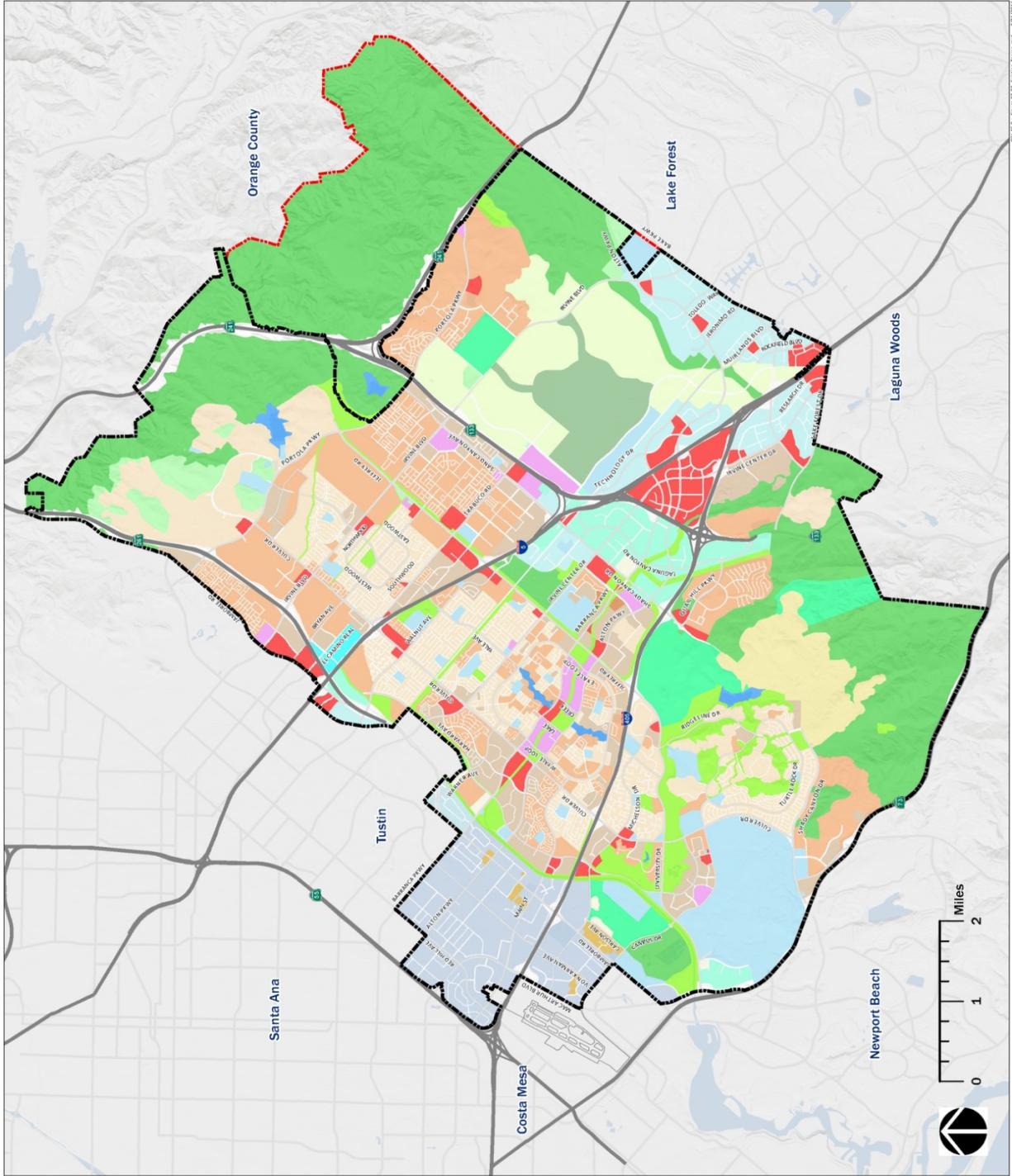
Figure 3-3 on the following page illustrates the City of Irvine's Zoning Map, which shows where specific uses are allowed in the community.

Figure 3-3

# EXISTING ZONING MAP

## LEGEND

- 1.1 - Exclusive Agriculture
  - 1.2 - Development Reserve
  - 1.3 - Conservation/Open Space Reserve
  - 1.4 - Preservation
  - 1.5 - Recreation
  - 1.6 - Water Bodies
  - 1.9 - Orange County Great Park
  - 2.1 - Estate Density Residential
  - 2.2 - Low Density Residential
  - 2.3 - Medium Density Residential
  - 2.4 - Medium-High Density Residential
  - 2.5 - High Density Residential
  - 3.1 - Multi-Use
  - 4.1 - Neighborhood Commercial
  - 4.2 - Community Commercial
  - 4.3 - Vehicle Related Commercial
  - 4.4 - Commercial Recreation
  - 4.5 - Irvine Center Regional Commercial
  - 4.6 - Irvine Center Retail/Office Commercial
  - 4.7 - Irvine Center Urban Commercial
  - 4.8 - Irvine Center Garden Commercial
  - 4.9 - LPC Regional Commercial
  - 5.0 - IBC Multi-Use
  - 5.1 - IBC Multi-Use
  - 5.2 - IBC Industrial
  - 5.3 - IBC Residential
  - 5.4 - General Industrial
  - 5.5 - Medical and Science
  - 5.6 - Business Park
  - 6.1 - Institutional
  - 8.1/8.1A - Trails and Transit Oriented Development
- City Boundary  
 Sphere of Influence



Source:  
City of Irvine, 2015



City of Irvine, 2015  
 Figure 3-3: Existing Zoning Map  
 03/20/2025



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### 3.5.1 Zoning Districts

Irvine’s has established a wide range of zoning districts that are intended to provide further guidance for land use designations in order to implement the land use designations in the general plan and various objectives and policies. Table 3-7 lists each zoning district and describes its purposes along with the primary land uses.

**Table 3-7  
Zoning Districts in Irvine**

Zone	Description
<b>Agricultural and Open Space</b>	
1.1 Exclusive Agriculture	Applies to land designated as agriculture in the City's general plan. Only agriculture and related accessory uses are permitted.
1.2 Development Reserve	Applies to land shown for future development and which is established for agriculture and other low-intensity uses on an interim basis. Allows very limited development to occur prior to establishing a planning area-wide concept and specific zoning, provided that the development is consistent with the agricultural or open space character.
1.3 Conservation/ Open Space	Applies to land shown as future conservation and open space areas. Uses compatible with the preservation category are permitted. This zone is a “holding zone” for land designated under the conservation and open space land use category of the existing general plan.
1.4 Preservation	Applies to lands judged viable for permanent preservation in a natural state with little or no modification. Visually significant ridgelines, biotic communities of high significance, geological constraints, and cultural resources are typical for this category.
1.5 Recreation	Applies to lands suitable for active recreational opportunities and activities for public use and enjoyment. Recreation is distinguished from Preservation by its more intense recreational use, manicured appearance, and improved facilities. Additionally, recreation areas do not necessarily require maintenance of natural resources.
1.6 Water Bodies	Applies to lands identified for public and privately owned water sources for consumptive and recreational use.
1.9 Orange County Great Park	Applies to lands suitable for active and passive recreation and activities for public use and enjoyment. The Great Park is a multi-destination facility that will include educational and recreational activities, including sports fields, museums, gardens, trails, wildlife habitat, and many other public-oriented land uses.



**Table 3-7  
Zoning Districts in Irvine**

Zone	Description
<b>Residential</b>	
2.1 Estate Density Residential	Allows up to 1.0 dwelling units per net acre. Both attached and conventional housing are allowed as long as the density averaged over the entire planning area does not exceed 1.0 du/net acre.
2.2 Low Density Residential	Allows up to 6.5 dwelling units per net acre, which is equivalent to the General Plan Low Density category of up to 5.0 dwelling units per gross acre. Attached and conventional housing and supportive uses (e.g., churches, child care centers) are allowed.
2.3 Medium Density Residential	Allows up to 12.5 dwelling units per net acre as either single-family detached or attached dwelling units. This corresponds to the Medium Density General Plan category of up to 10.0 dwelling units per gross acre.
2.4 Medium-High Density Residential	Allows up to 50.0 dwelling units per net acre and corresponds to the General Plan Medium-High Density category of up to 25 units per gross acre. This category is intended for attached and detached single-family residential units and compatible uses.
2.5 High Density Residential	Allows development up to 50.0 dwelling units per net acre. This corresponds to the General Plan High Density category of up to 40 units per gross acre. Attached and detached residential and compatible uses are allowed.
<b>Mixed Use and Commercial</b>	
3.1 Multi-use	Corresponds to the Multi-use land use category in the general plan. This category allows for a combination of commercial, office, residential, and institutional uses within the same project site.
4.1 Neighborhood Commercial	Provides areas for commercial centers within residential neighborhoods that provide everyday goods and services. The neighborhood commercial area should be convenient to the population it serves.
4.2 Community Commercial	Applies to commercial areas that provide goods and services to serve the needs of one or more planning areas. This category also encourages commercial and office uses that serve industrial or business areas as freestanding uses or centers. These commercial areas should be oriented toward major roads and away from local streets or planning area interiors.
4.3 Vehicle-Related Commercial	Applies to commercial areas that are designed primarily to provide for the sale and servicing of and parts for automobiles and recreational vehicles.
4.4 Commercial Recreation	Provides areas specifically used to provide private, profit-making recreation uses such as theme parks, bowling

**Table 3-7  
Zoning Districts in Irvine**

Zone	Description
	alleys, skating rinks, theaters, and health clubs.
4.5 Regional Commercial	Applies to lands designed for development of a regional shopping mall and other similar commercial uses.
4.6 Retail Office	This category is primarily an extension of the regional commercial uses in the Regional Commercial category and similar commercial uses.
4.7 Urban Commercial	Applies to areas allowing retail and office commercial uses and conditionally permitting residential use in an urban, high-intensity setting.
4.8 Irvine Center Garden Commercial	Allows the same uses as the Urban Commercial category, but the design of the commercial areas is much less intense. Setbacks are greater and allowable height is less than in the Urban Commercial category.
4.9 Lower Peters Canyon Regional Commercial	Facilitates the development of regional commercial uses within Sectors 6 and 10 of Lower Peters Canyon. In addition, it is the intent of this category to allow a wide enough range of ancillary uses to encourage full community utilization and to provide for synergy of compatible commercial activities.
<b>Irvine Business Center</b>	
5.0 IBC Mixed Use	Allows a mix of commercial, retail, and residential uses and restricts the amount of traditional industrial/warehouse uses in other IBC districts. This category encourages mixed-use projects by allowing commercial, office, residential, and institutional uses within the same project site. Specific uses encouraged in this area include those proposed to serve the needs of the residential and employee populations of this district, such as residential, retail, office, schools, parks, libraries, and theatres. Special provisions apply to several conditional uses in this area that generate high levels of traffic.
5.1 IBC Multi-use	Allows a wide variety of uses. Specific institutional uses are especially encouraged in this area, particularly those proposed to serve the needs of the residential and employee populations of this district, such as schools, parks, libraries, and theaters. Special provisions apply to several conditionally permitted commercial uses that generate high levels of traffic.
5.2 IBC Industrial	Preserves a viable industrial base in the IBC and protects nonindustrial land uses from the nuisances and hazards often associated with industrial activities by establishing an exclusively industrial district. The area designated for this district has historically been exclusively industrial and is currently unsuitable for most nonindustrial uses (e.g., residential, retail).



**Table 3-7  
Zoning Districts in Irvine**

Zone	Description
5.3 IBC Residential	Ensures that previously approved but unbuilt residential projects are not threatened by the development of incompatible land uses (e.g., hazardous materials). The regulation is intended, however, to permit the development of nonresidential uses, provided they are compatible with residential development. Special provisions are also included to allow for other uses under certain circumstances.
<b>Other Industrial</b>	
5.4 General Industrial	Reserves an area for uses such as manufacturing, warehousing, and service industries.
5.5 Medical and Science	Allows development of a biomedical/high technology complex combining health care facilities and related businesses, medical research and education, general research and development, and light manufacturing and assembly in one master-planned area.
5.6 Business Park	Reserves an area for business park uses within Planning Area 4 (Lower Peters Canyon).
<b>Institutional</b>	
6.1 Institutional	Applies to land for public and quasi-public facilities such as churches, schools, or utilities.
<b>Military</b>	
7.1 Military	Encompasses all land within the boundaries of the former military bases. Military air operations, training and related enterprises, and support activities served as the foundation for the land uses allowed by the federal government.
8.1 Trails and Transit-Oriented Development	Allows a variety of uses on the same site consistent with the Great Park land use category defined in the general plan. The Trails and Transit Oriented Development district allows for a mix of residential, commercial, recreational, and educational uses that support a multi-use environment.

*Source: Irvine Zoning Code, 2016.*

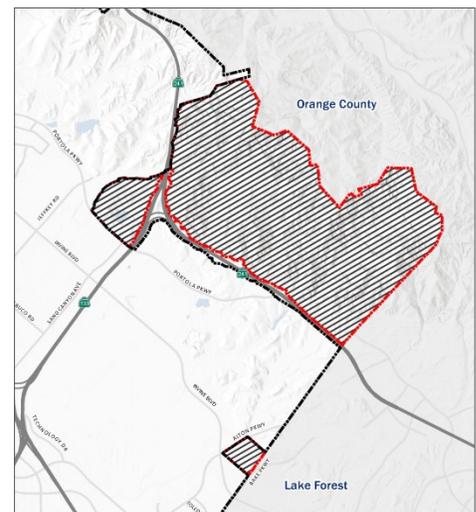
### 3.6 Sphere of Influence

The Orange County Local Agency Formation Commission (OCLAFCO) regulates the formation of local government agencies in Orange County. LAFCO authority is intended to be used to guide the logical formation of boundaries of cities and special districts so that community services are provided in an efficient and effective manner. In addition to approving boundary changes for local agencies, LAFCOs also approve incorporation of cities, prepare reviews of municipal services, and oversee the dissolution or consolidation of special districts. LAFCOs also establish a “sphere of influence” for cities, as discussed below.

A sphere of influence is the geographic area that LAFCO has determined is influenced by that city’s future growth. If a city plans to annex parcels outside of its sphere of influence, it must request an amendment to the sphere of influence prior to filing the annexation request. Irvine’s sphere of influence is largely coterminous with the city, except in two cases.

- The first is 5,300 acres northeast of the city that is bordered by SR-241 and the foothills to the north. This area contains Syphon Reservoir, Bowerman Landfill, portions of Limestone Canyon Regional Park. The Frank R. Bowerman Landfill is designated a Landfill Site, an overlay designation applied to the county general plan’s public facilities land use designation. The County’s Zoning Map designates this area between the General Agriculture (A1) and Open Space (OS) zoning districts.
- The second exception is a 100-acre parcel that is bordered by the City of Lake Forest. The site is home to the James A. Musick Facility, a 1,322-bed minimum security county jail. The site is designated Public Facilities in the county general plan and is zoned General Agriculture (A1) on the county’s zoning map.

Irvine’s sphere of influence areas that fall within the county’s land use authority and the existing land uses that occur in those areas play a significant role with respect to environmental impacts. The future development or preservation of these sites will also play a role in the comprehensive update of the general plan.



Irvine Sphere of Influence



## 3.7 Other Relevant Land Use Plans

### 3.7.1 Airport Land Use Compatibility Plan

Airports generate safety risks, noise, and traffic, making many land uses inappropriate for parcels near airports or under flight paths. Although all projects proposed in Irvine are subject to the City's review, those near John Wayne Airport are also subject to the airport's land use plan and review procedures of the county's airport commission. The Orange County Airport Commission (also known as the Airport Land Use Commission for Orange County) is an advisory body that makes recommendations to the Orange County Board of Supervisors regarding the airport's facilities, operations, and development near the airport.



John Wayne Airport

By WPPilot - Own work, CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=14534061>

The State Aeronautics Act (Public Utilities Code §§ 21670 et seq.) establishes statewide requirements for airport land use compatibility planning. The Airport Environs Land Use Plan (AELUP) for John Wayne Airport is a 20-year land use compatibility plan for the airport to safeguard the general welfare of the inhabitants within its vicinity and ensure its continued operation, and is approved by the Orange County Airport Commission. The plan's purposes are to protect the public from the adverse effects of aircraft noise, ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents, and ensure that no structures or activities adversely affect navigable airspace.

The John Wayne AELUP was last amended in April 17, 2008. John Wayne Airport primarily affects development within portions of the Irvine Business Complex (IBC). The areas directly under the airport's flight path on the north consist almost entirely of office parks, though in the past 10 years, residential uses have been introduced into the area. Figure 7-6 (Chapter 7) shows that most of southwestern Irvine is within the airport's height restriction area. Compliance with applicable height restrictions has limited the IBC to a generally midrise urban character, with taller buildings concentrated along the I-405 outside of identified flight hazard potential areas. Because of the surrounding land uses, flights are strictly regulated to ensure compatibility with urban uses.

The airport will continue to operate in accordance with the JWA Master Plan and subsequent settlement agreement amendments, and the current Airport Layout Plan through the 20-year planning horizon.

## 3.7.2 Regional Government

### 3.7.2.1 Southern California Association of Governments

The Southern California Association of Governments (SCAG) is a joint powers authority and association of local governments that voluntarily convene as a forum to address regional issues. It is the federally designated metropolitan planning organization for the region and a forum for addressing regional issues concerning transportation, the economy, community development, and the environment. The SCAG region encompasses six counties and 191 cities. SCAG is also the regional clearinghouse for projects requiring environmental documentation under federal and state law and reviews proposed development and infrastructure projects to analyze their impacts on regional planning programs. SCAG cooperates with the South Coast Air Quality Management District, the California Department of Transportation, and other agencies in preparing regional planning documents. Many of SCAG's regional planning initiatives relate directly to regional land use, transportation, sustainability, and other topics.

### 3.7.2.2 Regional Housing Needs Assessment

Under state housing law, local jurisdictions must demonstrate that they can accommodate their fair share of the region's housing growth. The Housing and Community Development Department (HCD) estimates the relative share of California's projected population growth that would occur in each county, and these figures are compiled by HCD in a Regional Housing Needs Assessment (RHNA) for each region of California. Where there is a regional council of governments, the HCD provides the RHNA to assign a share to each of its cities and counties. Irvine's RHNA allocation is determined by SCAG. The RHNA is described in greater detail in Chapter 4, *Housing*, but it is important to note how the required provision of affordable multifamily residential housing affects planned land uses in Irvine. Because the City must identify sites that can accommodate specific types and numbers of affordable housing units, the City's land use plans must reflect the applicable capacity. The City complies with this requirement by designating a sufficient number of parcels for higher-density housing. Chapter 4 provides more information about affordable housing in Irvine.



Multifamily housing in Irvine



### **3.7.2.3 Regional Transportation Plan/Sustainable Communities Strategy**



Irvine Transit Center

SCAG updates its RTP/SCS every four years to meet federal and state requirements to improve land use and transportation planning. It is intended to comply with Senate Bill 375, improve public health, and meet the National Ambient Air Quality Standards of the federal Clean Air Act. The RTP/SCS also focuses on encouraging future development in areas most suited to accommodating growth and ensuring that transportation infrastructure will be available to accommodate growth.

#### **HIGH QUALITY TRANSIT AREAS**

The 2016 RTP/SCS identifies certain areas as high quality transit areas (HQTAs), defined as a walkable transit village or corridor within one-half mile of a well-served fixed guideway transit stop and including bus transit corridors where buses pick up passengers every 15 minutes or less during peak commuting hours. The 2016 RTP/SCS supports land use patterns that focus about half of household and employment growth in the region into HTQAs. In Irvine, the HQTAs primarily consist of the rail corridor used by Amtrak and Metrolink that converge near the Spectrum, an established activity node of retail, office, and light industrial uses served by bus and trains. With proximity to Metrolink and the development of numerous residential projects, the area has gradually become a more transit-oriented district.

#### **TRANSIT PRIORITY AREA**

Public Resources Code § 21099 states that “aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site within a transit priority area shall not be considered significant impacts on the environment.” Under § 21155.4, the exemption applies if a project meets all of these criteria: 1) it is a residential, employment center, or mixed-use project; 2) it is in a transit priority area; 3) the project is consistent with a specific plan for which an EIR was certified; and 4) it is consistent with an adopted sustainable communities strategy or alternative planning strategy.

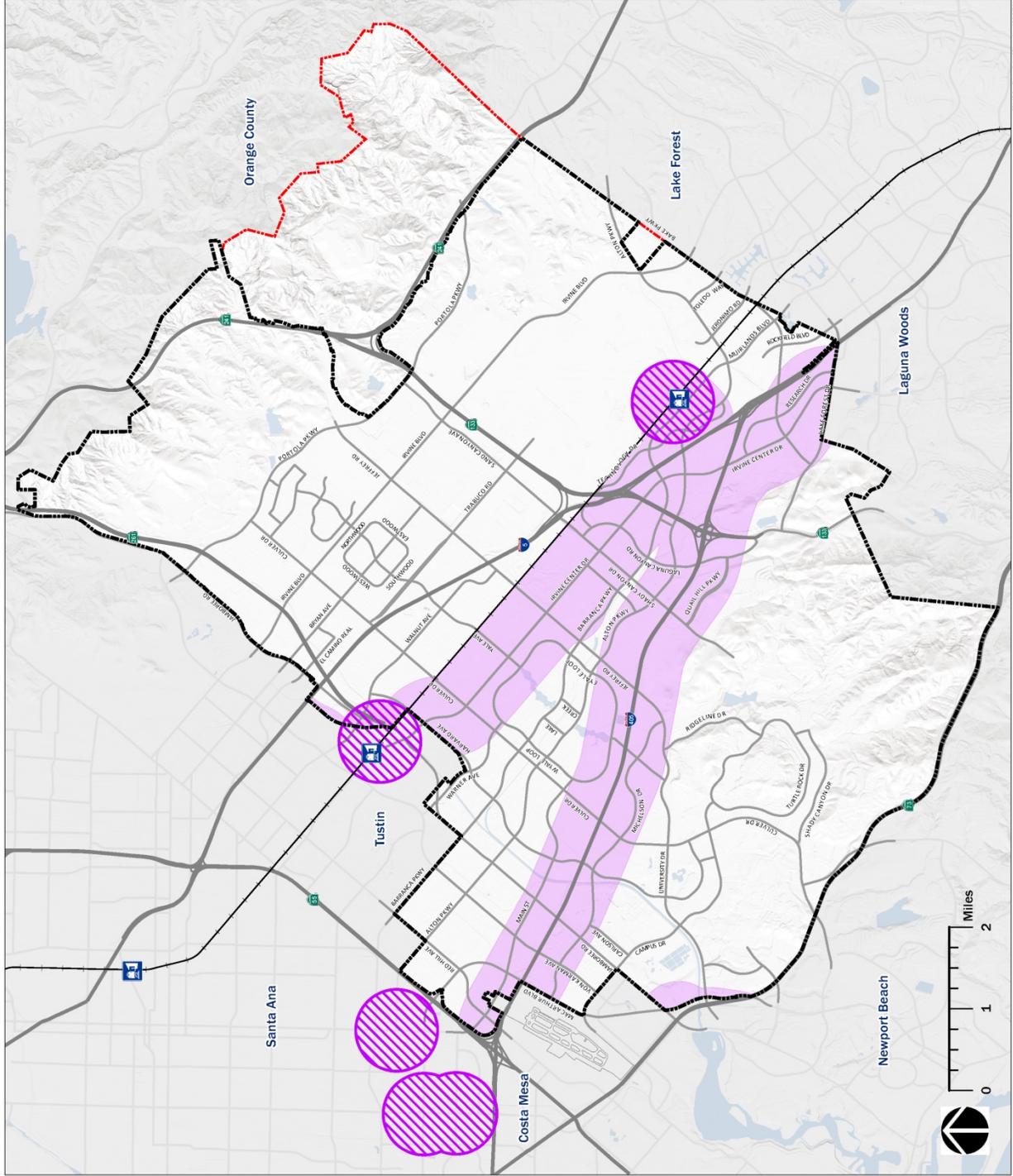
Figure \_\_ shows the location of existing and future HQTAs and TPAs identified in the 2012 RTP/SCS adopted by SCAG.

Figure 3-4

# HIGH QUALITY TRANSIT AREAS AND TRANSIT PRIORITY AREAS

## LEGEND

-  OC Metrolink Stations
-  Current Transit Priority Areas
-  2035 High Quality Transit Areas
-  City Boundary
-  Sphere of Influence



Source: City of Irvine, 2016; Southern California Association of Governments 2012 RTP/SCS





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### 3.7.2.4 Orange County Council of Governments

The Orange County Council of Governments (OCCOG) is a voluntary joint-powers agency that provides a vehicle for member agencies to engage cooperatively on subregional matters important to the county and collectively to member cities. OCCOG convenes jurisdictions to address land use, energy, mobility, and water issues facing the region’s residents and to ensure that the county is represented in regional decision-making. OCCOG studies and projects are designed to improve and coordinate common governmental responsibilities across the county. In partnership with SCAG, OCCOG leads the development of Orange County’s required planning documents so that the county can compete for state and federal funding.

### 3.7.2.5 Habitat Conservation Plan

The City of Irvine is a participant in the Central/Coastal Orange County Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP), a habitat restoration and enhancement plan that covers approximately 37,000 acres in Orange County. Of the NCCP/HCP acres in Irvine, 10,587 are designated for inclusion in the Habitat Reserve System, and 813 acres are designated as non-reserve lands called Special Linkages. Portions of Irvine that fall within the NCCP/HCP include 7,708 acres at the northern edge of the City and 3,692 acres at the southern edge. The NCCP/HCP provides regulatory coverage for 39 individual species and 4 “covered” habitats. The City of Irvine is to preserve these open space lands, implement the NCCP/HCP, and review project proposals for consistency with the plan.



Irvine Nature Preserve

### 3.7.2.6 UCI Long Range Development Plan (LRDP)

The University of California, Irvine, is required to adopt a LRDP to guide the physical development and land use planning in order to meet academic and institutional objectives (Public Resources Code §21080.09). UCI’s latest LRDP, adopted in 2007, identifies general types of campus development and land uses to support academic program initiatives through 2025/2026 and a potential of 37,000 students. Although forecasts suggest that the cap of 37,000 students may not materialize by 2007, the LRDP has plans to accommodate this if the demand occurs.



## 3.8 Opportunities and Constraints

Irvine is the product of visionary, master planned development, and its land uses are well planned and complementary. The City has successfully avoided the pitfalls of incompatible land uses that result from organic, market-driven, and short-term patterns of growth. As a result of this careful planning, Irvine has become renowned for its exceptional quality of life. Within this context, key opportunities and constraints face the City as it approaches buildout of available land.

### 3.8.1 Opportunities

**Variety of Land Uses.** Unlike many young, master-planned cities, Irvine is not just a bedroom community. The City is one of the region's most important commercial, office, educational, and research centers. Although the number and types of housing units in Irvine may not be perfectly aligned with the number and types of jobs, Irvine has all the land uses required for a well-balanced community. The diversity of land uses in the City and the wide variety of its built character provide a foundation for the City to be more adaptable as it grows and matures.

**Compatibility of Adjacent Land Uses.** Because the City was master planned, undesirable land use adjacencies have been largely avoided. Residential neighborhoods have generally been built far from noisy and hazardous land uses, such as heavy manufacturing, landfills, and wastewater treatment plants. Furthermore, parks and green spaces have been strategically located to create buffers between homes and other uses. Maintaining land use compatibility and the concurrent benefits will continue to be an important goal for the community.

**Focused Growth.** The City is quickly approaching buildout, and vacant sites available for development are diminishing. In some areas, land uses may benefit from revitalization or repurposing due to changes in the economy or market demand, aging, or other reasons. Careful market and fiscal analysis and new land use, urban design, and transportation strategies should be applied to these opportunity areas to accommodate growth and create dynamic places in the City.

### 3.8.2 Constraints

**Approaching Buildout.** In previous decades, the large inventory of available land in the City allowed great flexibility in how land uses could be arranged in new neighborhoods. Over the planning period of the upcoming general plan, Irvine will become largely built out. Future growth and redevelopment will need to be accommodated in areas that are already developed. The City and developers will need to develop and use a different set of land use and design strategies to integrate new uses with the existing urban fabric.

**Jobs-Housing Imbalance.** The City has carefully developed its residential neighborhoods to provide quality housing opportunities. However, Irvine is also a regional employment center, and many employees commute into Irvine every day. The imbalance between the types of jobs in Irvine and the available housing has contributed to higher housing prices and congestion on regional roadways. Although this imbalance will likely continue, future planning efforts should consider options for reducing this imbalance through focused growth strategies.

**Traffic Congestion.** Traffic congestion and the pace of development continue to be significant concerns for residents. Although many development projects received entitlements years ago, the uptick in the economy is causing many of them to be built simultaneously. In addition, increased economic activity regionwide is increasing commuting across the southern California region and causing traffic concerns on freeways and major arterials that cross Irvine.

**Maintaining High Quality of Life.** As the last vacant portions of Irvine are built out, the City will need to carefully examine how additional development will affect quality of life issues such as aesthetics, noise, safety, and traffic. Neighborhood preservation, quality of life, and safety are important values shared by residents and City staff. They are central hallmarks of Irvine and critical to Irvine's continued status as one of the country's most desirable places to live and work. Maintaining that standard of services and facilities, community character, aesthetics, and overall quality of life is paramount as future growth occurs.



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# Chapter 4. Housing

## 4.1 Introduction

Irvine is known for its high-quality homes and desirable village neighborhoods. Because of a thoughtful master-planned design since its inception more than 40 years ago, Irvine is considered one of the premier master-planned communities in the nation. The City's residential areas were intentionally planned and organized into villages or neighborhoods, each of which has a unique character, density of development, and anchoring school, park, or other amenity. The City's pattern of villages is one of the more cherished features of Irvine.

Although the earliest villages largely consisted of low-density, single-family homes, the housing stock has been diversified into a balanced range of product types. Areas near the Irvine Spectrum and along Jamboree Road in the Irvine Business Complex now include high-density residential projects that cater to a wide variety of lifestyles and household incomes. Newer areas such as Stonegate, Woodbury, and Orchard Hills include a mix of traditional single-family and multifamily housing. In addition, recent residential projects include housing units aimed at students, seniors, and families with low to medium incomes.

Housing remains an important quality of life consideration in Irvine. The quality of housing directly impacts quality of life, and Irvine's top priority is to continue providing the highest quality of life for its residents. However, Irvine is a major regional employment center, and as Irvine's commercial and industrial centers continue to attract high numbers of employers, housing has not always kept up with demand—despite its continued growth. More jobs exist in the City today than affordable housing options for the people working in those jobs.

This chapter provides a foundation for the general plan land use and housing elements and the general plan environmental impact report by describing the regulatory setting, housing needs, housing programs, and housing opportunities and constraints in Irvine.



Turtle Rock homes and UCI student housing



## 4.2 Regulatory Setting

Unlike other general plan elements, the state requires housing elements to be updated on a prescribed eight-year cycle. For this reason, they are usually prepared independently of comprehensive general plan updates. The City of Irvine Housing Element was last updated in 2013 and has been certified by the California Department of Housing and Community Development for the 2013–2021 housing element cycle.

This section describes California housing element law and related regulatory requirements.

### 4.2.1 California Housing Element Law

Under California housing element law, a city's housing element must identify housing needs for all economic segments and provide opportunities for housing development to meet that need. State law recognizes the vital role local governments play in the supply and affordability of housing. To that end, the California Government Code requires the housing element to:

- Identify adequate sites to facilitate and encourage the development of housing for households of all economic levels, including persons with disabilities.
- Remove, as legally feasible and appropriate, governmental constraints to the production, maintenance, and improvement of housing for persons of all incomes and disabilities.
- Assist in the development of adequate housing to meet the needs of low and moderate income households.
- Conserve and improve the condition of housing and neighborhoods, including existing affordable housing.
- Promote housing opportunities for all persons regardless of race, religion, sex, marital status, ancestry, national origin, color, familial status, or disability.
- Preserve for lower income households the publicly assisted multifamily housing developments in each community.

## 4.2.2 Regional Housing Needs Assessment

A key component of the housing element update process centers on local jurisdictions demonstrating that they can accommodate their designated fair share of the region's housing growth.

The Housing and Community Development Department (HCD) estimates the relative share of California's projected population growth in each county based on California Department of Finance population projections and historical growth trends. HCD uses these estimates to produce a regional housing needs assessment (RHNA) for each region of California. Where there is a regional council of governments, the HCD requires the council to assign a share of the regional housing need to each of its cities and counties. HCD oversees the process to ensure that the projected housing need is allocated. The RHNA does not promote growth, but provides a long-term outline for housing within the context of local and regional trends and housing production goals.

Irvine and Orange County fall within the Southern California Association of Governments (SCAG) region. State law requires SCAG to distribute the RHNA as part of its role in implementing state-mandated requirements for land use and transportation planning. As explained in Chapter 3, *Land Use*, SCAG is also required to prepare a sustainable community strategy (SCS). RHNA allocations distributed to cities and counties by SCAG must be consistent with the development pattern and housing strategy in the SCS.

SCAG's methodology for calculating individual RHNA allocations uses a number of factors, including:

- The member jurisdiction's existing (and projected) ratio of jobs and housing.
- Opportunities and constraints to housing development (e.g., availability of sewer and water service, suitable land).
- The distribution of projected household growth in relation to transit service and transportation infrastructure.
- Market demand for housing in the jurisdiction.



Multifamily housing in Quail Hill neighborhood



#### 4.2.2.1 2013–2021 RHNA Allocation

RHNA allocations for communities in the SCAG region were approved in 2011 and revised in 2013. For the planning period of October 15, 2013, through June 30, 2021, Orange County was assigned an overall RHNA allocation of 37,966 units. Irvine was assigned a RHNA allocation of 12,149 units, which is 31 percent of Orange County’s allocation. Table 4-1 shows the City’s housing need allocation by household income.

**Table 4-1  
City of Irvine RHNA Allocation for 2013–2021**

Household Income Category	Definition <sup>1</sup>	Number of Units
Extremely Low	30% or less of MFI	1,408
Very Low	31–50% of MFI	1,408
Low	51–80% of MFI	2,034
Moderate	81–120% of MFI	2,239
Above Moderate	above 120% of MFI	5,059
<b>Total:</b>		<b>12,149</b>

*Source: SCAG 2013.  
MFI = median family income*



Single-family homes, Stonegate community

Irvine is expected to accommodate thousands of units in all affordability categories during the current housing element cycle. However, it should be noted that the City is not required to build or approve the targeted number of units. It is merely required to demonstrate that approved projects and/or vacant parcels designated for residential uses could hypothetically accommodate the 12,149 RHNA-allocated units. The RHNA is a “distribution of housing development capacity” that each city and county must zone to meet its “fair share” of regional housing market need. It is not a “construction need allocation,” but is integral to the development of a sustainable community strategy. Affordable housing goals and implementation programs that contribute toward achievement of housing production targets must also be identified.

## 4.3 Housing Needs

The need for housing is largely determined by examining a community's current demographics and identifying demographic trends, yet it also considers regional demographics and trends.

### 4.3.1 Population Growth

Over the last few decades, Irvine has experienced significant and rapid population growth due to the construction of approved projects and annexation of its sphere of influence. As shown in Table 4-2, the City has grown by approximately 100,000 residents since 2000.

**Table 4-2**  
**Population Growth in Irvine**

Year	Population	Numerical Change	Percent Change
1980	62,134	—	—
1990	110,330	+ 48,196	77.6%
2000	143,072	+ 32,742	29.7%
2010	212,375	+ 69,303	48.4%
2014	229,850	+ 17,475	8.2%

Source: U.S. Census, American Community Survey 2014.

Irvine is expected to continue growing over the coming decades, although its growth will likely slow as the amount of land available for development diminishes. As shown Table 4-3, Irvine's population is forecast to increase to 326,733 by 2035, an increase of 10 percent beyond its 2014 population. Between 2020 and 2035, a quarter of the county's population growth is anticipated in Irvine.

**Table 4-3**  
**Growth Projections**

Forecast	City of Irvine		Orange County	
	2020	2035	2020	2035
Population	296,264	326,733	3,264,955	3,434,443
Households	115,796	127,812	1,131,401	1,193,601
Employment	280,649	313,960	1,730,085	1,870,025

Source: Center for Demographic Research, CSUF, Orange County Projections, 2014.



### 4.3.2 Demographic Characteristics and Trends

Meeting housing needs goes beyond merely building housing units to accommodate population growth. It includes meeting specific needs related to household size, age, income level, health, disabilities, and employment. The key demographic indicators in Irvine are summarized here from the 2014 American Community Survey. Chapter 2, *Demographics and Economics*, discusses many of these characteristics.

Key trends and characteristics include:

- **Age Distribution.** Irvine has a median age of 34 years. Residents are 10 percent seniors 65 years and older and 21 percent youth aged 18 years and under (versus 12 percent seniors and 24 percent youth in Orange County).
- **Disabled.** Irvine’s disabled population totals approximately 12,446 residents, of which 50 percent are 65 years and older and 44 percent are 18 to 64 years. Disabilities include cognitive, vision, ambulatory, self-care, and independent living.
- **Race/Ethnicity.** Irvine’s population is racially and ethnically diverse—44 percent non-Hispanic white, 39 percent Asian, 10 percent Hispanic, and 7 percent other racial and ethnic categories. Approximately 38 percent of Irvine’s residents are foreign born, of which 57 percent are naturalized U.S. citizens.
- **Household Size and Composition.** In 2014, the average household size in Irvine was 2.67 persons. This is generally smaller than the average household size of 3.04 countywide.
- **Poverty.** Compared to California, Irvine has a low percentage of children (10 percent vs. 23 percent) and adults (13 percent) living in poverty. However, the City’s poverty rate for adults is slightly higher than the county’s rate of 11 percent.
- **Students.** Over 50,000 university and college students attend school in Irvine. Although many live in campus housing—UC Irvine estimates that over 12,000 students live on campus—thousands of students live off campus.



Irvine’s diverse population includes over 50,000 students at colleges and universities, including UC Irvine.

### 4.3.3 Housing Costs and Affordability

Housing in Irvine is relatively expensive compared to Orange County. According to Esri Business Analyst (software), in 2014, the average value of an owner-occupied unit in Orange County was \$625,500. In comparison, the average value of an owner-occupied home in Irvine was \$682,000, 10 percent above the Orange County average. However, more than 18 percent of the City's owner-occupied homes are worth more than \$1 million. Housing affordability is typically defined as paying less than 30 percent of income toward housing costs.

According to the *Orange County Register*, the average asking rent for housing in Irvine in 2015 was around \$2,094 a month—13 percent more than Orange County at \$1,848 a month.<sup>1</sup> Low rental vacancy rates—4.6 percent for Irvine and 4.0 percent for Orange County (2014 American Community Survey 5-year estimates)—indicate that demand exceeds supply, which has allowed landlords to steadily increase rents.

Table 4-4 shows that 58 percent of Irvine's homeowners with a mortgage can afford housing, slightly above the 54 percent rate in Orange County. Roughly 45 percent of Irvine's renter households can afford housing, slightly above the 42 percent rate in Orange County. Altogether, 49 percent of Irvine's residents (both renters and owners) overpay for housing. This is slightly less than in Orange County and California—52 percent and 51 percent, respectively (ACS, 2015).

**Table 4-4**  
**Housing Overpayment for the City of Irvine**

Cost Burden	2014 Owner		2014 Renter		2014 Total	
	Number	%	Number	%	Number	%
No Overpayment (<30%)	18,384	58%	19,401	45%	37,785	51%
Moderate Overpayment (30%–49%)	8,273	26%	12,204	28%	20,477	27%
Severe Overpayment (>50%)	5,039	16%	11,720	27%	16,759	22%

Source: U.S. Census, American Community Survey 2009–2014, five year averages.

<sup>1</sup>Jeff Collins, "Want to Live in Orange County? It'll Cost You \$1,848 a Month for an Apartment: An All-Time Average High," *Orange County Register*, July 15, 2015, <http://www.ocregister.com/articles/rent-671796-percent-month.html>.



### 4.3.4 Housing Sites Inventory

The housing element demonstrates that vacant parcels in the City can accommodate the City’s 2013–2021 RHNA allocation of 12,149 dwelling units. Table 4-5 shows that the capacity for construction of approximately 12,729 units is dispersed over 10 planning areas.

**Table 4-5  
Residential Development Potential of Vacant Sites**

Planning Area	Acreage	Density Range (du/ac)	Potential Units
<b>Low Density Zones (less than 30 du/ac)</b>			
PA 1 (Orchard Hills)	235.5	0–31	3,588
PA 6 (Portola Springs)	372.0	0–12.5	2,232
PA 18 (Laguna Alta)	163.7	0–6.5	982
PA 22 (Shady Canyon)	74.0	0–12.5	78
PA 40 (Cypress Village)	55.4	0–31	665
<b>Subtotal:</b>	<b>900.6</b>	–	<b>7,545</b>
<b>High Density Zones (greater than 30 du/ac)</b>			
PA (Irvine Center)	10.6	0–55	1,548
PA 36 (IBC)	34.8	30+	1,584
PA 39 (Los Olivos)	44.8	30–50	1,343
PA 40 (Cypress Village)	3.5	0–31	104
PA 51 (Great Park)	18.7	10–50	562
<b>Subtotal:</b>	<b>164.0</b>	–	<b>5,184</b>
<b>Total:</b>	<b>1,046.6</b>	–	<b>12,729</b>

*Source: 2013–2021 City of Irvine Housing Element.*

Unit estimates were based on permitted development densities, development standards, maximum unit caps for specific planning areas, and applicability of the City’s density bonus program. To ensure realistic estimates, average densities of new development are assumed to be 70 to 80 percent of the maximum permitted. Although the City does contain additional vacant and underutilized sites, particularly in the Spectrum and IBC, these sites are not needed to accommodate its RHNA. There is also sufficient capacity on higher density parcels (about 5,184 units) to accommodate the RHNA’s need for affordable housing (4,841 units affordable to low and very low family incomes).

## 4.4 2013–2021 Housing Element

HCD certified Irvine’s 2013–2021 Housing Element on November 4, 2013. In addition to documenting housing needs in the City, the housing element identifies housing sites and programs that together will ensure that the City can accommodate its RHNA allocation and meet housing needs in general.

### 4.4.1 Goals, Policies, and Programs

Housing development in Irvine is guided by the goals, policies, and programs of the housing element as well as the Inclusionary Housing Ordinance (described below in Section 4.4.2.3). Six goals guide short- and long-term housing policy for the City:

1. Provide suitable sites for development that can accommodate a range of housing by type, size, location, price and tenure.
2. Assist in the provision of housing that meets the needs of all economic segments of the community.
3. Maintain and enhance the existing viable housing stock and neighborhoods within Irvine.
4. Maintain the affordability of all at-risk units in the City.
5. Mitigate to the extent legally feasible potential governmental constraints to housing production and affordability.
6. Promote equal housing opportunity in Irvine’s housing market regardless of race, religion, sex, family size, marital status, ancestry, national origin, color, age, or physical disability.

Accompanying policies and 13 programs further these goals. Housing programs include a time frame and objectives for implementation. Topics addressed by the programs include: a site inventory, public/private partnerships, promotion of mixed-use and transit-oriented development, financial subsidies, housing rehabilitation, strategies for citywide communication of affordable housing, and programs aimed at preserving and increasing affordable housing units. These programs and resources are described in the following sections.



Granite Court is an affordable apartment community in the Irvine Business Complex.

## 4.4.2 Housing Programs and Resources

The City has an inventory of vacant parcels available for development and implements programs related to the Irvine Community Land Trust. In addition, the City provides or supports a robust array of housing programs, which are described in depth in the housing element.

### 4.4.2.1 Residential Sites Inventory

The City maintains and annually updates a Geographic Information System (GIS) database of residential sites that can adequately accommodate the City's RHNA. Upon request and subject to reproduction costs, the City will make the most recent map of vacant, residentially zoned properties available to interested developers.

### 4.4.2.2 Irvine Community Land Trust

In 2006, the ICLT was created to address the production and preservation of affordable housing in Irvine. The City coordinates with the ICLT to pursue land acquisition opportunities for affordable housing, including rental, owner, and single-occupancy residences as well as emergency, transitional, and supportive housing. The vision of the ICLT is to create approximately 5,000 units of permanently affordable housing throughout the City by 2025.

### 4.4.2.3 Inclusionary Zoning Ordinance

The City's inclusionary zoning ordinance requires 15 percent of all new residential development to be set aside as housing for very low, low, and moderate income households. Pursuant to the ordinance, developers can provide the required units or pay in-lieu fees to the City. This program has produced hundreds of accessible units.

### 4.4.2.4 Mixed-Use and Transit-Oriented Development

Irvine encourages development of housing in areas designated for mixed uses. In particular, the IBC, Irvine Spectrum Center, and Orange County Great Park are targeted for transit-oriented mixed uses. Coordinating residential and nonresidential uses can reduce commute times and traffic congestion as well as improve jobs-housing balance. The City allows increased densities and height limits in these areas.

#### **4.4.2.5 Financial Participation**

The City has committed to providing deferred payment loans and/or grants to local housing developments when available. This financial support subsidizes the cost of developing affordable housing units. The highest priority for the funding is housing that is permanently affordable, but the City also assists developers with acquiring financing from state and federal housing programs to produce housing that is affordable to a mix of household income levels.

#### **4.4.2.6 Housing Rehabilitation**

The Residential Rehabilitation Program provides financial assistance to lower-income homeowners for critical home improvements. This program assists homeowners of owner-occupied single-family dwellings or manufactured homes in need of repairs related to health and safety, the building code, and accessibility. Financial assistance consists of deferred loans and emergency grants.

#### **4.4.2.7 Affordable Housing Brochure**

The City makes available to its residents an up-to-date brochure detailing the affordable housing resources in Irvine, including rental and homeownership opportunities as well as programs that qualified families or individuals may be in need of, such as emergency housing, food, counseling, and other support services. The brochure is updated every four to six months and as new affordable housing units become available. It is accessible on the City's website, at the Community Development Department counter, and at both City senior centers.

#### **4.4.2.8 Preservation of At-Risk Units**

The 2013–2021 Housing Element is required by state law to include a program aimed at preserving publicly assisted affordable housing projects at risk of conversion to market-rate housing. It estimates that approximately 528 rental units are at risk of being converted. However, the program expresses the City's intent to work with property owners, interest groups, and agencies to ensure that affordable housing is preserved. The City has committed to monitoring at-risk units, working with property owners and prospective operators of affordable projects, and distributing educational materials to tenants of affordable units that will be converted to market-rate units.



#### **4.4.2.9 Housing Choice Voucher**

The City provides referrals to households interested in participating in the Section 8 Housing Choice Voucher Program, a federal program administered by the Orange County Housing Authority. Vouchers offer rental subsidies to extremely low and very low income households. Vouchers pay the difference between the current fair market rent established by the federal government and what a tenant can afford. Unlike many affordable housing programs, the Housing Choice Voucher provides assistance that allows tenants to live in market rate housing provided they pay their portion of rent, which is based on income. Vouchers are limited. In 2012, OCHA opened its waiting list for the first time since 2005, and approximately 48,000 applications were received over a two-week period. The application waiting list will most likely not be reopened until 2019. As of January 2013, 825 households in Irvine receive a Housing Choice Voucher, of which 287 are families, 224 are disabled persons, and 314 are elderly persons.

#### **Universal Design**

Universal design features make a home safer and easier to use for persons who are aging or frail or have activity limitations or disabilities. Modifications include exterior and interior adaptations such as accessible routes of travel, additional maneuvering clearances, audio and visual alerts, handrails, etc.

In the early 2000s the City's Accessible Housing Task Force actively partnered with homebuilders, including the Irvine Company, to provide more universal design options for new home buyers. This resulted in a voluntary program to ensure that:

- 50% of homes should be "visitabile"
- 5% of homes should be readily adaptable for full accessibility
- 100% of model homes should meet "visitability" guidelines.

At least one model home in each model complex should showcase "Universal Design" features. This is one example of how the City promotes universal design in residential development:

#### **4.4.2.10 Special Needs**

This program is an assemblage of programs and services for special needs populations, which include those with disabilities, seniors, single-parent households, and the homeless. The City supports a variety of services that assist these populations, including programs that support nontraditional housing such as emergency shelters, transitional housing, supporting housing, and single-room-occupancy units. In addition to partnering with housing developers and nonprofit organizations, the City also pledged to establish a developmental disability task force to consider the concerns and needs of special needs populations in Irvine.

#### **4.4.2.11 Universal Design**

Under this voluntary program, homebuilders construct housing units with design features that simplify life for children, aging populations, and persons with disabilities. Universal design features include physical elements that increase accessibility, technology that makes tasks simpler and/or more intuitive, and aesthetic elements that aid visibility and navigation. The City distributes informational materials on universal design principles to builders and homebuilders on an ongoing basis, and maintains this information on the City's website.

#### **4.4.2.12 Fair Housing**

The City contracts with nonprofit organizations to provide fair housing and tenant/landlord mediation services, which include outreach and education, advocacy, dispute resolution, and legal representation. The City of Irvine’s Analysis of Impediments to Fair Housing Choice provides a fuller range of programs and services offered to residents.

#### **4.4.2.13 Assist in Development of Extremely Low Income Housing**

In addition to indirectly promoting the development of housing for households with extremely low incomes, the City works directly with for-profit and nonprofit housing developers to apply for funding sources to support the construction or rehabilitation of units affordable to extremely low incomes. Sources of funding include the Community Development Block Grant Program, HOME Investment Partnerships Program, Local Housing Trust Funds, and other sources.

## **4.5 Housing Strategy and Implementation Plan**

In 2006 the City completed a Housing Strategy and Implementation Plan to clarify and expand its housing goals and strategy for affordable housing and offer an implementation plan to put the strategy into action. This plan is consistent with and supports the City’s housing element. The City updated its plan in November 2015. The goals and priorities of the plan are to:

- Maintain the high quality of both new and existing housing.
- Disburse affordable units throughout the community.
- Incorporate green design/sustainable development and accessible development features to improve affordability and contribute to resource conservation and accessibility.
- Facilitate development of additional rental housing.
- Create equity-building options for first-time homebuyers.



## 4.6 Jobs-Housing Balance

The jobs-housing ratio is a general measure of the total number of jobs to housing units in a defined geographic area, without regard to economic constraints or individual preferences. The balance of jobs and housing in an area—the total number of jobs and housing units and the type of jobs versus the price of housing—has implications for mobility, air quality, and the distribution of tax revenues. Even in a “balanced” community, commuting is expected. However, managing a community’s jobs-housing balance can benefit quality of life when that balance allows working adults to spend more time with their families instead of commuting long distances. For these reasons, Irvine has sought to balance jobs and housing.

A main focus of SCAG’s regional planning efforts has been to improve the balance of jobs and housing at the regional level. SCAG applies the jobs-housing ratio at the regional and subregional levels to analyze the fit between jobs, housing, and infrastructure. No ideal jobs-housing ratio has been adopted in state, regional, or city policies; jobs-housing goals. However, SCAG considers a ratio of 1.0 to 1.29 to be “balanced.” A balance between jobs and housing reduces commuting trips, other vehicle trips, air pollutant emissions (including greenhouse gas emissions) and traffic congestion.

**Table 4-6  
Jobs-Housing Balance**

	Irvine	So. Orange County	Orange County	California
Jobs	232,728	546,619	1,532,325	15,614,666
Households	83,321	384,320	1,002,285	12,617,280
Jobs/Hhld Ratio	2.8	1.4	1.5	1.2

*Source: U.S. Census Bureau LEHD and ACS 5-Year Estimates, 2014.*

Irvine has grown significantly as an important technological and innovative job market. The jobs-housing imbalance is due to the high number of people who commute into Irvine for work and to housing costs that are higher than the regional average. Providing an adequate supply of housing that is affordable to those with an average and even above average salary is a significant challenge.

## 4.7 Opportunities and Constraints

The City has been proactive about allowing and promoting housing production because of the growing need for housing in the community. However, there continue to be constraints to achieving this goal, including issues related to costs associated with development, public acceptance of higher density housing, and the affordability of new units for people who work or attend school in Irvine.

### 4.7.1 Opportunities

**Depth and Breadth of Existing Housing Programs.** As demonstrated in the City’s Affordable Housing Strategy and Implementation Plan and the 2013–2021 Housing Element, Irvine promotes and implements a diverse range of programs aimed at ensuring that the City’s housing options are broad enough to adequately reflect and accommodate the needs of the community. Although a major focus of these programs is housing that is affordable to low-income households, the City’s housing plans also promote diverse types of market-rate units.

**Vacant Sites.** Because of the historically vast amount of land and single ownership, Irvine’s growth has been meticulously master planned and phased. This growth strategy has facilitated the progressive development of the community into intact neighborhoods. Looking forward, the City will focus more on infill development opportunities. Although the number of planning areas remaining for master planning have declined, the remaining infill areas are designated for a broad range of residential densities and zoned to allow a variety of unit types. This will aid the City in accommodating its future housing needs.

**Mixed-Use and Transit-Oriented Districts.** Irvine’s original villages are suburban-scaled neighborhoods with single-family residences and low-density townhomes. In recent years, the City has allowed a broader range of housing types and allowed housing with other uses in its employment and activity centers. Areas of the City such as the Irvine Business Center and Irvine Spectrum accommodate housing types for people who don’t often live in traditional single-family homes, such as renters, students, one-person households, and seniors. Introducing housing in these locations also gives residents better access to jobs, shopping, transportation, and public services.



Irvine’s high quality, desirable neighborhoods are often hard to afford to those who work in the City.



## 4.7.2 Constraints

**Housing Prices.** Due in part to housing prices, housing affordability continues to be a challenge for many Irvine residents. Ownership and renting in Irvine continue to be expensive, even for middle class families. Despite the recent production of more multifamily housing and rental communities, the desirability of living in Irvine and the number of middle- and high-wage jobs are anticipated to maintain high demand for housing in the City and feed the upward trend of local housing prices.

**Jobs-Housing Imbalance.** Irvine has grown significantly as an important technological and innovative job market, creating a jobs-housing imbalance where a high number of people commute into Irvine for work and housing costs in the City are higher than the regional average. Providing an adequate supply of housing that is affordable to those with an average and even above average salary is a significant challenge. The imbalance could constrain economic growth as longer commutes limit productivity and cause heavy traffic congestion.

**Market Constraints.** There are numerous market constraints that affect the production of new housing in a community or region. Housing demand is perhaps the most fundamental as it drives up other cost factors. These factors include land costs, construction costs, and even the availability of construction financing among others. Land and construction costs are both high in Irvine, and lending has been more tightly controlled since the late-2000s subprime mortgage crisis and recession. Insurance continues to be a cost driver for condominium projects as well.

**Community Perceptions.** Affordable housing, medium- to high-density housing developments, and senior-oriented housing projects often face public opposition when proposed in the City. Many times this opposition is due to concerns about aesthetics, traffic, crime, and/or negative behaviors that residents associate with such communities. However, affordable, higher-density, and senior housing have been successfully integrated into neighborhoods throughout Irvine, both as stand-alone projects and as part of market-rate residential developments. Continuing effort will be needed to balance resident concerns with efforts to meet the diverse range of housing needs in the City.

# Chapter 5.

# Circulation

## 5.1 Introduction

The City of Irvine serves as a crossroads for the region’s major freeways. On the east, the City is anchored by the El Toro “Y,” where the Santa Ana (I-5) and the San Diego freeways (I-405) intersect. On the City’s western edge is the junction of the I-405 and SR-55 freeways. Irvine’s size and location in the region, as well as its intricate and well-connected series of internal arterials, has resulted in it serving as an important node for a variety of transportation modes, including public transportation, commercial air travel, goods movement, bicyclists, pedestrians, and automobile travel on arterial surface streets.

Similar to the City’s land use pattern, Irvine’s circulation system has been influenced by its development as a master-planned community. The City’s phased growth as a series of “villages” (see Chapter 3, *Land Use*, for a brief history of the City’s growth) has resulted in a local circulation system with a pronounced hierarchy: lower-volume roads facilitate circulation within each village, and larger roads link the villages to each other. The design and connectivity of the City’s roadways and trails have directly reflected the sequential addition of new neighborhoods, which are generally connected by a grid of large arterial roadways. Similarly, local bus service has expanded geographically as Irvine has growth northward and eastward.

This chapter discusses Irvine’s existing circulation system and issues of mobility generated by the City’s continued growth and development. This includes its roadway network, pedestrian and bicycle network, public transit, air transportation, goods movement, and efforts to implement transportation demand and system management strategies. To maintain a safe environment for drivers, bicyclists, and pedestrians, transportation safety concerns are also addressed in this report.



## 5.2 Roadways

Irvine’s network of roadways serves local motorists traveling within the City and those traveling through central Orange County. In many cases, it also serves bicyclists, pedestrians, and/or public transit.

### 5.2.1 Regulatory Setting

#### 5.2.1.1 Federal Highway Administration

The Federal Highway Administration oversees the distribution of federal funds for the construction and maintenance of the national highway system. In Irvine, this includes both Interstate-405 and Interstate-5. FHWA also grants funds to state transportation agencies for various infrastructure improvements, including the various bridges and overpasses for the national highway system.

#### 5.2.1.2 Caltrans Highway Design Manual

The California Department of Transportation (Caltrans) implements a Highway Design Manual for the design of Caltrans circulation facilities. The manual outlines engineering standards for state-owned and operated highways, intersections, freeway interchanges, bridges, drainage facilities, and other transportation infrastructure under Caltrans’s purview. Similar to the federal government, the California Transportation Commission allocates funding for various projects.

#### 5.2.1.3 California Complete Streets Act

The California Complete Streets Act, signed into law in 2008, requires circulation elements to address the transportation system from a multimodal perspective. The bill states that streets, roads, and highways must “meet the needs of all users...in a manner suitable to the rural, suburban, or urban context of the general plan.” Essentially, this bill requires a circulation element to plan for all modes of transportation where appropriate—including walking, biking, auto, and transit. The Complete Streets Act also requires circulation elements to consider multiple users of the transportation system, including children, adults, seniors, and the disabled. The Office of Planning and Research publication, “Complete Streets and the Circulation Element”, provides specific guidance related to compliance with the new legislation.

## 5.2.1.4 Regional Transportation Plan

The Southern California Association of Governments (SCAG) conducts regional transportation planning activities that are embodied in its Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS). The RTP/SCS is a long-range planning document that is updated every four years, most recently in 2016. The 2016–2040 RTP/SCS covers a range of land use and circulation-related topics, including but not limited to:

- Active Transportation (walking and bicycling)
- Aviation
- Congestion Management
- Goods Movement
- Highways and Arterial Roadways
- Transit and Passenger Rail
- Transportation Demand Management
- Finance of Transportation Projects
- Transportation Safety and Security

The RTP process also involves the prioritization of transportation projects, which include freeway improvements, new transit lines, and projects aimed at promoting multimodal transportation. Future projects are identified based on economic and demographic trends, existing and future land use patterns, performance indicators, environmental considerations, and community input. The RTP also forecasts cost estimates for planned transportation expenditures. State and federal agencies use the RTP to allocate funds for transportation projects.

The Federal Transportation Improvement Program (FTIP) is a capital listing of all transportation projects proposed over a six-year period for the SCAG region. The FTIP is prepared to implement projects and programs listed in the RTP and is developed in compliance with state and federal requirements. SCAG develops the FTIP based on consistency with the current RTP, intercounty connectivity, financial constraints, and conformity satisfaction. A large list of transportation-related projects benefit Irvine and surrounding communities.



### **5.2.1.5 Congestion Management Program**

The Orange County Transportation Authority is required to develop, monitor, and update the County's Congestion Management Program (CMP). The CMP supports regional mobility and air quality objectives by reducing traffic congestion, providing a mechanism for coordinating land use and development decisions that support the regional economy, and determining gas tax fund eligibility. To meet these goals, the CMP contains policies to monitor and address system performance. The 2015 CMP identifies 11 CMP intersections in Irvine:

- SR-133 Ramps/Irvine Boulevard (NB and SB Ramps)
- SR-261 Ramps/Irvine Boulevard (NB and SB Ramps)
- I-405 NB Ramps/Enterprise/Irvine Center Drive
- I-405 Ramps/Jamboree Road Irvine (NB and SB Ramps)
- I-405 SB Ramps/Irvine Center Drive
- I-5 Ramps/Jamboree Road (NB and SB Ramps)
- MacArthur Boulevard/Jamboree Road

### **5.2.1.6 Master Plan of Arterial Highways**

The Orange County Master Plan of Arterial Highways (MPAH) is a countywide, long-range transportation plan maintained by the Orange County Transportation Authority (OCTA) and implemented by the County and its 34 cities. The MPAH defines Orange County's transportation planning and policy objectives by laying out an inter-community arterial highway system that balances regional mobility and local access to accommodate existing and projected traffic. Section 5.2.2.1 discusses road classifications in the MPAH. Measure M2, passed by Orange County voters in November 2006, renewed OCTA's authorization to use tax revenue generated by a half-cent sales tax to fund specific transportation investments. In order to be eligible for Measure M2 tax revenues for qualified projects, the circulation element of Irvine's general plan must be consistent with the MPAH.

The City of Irvine maintains consistency with the MPAH.

### **5.2.1.7 Traffic Fee Programs**

The City of Irvine implements two traffic fee programs: one for the Irvine Business Complex (IBC) in Planning Area 36, and one that applies

to development in the Northern Sphere and Great Park (Planning Areas 1, 2, 5, 6, 8, 9, 40, and 51). These traffic fee programs are designed to finance circulation-related infrastructure in designated areas.

- **IBC Development Fee Program.** This program funds area-wide circulation improvements required due to potential circulation impacts associated with buildout of the IBC. Fees are assessed for new construction or when there is an increase in square footage within an existing building or the conversion of existing square footage to a more intensive use. The development fees collected are used strictly for circulation improvements, right-of-way acquisition, and transportation monitoring measures in the IBC area. Fees are calculated by multiplying the proposed square footage, dwelling unit, or hotel room by the appropriate rate. The fees are included with any other applicable fees, payable at the time a building permit is issued.
- **North Irvine Transportation Mitigation (NITM) Fee Program.** The NITM was established for funding the coordinated and phased installation of traffic and transportation improvements required under CEQA documents previously certified or adopted by the City in connection with land use entitlements in North Irvine. Prior to the issuance of a first building permit or the commencement of construction, project applicants in the NITM program area must pay fees consistent with the NITM, which allocates total fair share fee amounts by planning area. The City maintains a list of NITM improvements that will be funded, in whole or in part, by collected fees.

## 5.2.1.8 City of Irvine Standard Plans

The City implements a set of standard plans for street design that is intended to provide for uniform street sections throughout Irvine. The standard plans include detailed diagrams for all street types, from major arterial highways to cul-de-sacs and driveways. The plans are meant to be used in conjunction with other portions of the City's Design Manual and the Irvine Municipal Code. They include standards for overall right-of-way dimensions, drainage design, turning radii, and materials.



### **5.2.19 Existing General Plan**

The circulation element of the existing general plan identifies citywide and special area policies related to the City's roadway network. Citywide policies include those that:

- Establish the City's Master Plan of Arterial Highways (Policy B-1 [b] and level of service standards (Policy B-1 [c])
- Promote coordination between the City and other public agencies (Policies B-1 [e] through B-1 [i])
- Require roadways to be designed to minimize or avoid environmental impacts (Policies B-2 [a] through B-2 [d])

The circulation element also contains policies that address specific roadways or planning areas. The IBC and the City's freeways are given special attention due to their substantial impact on the City's overall traffic patterns. The former is major employment center that generates large numbers of peak-hour vehicle trips. The latter freeways result in increased traffic on east-west oriented surface streets when congested.

### **5.2.10 Special Studies**

Irvine embarked on a citywide traffic management study in early 2015 to review and analyze the transportation network across the City, particularly to address traffic conditions and key issue areas. Additional existing conditions information and recommendations from that study will be incorporated into the general plan update, if applicable. Among others, key recommendations to be pursued include:

- Incorporate protected/permissive left-turn phasing at certain intersections to enhance signal timing and improve traffic flow
- Implement a citywide signal coordination agreement with Caltrans to improve traffic progression at major roadway intersections traversing freeway ramps
- Accelerate planned pedestrian and bicycle detection system improvements for safety
- Complete agreements with the OCTA to implement iShuttle weekday commuter routes

## 5.2.2 Existing Conditions

Irvine has a prominent hierarchy of roadways. Most large cities in California feature semicontinuous networks of similarly sized streets sprinkled with opportunistically upgraded major roadways. However, Irvine's network of major arterial streets has largely been constructed to a predetermined community-wide master plan. For instance, the physical layout of the Woodbury and Stonegate communities (PA 9) is partially defined by the inward focus of land uses away from the large, high-volume roadways surrounding them (Irvine Boulevard, Jeffrey Road, Sand Canyon Avenue, and Trabuco Road). This has allowed those roads to accommodate high volumes of fast-moving traffic.

As with its larger roadways, Irvine's minor streets, alleys, and trails have been developed in a deliberate and predetermined way. Rather than follow a simple grid or web of streets, they are generally designed to access the specific land uses they were constructed to serve. In many cases, this includes meandering collector streets that showcase layered landscaping and/or views into public spaces; curvilinear networks of local residential streets that feature cul-de-sacs; and branched driveways that access clusters of attached housing. The nesting hierarchy of large streets to smaller streets also tends to highlight Irvine's land use pattern, defined by separate enclaves, which differs from the continuous urban fabric found in other cities.

### 5.2.2.1 Arterial Highways

Arterial highways are generally intended to accommodate large numbers of vehicles (traffic volume) and/or high speeds. The existing general plan defines types of arterial highways using categories established by the Orange County MPAH administered by OCTA. These categories are listed below:

- **Freeway.** A divided state highway with access restricted to grade-separated interchanges. Freeways provide for movement of high volumes of intercity traffic.

Examples: I-5 and I-405 traverse Irvine in a northwest-to-southeast direction, merging and forming an interchange commonly referred to as the "El Toro Y." SR-55 travels southwest to northeast on the City's western edge.



- **Transportation Corridor.** A multimodal facility with restricted access, having a median of sufficient width to be utilized for fixed rail or high occupancy vehicle lanes in addition to general purpose lanes. Transportation corridors provide for movement of intercity traffic.

Examples: Toll roads in the City include SR-241, the Foothill Transportation Corridor, and SR-261 and SR-133, both part of the Eastern Transportation Corridor. SR-73, the San Joaquin Hills Transportation Corridor, runs along Irvine’s southern border with Newport Beach.

- **Expressway.** A divided high-flow arterial highway with three or more lanes in each direction and grade-separated intersections and/or access ramps.

Examples: Jamboree Road between Barranca Parkway and Walnut Avenue is the only designated expressway in Irvine. It connects the Irvine Business Complex to neighborhoods in northern Irvine, traveling through the former Marine Corps Air Station (MCAS) Tustin.

- **Major Highway.** A divided arterial highway of six to eight through lanes. Major highways provide for the movement of traffic between planning areas and/or the distribution of traffic to and from freeways or transportation corridors.

Examples: Irvine Boulevard, Irvine Center Drive, Jamboree Road (south of Barranca Parkway), Jeffrey Road, and Sand Canyon Avenue are examples of major highways. These roadways function as alternatives to freeways for motorists traveling through the City.

- **Primary Highway.** A divided arterial highway of four through-lanes. Primary highways provide for the movement of traffic between planning areas, the movement of traffic to and from activity centers within planning areas, and/or the distribution of traffic to and from freeways or transportation corridors.

Examples: Barranca Parkway (east of Culver Drive), Bryan Avenue, Trabuco Road, and Walnut Avenue.

- **Secondary Highway.** An undivided arterial highway of four through-lanes. Secondary highways provide for the movement of traffic between planning areas and/or the movement of traffic to and from activity centers within planning areas.

Examples: Yale Loop (East and West), Ridgeline Drive, Research Drive, and Shady Canyon Drive are examples of secondary highways.

- **Commuter Highway.** A two-lane undivided highway that functions primarily as a collector facility and has the ability to handle through-traffic movements between arterials.

Examples: Harvard Avenue (south of Michelson Drive), Michelson Drive (east of Culver Drive), and Turtle Rock Drive are examples of commuter highways.

## 5.2.2.2 Lower Volume Roadways

Irvine's network of arterial roadways is a critical component of long-range planning activities in the City and region. However, smaller streets and corridors also play an important role in shaping the City's urban form and quality of life. Low-volume, low-speed roadways provide access to individual parcels, buildings, or land uses.

- **Local Street.** A low-speed, low-volume roadway primarily for access to residential, business, and other abutting properties. A local street may have parking and a significant amount of parallel and/or perpendicular pedestrian traffic.

Examples: Local streets are found throughout Irvine. Many of the City's local streets are in single-family residential neighborhoods, where they provide access to individual driveways and garages. Sidewalks can be adjacent to the road surface or separated from it by landscaping.

- **Alley.** An alley is a narrow, linear roadway that travels behind buildings and connects two or more local streets. Alleys typically provide direct access to garages or carports with minimal landscaping or pedestrian infrastructure.



Examples: Irvine has few traditionally designed alleys since it has largely developed since World War II. Alleys are more common in older, dense urban environments.

- **Driveway/Drive Aisle.** A driveway is an off-street roadway that provides direct access to a garage, carport, or parking lot and is usually paved. A drive aisle is a driveway that leads to more than one garage or parking space. These can function similarly to alleys, but are often landscaped and include paths or gates that provide access to residential units.

Examples: Irvine has multifamily residential developments—both attached and detached—that provide access to individual units via an internal drive-aisle circulation network. This arrangement connects garages and carports to an adjacent local street and also provides parking spaces for guests.

- **Private Ways and Private Courts.** Irvine has a number of private ways and private courts. A private way is a low speed roadway in neighborhoods to access residential units, garages, and parking areas. A private court is a low-speed, low-volume, dead-end travel way that serves the same purpose as a private way but is designed for fewer daily vehicle trips.

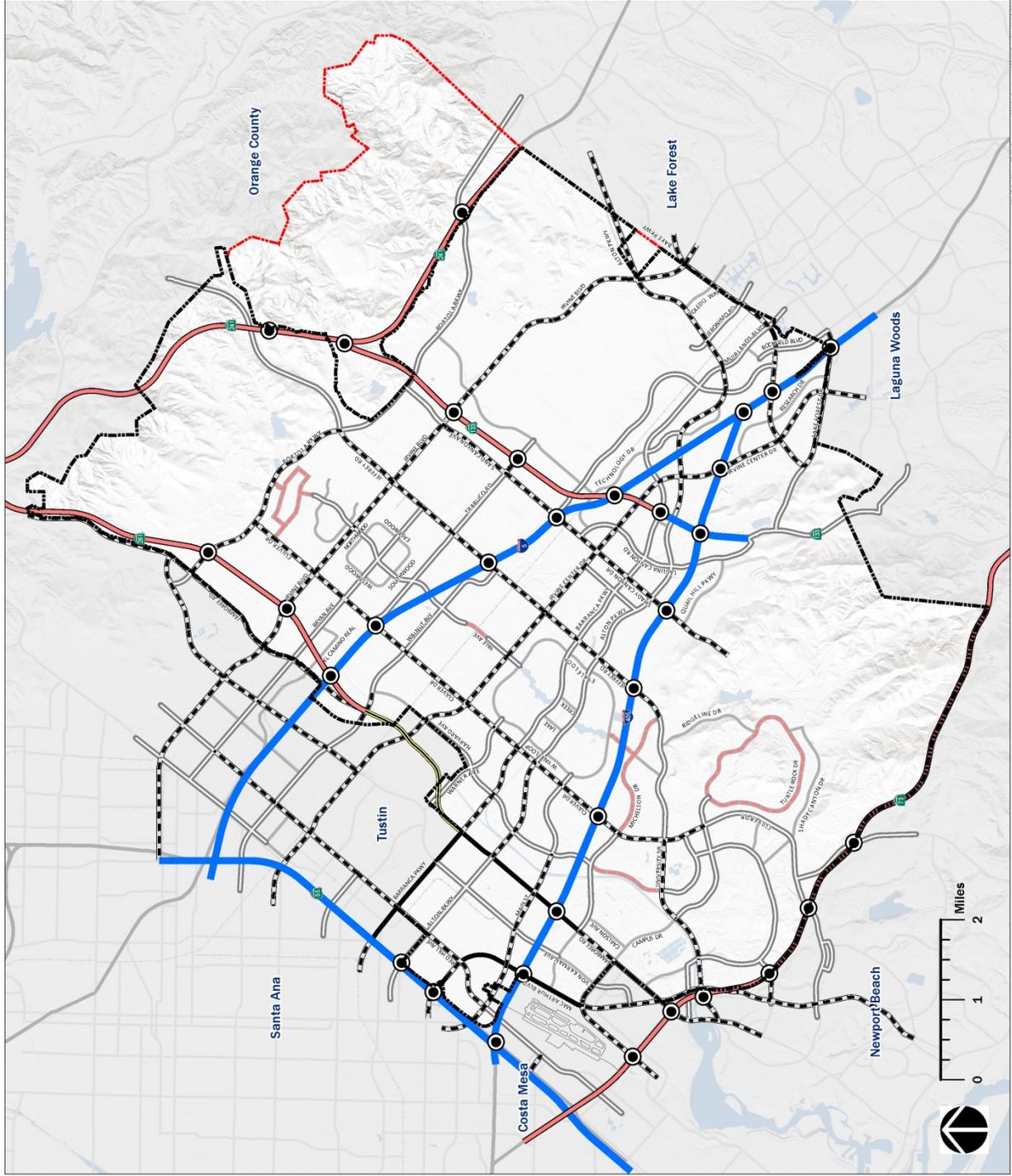
Figure 5-1 on the following page show Irvine’s Master Plan of Arterial Highways (MPAH) and the layout of the City’s roadway network. The City’s roadway network is consistent with the County of Orange’s Master Plan of Arterial Highways.

Figure 5-1

# MASTER PLAN OF ARTERIAL HIGHWAYS

## LEGEND

-  Interchange
-  Freeway
-  Trans. Corr./Toll Roads
-  Expressway
-  Major Highway 8-Lane
-  Major Highway 6-Lane
-  Primary Highway
-  Secondary Highway
-  Commuter Highway
-  City Boundary
-  Sphere of influence



Source:  
City of Irvine, 2015





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### 5.2.3 Analysis of Traffic Impacts

In California, environmental analysis of proposed development projects includes analysis of potential project impacts to traffic and local roadways. In Irvine, as in most of the state, this analysis is principally based on the concept of level of service (LOS). LOS is a method of grading or classifying an intersection based on its ability to efficiently accommodate cars trying to travel through it. In other words, the metric is a measure of volume to capacity (V/C).

The existing general plan defines the City's LOS standards.

- **LOS A.** The V/C ratio ranges from 0.0 to 0.60. Traffic volumes are low, and speed is not restricted by other vehicles. All signal cycles clear with no vehicles waiting through more than one cycle. For roadway links, this LOS indicates no physical restriction on operating speeds.
- **LOS B.** The V/C ratio ranges from 0.61 to 0.70. Traffic volumes begin to be affected by other traffic. Between 1 and 10 percent of the signal cycles have vehicles that wait through more than one signal/cycle during peak traffic periods. For roadway links, this LOS indicates flow with few restrictions on operating speeds.
- **LOS C.** The V/C ratio ranges from 0.71 to 0.80. Operating speeds and maneuverability are controlled by other traffic. Between 11 and 30 percent of the signal cycles have vehicles that wait through more than one signal/cycle during peak traffic periods. For roadway links, this LOS indicates stable flow, higher volume, and more restrictions on speed and lane changes.
- **LOS D.** The V/C ratio ranges from 0.81 to 0.90. Traffic operates at tolerable speeds, but with restricted maneuverability. More than 30 percent of signal cycles have vehicles that wait through more than one signal cycle during peak traffic hours. For roadway links, this LOS indicates tolerable conditions, approaching unstable flow, and little freedom to maneuver.
- **LOS E.** The V/C ratio ranges from 0.91 to 1.0. Traffic will experience restricted speeds, and vehicles will frequently have



to wait through two or more cycles at signalized intersections. Any additional traffic will result in breakdown of the traffic-carrying ability of the system. For roadway links, this LOS indicates unstable flow, lower operating speeds than LOS D, and some momentary stoppages.

- **LOS F:** The V/C ratio is greater than 1.0. This LOS features long queues of traffic, unstable flow, and long stoppages. Through-traffic congestion will be worse than LOS E. For roadway links, this LOS indicates forced flow operation at low speeds where the roadway acts as a storage area and vehicles are often forced to a stop.

Table 5-1 summarizes the volume/capacity ratios of the LOS categories. As shown in the table, these range from completely free-flowing traffic (LOS A) to completely congested traffic (LOS F).

**Table 5-1  
Volume/Capacity Ratio Ranges for Levels of Service**

Level of Service	Volume/Capacity Ratios for Arterial Roadways
A	0.00–0.60
B	0.61–0.70
C	0.71–0.80
D	0.81–0.90
E	0.91–1.00
F	Above 1.00

*Source:*

In common practice, LOS is used in CEQA analysis throughout California—including the City of Irvine—to analyze the potential traffic impacts of proposed projects. The estimated additional volume of automobile trips generated by new land uses, and how those trips affect the LOS of surrounding roadways, is used to determine if modifications to roadway infrastructure would be needed. Such improvements, or payment of fees to fund improvements, are typically included as required mitigation measures for the proposed project.

## 5.2.3.1 Upcoming Changes to the CEQA Guidelines

The Governor's Office of Planning and Research is currently modifying the CEQA Guidelines, including new metrics for analyzing traffic impacts of proposed development projects. These changes are due in part to Senate Bill (SB) 743, passed in 2013. The intent of SB 743 is to better balance "the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions."

A draft of the revised CEQA Guidelines emphasizes vehicle miles traveled and promotes multimodal transportation instead of LOS. Under the draft guidelines, automobile delay alone cannot be considered a significant impact under CEQA. Improvements to arterial roadways have largely resulted from mitigation of project impacts to LOS, but under the new CEQA Guidelines, improvements could themselves pose significant impacts. This fact and the new metrics could affect how street improvements are designed and funded in the future. However, as long as LOS-based metrics are in the Irvine General Plan, LOS will continue to shape the construction of roadway improvements.

SB 743 also has implications for general plans. According to OPR, the circulation element of a general plan should discuss a transportation system that is designed and sized using appropriate metrics. LOS has traditionally been used in determining roadway and intersection capacity needed to provide congestion-free motor vehicle travel, but SB 743 introduced new measures. As part of the draft 2016 OPR Guidelines for general plans, OPR suggests ways to use LOS in the planning context.

- Use LOS during project planning to size roads, but consider other criteria at the point of project implementation to require mitigation or to allocate impact fees.
- LOS should be balanced with other metrics rather than triggering decisions by itself.
- Set LOS thresholds in consideration of the tradeoffs between mobility and other goals.

Changes to the CEQA and general plan guidelines to address the provisions of SB 743 are still under consideration, and the final determinations are unknown at this time.



## 5.3 Pedestrian and Bicycle Facilities

Irvine is known for its extensive network of pedestrian and bicycle trails, a system that is the by-product of the City's master-planned design. Many communities add pedestrian and bike trails as an afterthought, incorporating them into existing right-of-ways decades after the fact. Irvine has integrated pedestrian and bicycle facilities into the urban fabric from the very beginning. The system includes smaller paths within neighborhoods that are often used by children and shared by pedestrians, and longer-distance regional trails used by people who commute to work or school by bicycle.



Bicycle crossing signage

### 5.3.1 Regulatory Setting

#### 5.3.1.1 Caltrans Design Standards

Standards for the design of bicycle facilities, including signage, markings, and signals, are embodied in Chapter 1000 of the Caltrans Highway Design Manual. Pedestrian facilities (e.g., sidewalks) are also included. These Caltrans standards are referenced and then further augmented and tailored in the City of Irvine's roadway design standards.

#### 5.3.1.2 Active Transportation Plan

The City of Irvine's Active Transportation Plan (2015) provides a set of recommendations for increasing the levels of walking and bicycling in Irvine. The plan recommends a mutually supportive combination of programs and infrastructure that—applied together—promote walking and bicycling activity. The plan identifies potential barriers to active transportation (long crossing distances, dropped bicycle lanes at major intersections, high speeds, etc.), provides recommendations for enhancements to bicycle and pedestrian infrastructure, and suggests programs to promote use of the extensive network of trails, paths, and bicycle lanes. The findings are based on a survey of 1,000 residents.

#### 5.3.1.3 Irvine Bicycle Transportation Plan

Irvine's Bicycle Transportation Plan (2011) guides the development and maintenance of a bicycle infrastructure system that is "safe, efficient, and enjoyable." Consistent with requirements of the Caltrans Bicycle Transportation Account grant program, the bicycle transportation plan is updated on a five year schedule. The plan includes an inventory of the existing bikeway system, a prioritized implementation strategy for

expansion of that system, a funding plan for proposed projects, and design guidelines for new bicycle facilities. Several hundred bicycle infrastructure projects are proposed. A special focus of the plan is grade-separation projects, where bikeways cross above or below other transportation rights-of-way.

### **5.3.1.4 OCTA Commuter Bikeways Strategic Plan**

The Commuter Bikeways Strategic Plan has been developed by OCTA to encourage the enhancement of Orange County's regional bikeways network in order to make bicycle commuting a more viable and attractive travel option and help address the many challenges facing communities in improving bicycling options. The plan provides: 1) a strategy for improving the regional bikeway network; 2) eligibility for state Bicycle Transportation Account funds; 3) identification of roles and responsibilities for OCTA regarding bikeways; and 4) documentation of existing and planned Orange County bikeways. Funding for these projects will not be limited to the OCTA Call for Projects.

### **5.3.1.5 Existing General Plan**

Objective B-4 of the existing circulation element establishes that Irvine will plan, provide, and maintain a comprehensive bicycle trail network system that encourages use of bicycle trails for commuters and recreational purposes. Supporting policies include, but not limited to: 1) requiring bike trails to be in every planning area (Policy B-4 [b]); 2) requiring the network to accommodate all levels of bicyclists (Policy B-4 [c]); 3) requiring infrastructure that ensures the safety of bicyclists (Policies B-4 [g] through B-4 [i]); and 4) other policies as well.

Objective B-3 also establishes a pedestrian circulation system to support and encourage walking as a viable mode of transportation in Irvine. Supporting policies include, but are not limited to: 1) linking residences with schools, shopping centers, and other public facilities, both within a planning area and to adjacent planning areas, through an internal system of trails (Policy a); and 2) requiring development to provide safe, convenient, and direct pedestrian access to surrounding land uses and transit stops Policy (b); and 3) other policies as well.

The circulation element also includes an aspirational map that outlines where the City would like to develop off-street bike trails, including several routes within the Orange County Great Park.



### 5.3.16 Zoning Ordinance



The municipal code and zoning code contain several incentives to encourage bicycling for recreational and/or work purposes and to make Irvine more bicycle-friendly to bicyclists of all ages and abilities. Section 4-3-7 of the Irvine Zoning Ordinance establishes minimum bicycle parking requirements for specific land uses (see Table 5-2).

**Table 5-2  
Bicycle Parking Requirements**

Existing Land Use That Requires Bicycle Parking Spaces	Required Number of Bicycle Parking Spaces
Regional shopping center	5 spaces at mall entrance
Shopping center with more than 50,000 square feet of gross floor area	1 space/33 required vehicle parking spaces
Fast food/coffee shop/pizza parlors	5 spaces
Dinner house	2 spaces
Arcade (game or video)	1 space/2 games up to 20 games, plus 1 space/5 games for over 20 games
Bowling alleys, miniature golf, skating rinks, movie theaters, health clubs, swim clubs, racquet and tennis clubs, community centers, and similar uses determined by the Director	1 space/33 required vehicle parking spaces
Library	1 space/10 required vehicle parking spaces
Government offices/civic center	5 spaces
Office developments over 100,000 square feet of floor area	2 spaces
Bank, savings and loan, medical dental offices	2 spaces
Hospital	4 spaces

*Source: Irvine Zoning Ordinance § 4-3-7.*

In order to use the existing and planned transportation system more efficiently and to reduce vehicle emissions, the municipal code encourages the use of alternative transportation modes—such as ridesharing, carpools, vanpools, public bus and rail transit, bicycles, and walking—and facilities that support such modes. The municipal code requires that structures meeting certain size thresholds provide secure, adequate, and convenient storage for bicycles.

## 5.3.2 Existing Conditions

Southern California is known for being car dependent, with goods and services far from residential areas and limited connectivity within neighborhoods for accessing local services. Because of Irvine’s master planning, the City has a highly developed network of pedestrian trails and bicycle routes. As described below, the city’s highly developed system of trails and pedestrian bridges have been built to enable people and bicyclists to move freely about the community.

### 5.3.2.1 Sidewalks

The City of Irvine is known for its extensive pedestrian-friendly network of sidewalks. Irvine has more than 675 miles of paths (primarily sidewalks adjacent to roadways) and 52 miles of off-street trails. Residential neighborhoods throughout Irvine are designed with the pedestrian in mind and are generally well served by infrastructure. Most parks are within a ¼- to ½-walk from residences. Many of the City’s paved trails accommodate bicyclists and pedestrians.

However, sidewalks are limited in some areas of Irvine. Specifically, the Irvine Business Center has a limited sidewalk network as the majority of the area was not master-planned. Although the area has traditionally served commerce and industry, the introduction of significant residential development has increased the number of people working and walking in the immediate area. The City is prioritizing the completion of new sidewalks consistent with the IBC Vision Plan.

UC Irvine’s campus is notable for being almost exclusively devoted to accommodating and encouraging the use of bicycles and pedestrians. Most of the university’s academic colleges form a circle around Aldrich Park, which is traversed by numerous pedestrian paths. The university’s disciplines and educational land uses are connected by a pedestrian “ring road” that travels through each group of buildings, making it convenient to walk or bicycle to class or for leisure purposes.

In addition to the pedestrian trails, informal unpaved trails are located in the Quail Hill Preserve (PA 16), Bommer Canyon Community Park (PA 28), and Limestone Canyon Nature Preserve (PA 3), and eventually the Orange County Great Park (PA 51). For more information about nature trails in Irvine, see Chapters 9, *Parks and Recreation*.

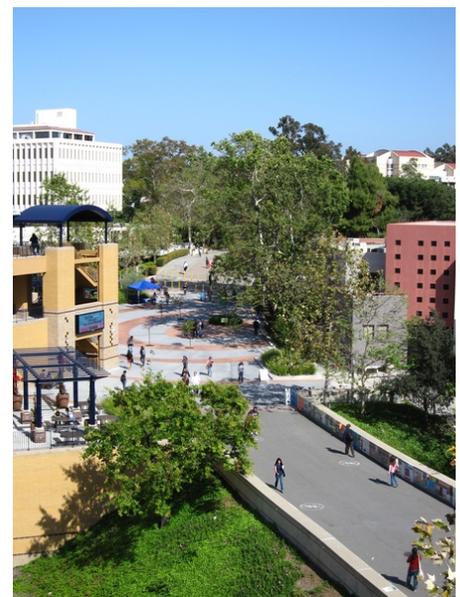


Photo credit: LocalWiki Contributors  
Ring road at UCI



### 5.3.2.2 Pedestrian and Bicycle Bridges

An uncommon and notable aspect of the City's bicycle and pedestrian circulation system is its numerous bridges and other grade-separated crossings that allow improved and safe bicycle and pedestrian access. Because of the high volume roadway network, the City of Irvine has prioritized the development of bridges to allow people and bicyclists to move freely and safely throughout the community. These include:



Irvine Boulevard pedestrian bridge

- Six pedestrian bridges in the Woodbridge community (PA 15), including ones that cross major arterial roadways, man-made lakes, and channelized waterways.
- Fifteen bridges on the UC Irvine campus (PA 50), including one that connects the campus with the adjacent shopping center across Campus Drive (PA 24).
- The Jeffrey Open Space Trail (for pedestrians and bikes) crosses under several major arterial roadways in and around the Woodbury community (PA 9 and PA 40).
- Pedestrian bridges (for pedestrians and bikes) will cross over Irvine Boulevard into the Great Park Neighborhoods. These projects are currently in the design and construction phase.
- IBC bridges. Pedestrian bridges over Jamboree Road will form gateways to the IBC for residents in adjacent neighborhoods. In 2015, \$20 million from IBC area-wide fees and public benefit improvement funds was earmarked for the construction of a bridge connecting Park Place and Central Park West projects.

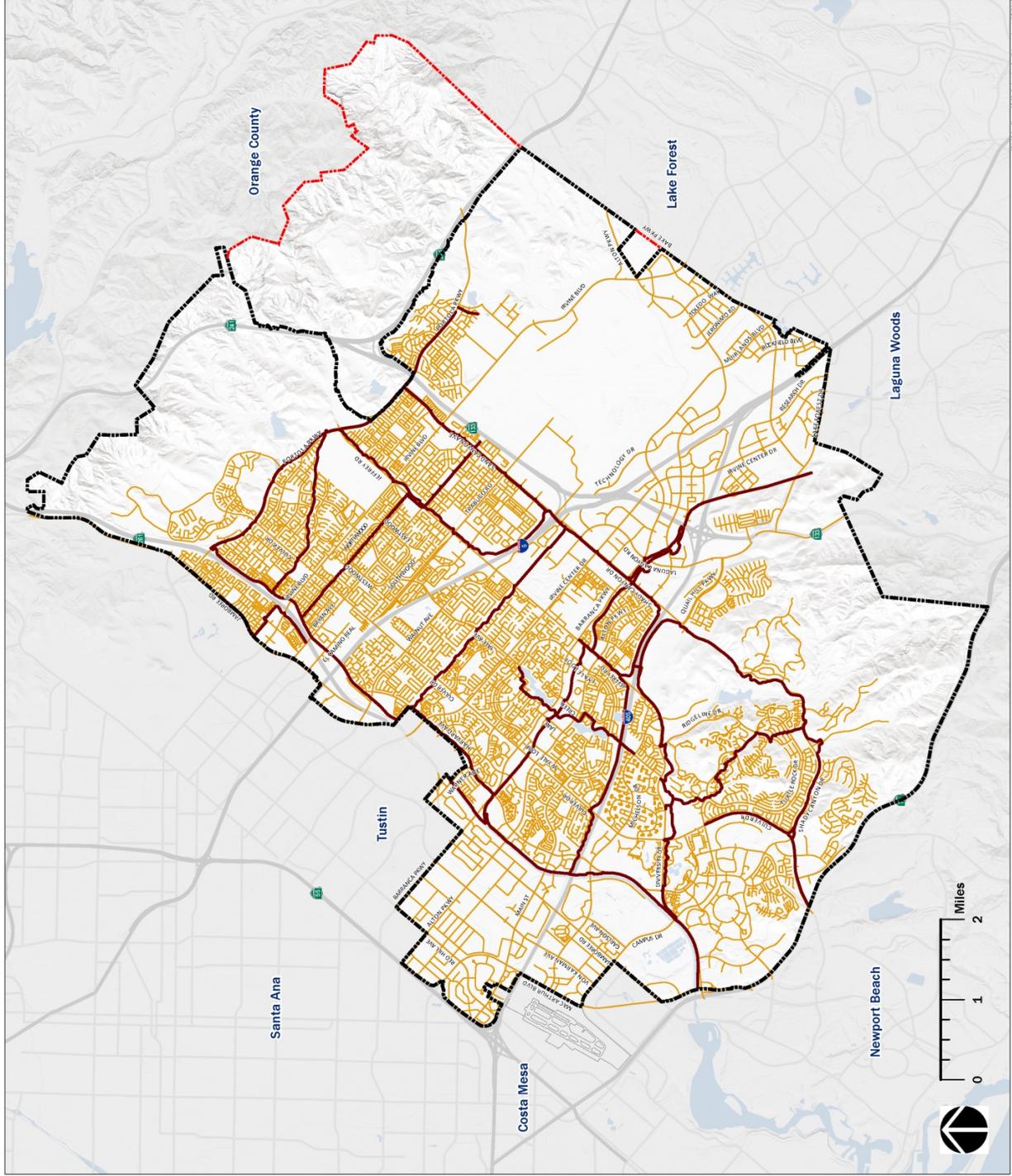
Figure 5-2 displays the location of pedestrian routes in the community. As mentioned earlier, existing residential areas are well served. The primary area with limited sidewalks is the Irvine Business Complex.

Figure 5-2

# PEDESTRIAN FACILITIES

## LEGEND

- Pedestrian Path
- Existing Trail
- City Boundary
- Sphere of Influence



Source:  
City of Irvine, 2014



GP 48.17 - Figure 5B-2 - Pedestrian Facilities.mxd 12/23/2017



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### 5.3.2.3 Bicycle Trails

Irvine maintains a hierarchy of bicycle classifications that depend on the user and design of trail. The following definitions of bikeway classifications are from the Caltrans Highway Design Manual and the Irvine Bicycle Transportation Plan.

- **Class I Bikeway/Bicycle Path.** A completely separated right-of-way for the exclusive use of bicycles and pedestrians.
- **Class II Bikeway/Bicycle Lane.** A striped lane for one-way bicycle travel on a street or highway.
- **Class III Bikeway/Bicycle Route.** Shared use with pedestrian or motor vehicle traffic.

As of 2014, Irvine had 55 miles of off-street bikeways in Irvine (Irvine Bicycle Transportation Plan), including these named bikeways.

- **West Irvine Trail.** This bikeway runs north-south adjacent to Jamboree Road, east-west between Jamboree Road and SR-241, and north-south adjacent to SR-241.
- **Peters Canyon Trail.** This bikeway begins in Orange and extends through Tustin, Irvine, and Newport Beach to Upper Newport Bay. Peters Canyon Trail follows Jamboree Road, SR-261, and Peters Canyon Wash to the railroad tracks.
- **Jeffrey Open Space Trail.** This bikeway runs north-south, parallels Jeffrey Road, and provides access to a number of communities and schools.
- **Sand Canyon Trail.** This provides a north-south connection along Sand Canyon Avenue, extending from Portola Parkway to Trabuco Road and from Walnut Trail to Alton Parkway.
- **Portola Trail.** This bikeway along Portola Parkway provides east-west access and currently connects Peters Canyon Trail to Sand Canyon Trail.
- **Hicks Canyon Trail.** This trail in Northwood runs east-west from SR-261 to Portola Parkway.
- **Venta Spur Trail.** The Venta Spur Trail runs east-west from the Peters Canyon Trail to SR-133.



- **Walnut Trail.** The Walnut Trail runs adjacent to the Metrolink tracks between Harvard Avenue and Sand Canyon Avenue.
- **San Diego Creek.** This trail connects the city of Orange with the Upper Newport Bay and follows the San Diego Creek channel from Peters Canyon Wash to Newport Beach.
- **Harvard Trail.** This bikeway runs along Harvard Avenue and connects Walnut Trail just south of the railroad tracks to San Diego Creek.
- **Woodbridge Trail.** This trail runs along San Diego Creek through Woodbridge; it also follows Woodbridge's North Lake and South Lake, eventually connecting with Yale Loop.
- **Freeway Trail.** This bikeway runs east-west in the Edison easement along the north side of the I-405 between the San Diego Creek Trail and the Jeffrey/I-405 bike bridge.
- **University Trail.** This bikeway facility is on the south side of University Drive and runs east-west through Mason Regional Park between Harvard Avenue and Ridgeline Drive.
- **Shady Canyon Trail.** This bikeway connects Quail Hill in the northeast with Turtle Rock and UCI Irvine and the San Diego Creek Trail as it passes through Shady Canyon Drive.
- **Barranca Trail.** This bikeway runs east-west from Sand Canyon Trail to SR-133. This bikeway parallels San Diego Creek and is on the north side of the San Diego Creek Trail.
- **Bonita Canyon Trail.** This bikeway parallels Culver Drive and connects Campus Drive to Shady Canyon Trail.
- **Turtle Rock Trail.** This bikeway goes through Turtle Rock and connects University Trail to Shady Canyon Trail.

Irvine also has 301 miles of on-street bikeways on most major arterials, most major and primary highways, and some secondary and commuter highways. As identified in Figure 5-3, most Class II bikeways are part of the arterial highway systems and well distributed throughout the City.





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## 5.4 Public Transit Services

Public transit is becoming an increasingly viable transportation mode as operating costs for private autos increase, roadway congestion increases, and demographics change (increase in elderly population). While public transit may never supplant the automobile as the primary mode of transportation, public transit agencies are continuing to expand and retool services to both retain and improve ridership. Public transit in Irvine consists of passenger rail, bus, and shuttle service.

### 5.4.1 Regulatory Setting

#### 5.4.1.1 Metrolink Rail Plan

Metrolink is governed by the Southern California Regional Rail Authority (SCRRA), a joint powers authority made up of an 11-member board representing the transportation commissions of Los Angeles, Orange, Riverside, San Bernardino and Ventura counties. Metrolink trains operate on seven routes across a six-county, 536 route-mile network, which includes a portion of northern San Diego County. The SCRRA has prepared a 10-year strategic plan to guide its strategic direction and plan for the next generation of rail system improvements that will maintain and improve ridership, infrastructure, and quality of services provided. The Strategic Plan also focuses on strategies for funding operations and capital improvements to address capacity constraints.

#### 5.4.1.2 Orange County Long Range Transportation Plan

The OCTA Long Range Transportation Plan outlines the vision for multi-modal transportation improvements throughout Orange County. For the 2015 update, the Plan is designed to facilitate and expand transportation system choices by providing access to an integrated multimodal transportation system. Four goals are proposed: 1) deliver on commitments proposed in Measure M2; 2) improve transportation system performance with increased speeds, reduced delays and increased transit ridership; 3) expand transportation system choices through investment in new facilities and expanded transit service; and 4) support financial and environmental sustainability. Projects slated for Irvine include grade separations at Jeffrey and Sand Canyon.



### **5.4.1.3 Orange County Transit Master Plan**

OCTA is developing a comprehensive Transit Master Plan (TMP) that will be an integrated bus, rail, and paratransit plan. The TMP will serve as a vision for Orange County’s transit future, taking a high-level look at long-term transit needs throughout the County as well as important connections to transit projects from other local transit agencies. The TMP also will identify a series of corridors that could lead to smoother, more efficient journeys on public transportation options like bus rapid transit and fixed-guideway alternatives such as streetcars

### **5.4.1.4 Irvine General Plan**

The Circulation Element addresses five different types of systems of transportation and circulation: air, roadways, rail, public transit, and bicycle trails. Irvine’s circulation system is designed to: create a hierarchy of roadways; 2) reinforce boundaries of planning areas; 3) respond to conservation, noise, air pollution, and wildlife preservation policies; and 4) satisfy City General Plan and Strategic Business Plan objectives.

The City of Irvine’s public transit system is comprised of four transit corridors—Regional Transit Corridors, Regional Advanced Transit Corridors, Intercity Public Transit Corridor, Local Feeder Transit Corridor, and Arterials. The transit corridors are hierarchical in nature and each play a complementary role in facilitating public transportation. While not all transit options are feasible and are subject to change depending on feasibility, the hierarchy recognizes the need to prioritize transit.

The Irvine General Plan Objective 6—Public Transportation Program—is to work with Orange County Transportation Authority to implement a public transit system for trips within the City and adjacent areas. Supporting policies are designed to encourage the development of a viable transit system serving Irvine. These including:

- Planning residential, commercial, and industrial areas to enable effective use of transit (Policy a)
- Coordinating with OCTA to implement a viable, efficient, and cost-effective transit service (Policy c)
- Proactively planning for advanced methods of public transit for intercity and intracity use (Policies e, f, and g)

## 5.4.2 Existing Conditions

Public transit should become an increasingly viable transportation mode as operating costs for private autos increase, roadway congestion increases, and lack of accessibility to private autos for certain groups (i.e., elderly, handicapped, low income) increases. As Irvine and the region develop, regional transit providers are expanding services.

### 5.4.2.1 Rail Transit

Irvine is served by several rail transit options—Amtrak and Metrolink. Amtrak's Pacific Surfliner provides regional passenger rail service with stops in Fullerton, Anaheim, Santa Ana, Irvine, San Juan Capistrano, and San Clemente. Every day, 26 Amtrak trains serve the Irvine Station. As Irvine is a central stop in Orange County (strategically located between San Diego and Los Angeles) and a major regional employment base, Irvine has the 25<sup>th</sup> busiest Amtrak station in the nation, with approximately 425,000 boardings and alightings in 2015.<sup>1</sup>

Metrolink also operates trains along on the Los Angeles to San Diego (LOSSAN) railroad right-of-way through the community. The Orange County Line, which travels between Oceanside and Los Angeles, runs every 10 to 30 minutes during rush hour. The Inland Empire-Orange County Line runs between Oceanside and San Bernardino, every 10 to 40 minutes during rush hour. These lines also provide weekend rail service. In FY 2016/17, weekday ridership averaged 8,765 on the Orange County Line and 4,563 on the Inland Empire Line.

The Irvine Transportation Center is the busiest station in Orange County, serving more than a million commuters annually. The Irvine Station is served by Amtrak and Metrolink and is a hub for express, local, and rail-feeder bus services operated by the OCTA and the iShuttle. These lines offer direct routes to both the Spectrum and Irvine Business Complex. Free parking is available at the Irvine Station in a 1,500-space parking structure. Parking is limited to 72 hours, but Amtrak customers can park longer by registering their vehicle with the on-site security guard.



Irvine Metrolink Station

<sup>1</sup> <https://www.amtrak.com/national-facts>



### 5.4.2.2 Local Transit

OCTA provides bus service within Irvine and throughout Orange County, connecting the City to other counties as well. OCTA also now provides service for Irvine’s I-Shuttle. OCTA also provides transit for people with disabilities. Additional local transit service is provided by UC Irvine.

#### OCTA Bus Service

OCTA provides transit service to all of Orange County, including Irvine. OCTA operates a hierarchy of transit routes, ranging from regional routes used by commuters to local riders using community shuttles. In 2016, OCTA and the City of Irvine adopted an agreement transferring the operation and maintenance of Irvine’s I-shuttle program to OCTA. Table 5-3 summarizes OCTA routes serving Irvine.

**Table 5-3  
OCTA Transit Routes**

Type of Route	Description	Route Numbers
Local Route	Local routes designed to travel primarily within Irvine or nearby cities. Headways are typically one hour.	53, 59, 66, 71, 72, 79, 83, 86, and 90
Community and Shuttle Route (“I-shuttle”)	These routes are intended to connect select locations in Irvine to other cities. Headways are typically an hour.	167, 175, 178, and 188.
Intracounty Express	Regional routes offering express service along freeways, have fewer stops and operate only during peak hours.	211, 212, 213, and 206
Station Link Routes	These routes are designed to link specifically with transit stations and serve nearby employment centers.	472 and 473
Access Routes	Door-to-door service for residents unable to use the regular fixed route service due to functional limitations caused by a disability.	Door to Door

*Source: Orange County Transit Authority, 2016*

The City of Irvine also offers its Transportation for Irvine Residents with Disabilities (TRIPS) service for Irvine residents (18+) who are unable to drive due to a permanent physical and/or cognitive disability. TRIPS provides door-to-door transportation and wheelchair-accessible vehicles on a first-come/first-served basis. Services are available on evening, weekends, and holidays depending on demand.

### 5.4.2.3 Irvine Shuttle

The iShuttle is a clean-fuel, rubber-tire shuttle bus that operates exclusively in Irvine during weekday morning and evening peak commute times. As of FY2015/2016, the annual ridership on the i-shuttle's four routes totaled approximately 260,000 trips. The iShuttle network has four routes, with two routes under consideration:

- **Route A.** Operates along Von Karman Avenue, connecting to Tustin Station and John Wayne Airport. The service operates weekdays from approximately 5:30 to 9:30 am and 3:30 to 7:15 pm. The bus frequency is tied to the train schedules, but is roughly every 10 to 30 minutes.
- **Route B.** Connects Tustin Station to major employment and residential developments on Jamboree Road and Michelson Drive. The service operates weekdays from approximately 6:10 to 9:30 am and 2:30 to 7:45 pm. The bus frequency is tied to the train schedules, but is roughly every 10 to 30 minutes.
- **Route C.** Connects Irvine Station to major employment centers along Alton, Irvine Center Drive, and Sand Canyon. The service operates weekdays from approximately 6:15 to 9:15 am and 3:15 to 6:30 pm. The bus frequency is tied to the train schedules, but is roughly every 10 to 30 minutes.
- **Route D.** Connects Irvine Station to job centers, residential developments, and the Irvine Spectrum Center. The service operates weekdays from approximately 6:15 to 10:00 am and 3:30 to 7:00 pm. Bus frequency is tied to the train schedules, but is roughly every 10 to 30 minutes during the peak hours.
- **Route E Proposed.** The City is working with OCTA to develop a new weekday commuter route to connect the Irvine Station to major employers and residential communities around the station, which includes the Irvine Spectrum.
- **Route W Proposed.** The City is also working with OCTA to develop a new weekday commuter route to connect employment areas and residential communities to the Irvine Business Complex.



#### **5.4.2.4 Anteater Express**

The Anteater Express is a shuttle operated by the UC Irvine Department of Transportation and Distribution Services, primarily to connect the UC Irvine campus with surrounding neighborhoods and housing complexes. However, the service also travels to Diamond Jamboree and the Irvine Spectrum to provide students with an alternative to driving to shopping or recreational opportunities. The six routes closest to campus are free. The ACC Summer Route, Newport Beach Route, Park West-Carlson Route, and Irvine Spectrum Route require payment of a limited fare. As of the 2013-2014 academic year, the Anteater Express had a weekly ridership of almost 60,000 students and faculty members.<sup>2</sup>

#### **5.4.2.5 Additional Transit Providers**

Additional transit options are available in Irvine for seniors and individuals with special needs. The Irvine Senior Service Program coordinates with volunteers to provide free transportation for seniors to medical appointments. Age Well Senior Transportation Services provides nonemergency medical transportation throughout the county. American Cancer Society provides free transport to and from cancer treatments. Service is also available for disabled American veterans. The City's Mobility Guide provides a directory of transit services for senior citizens and special needs individuals.

Figure 5-4 illustrates the location and distribution of transit services traveling on fixed routes in Irvine.

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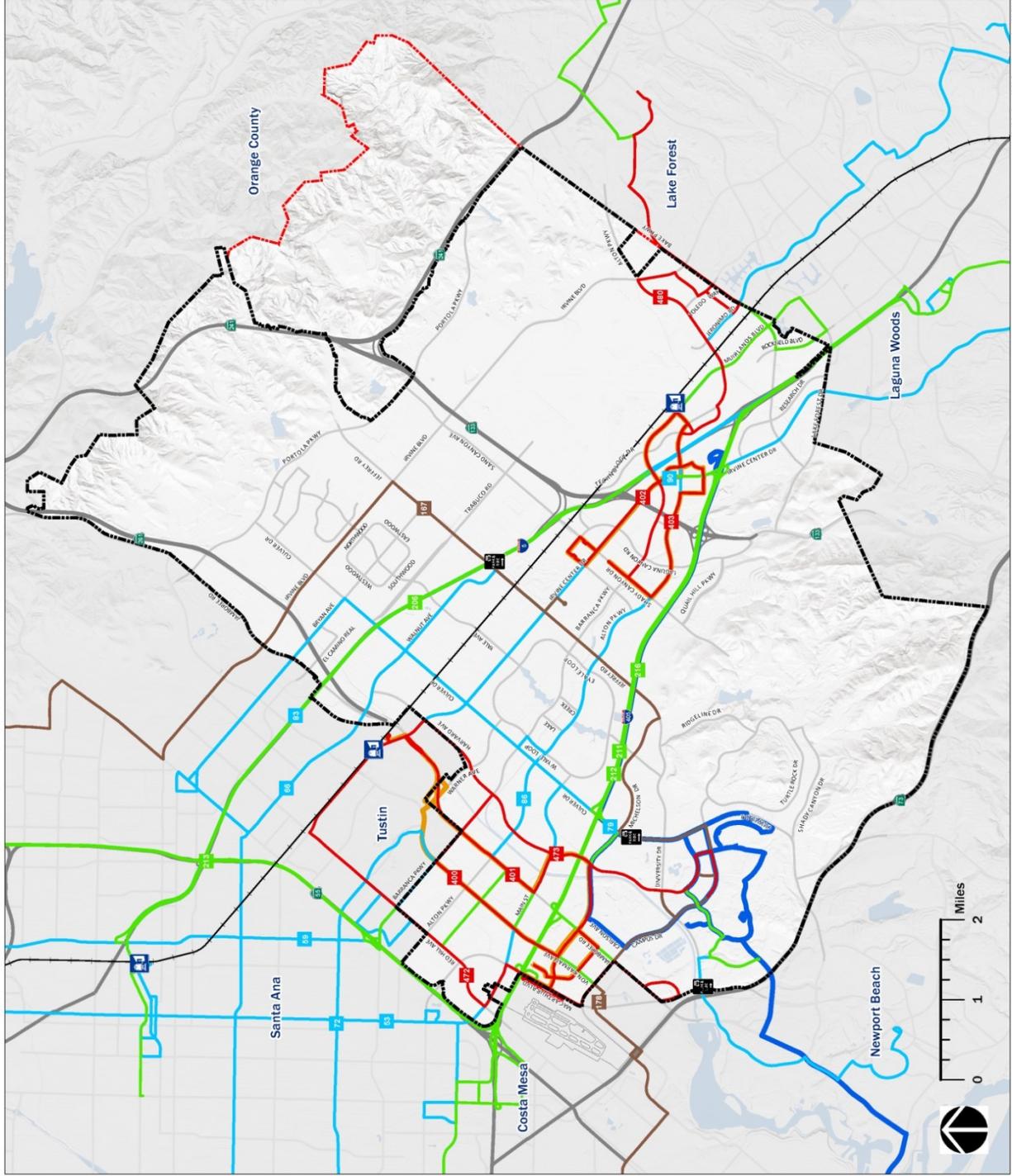
<sup>2</sup> <http://www.shuttle.uci.edu/about/ridership/>

Figure 5-4

# TRANSIT SERVICE

## LEGEND

-  Park and Ride Locations
-  OC Metrolink Stations
-  OCTA Bus Routes
-  Local Routes
-  Community and Shuttle Routes
-  Intra-county Express Routes (Weekday Rush Hour Only)
-  Stationlink Metrolink Rail Feeder Routes (Weekday Rush Hour Only)
-  OC Metrolink Rail
-  Irvine Shuttle
-  UCI Anteater Express
-  City Boundary
-  Sphere of Influence



Source: City of Irvine, 2016; Orange County Transportation Authority, 2016; PlaceWorks, 2016; University of California, Irvine, 2016



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## 5.5 Goods Movement

Goods movement is the transport of commodities and products from one place to another, usually from where the items were manufactured or produced to where they will be sold. The movement of goods through the City—by arterial roadways, rail, or airport—is an important component of the economic vitality and growth of the region.

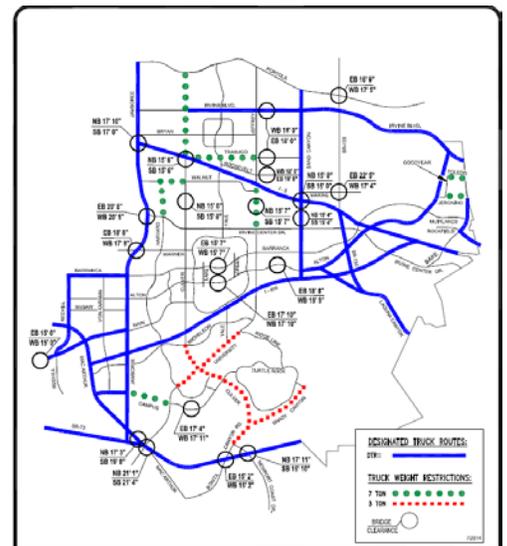
### 5.5.1 Municipal Code

In Irvine, regional movement of goods typically occurs by rail and on the three local freeways around Irvine via truck-trailer. Local truck routes are designed to avoid residential neighborhoods and takes advantage of major freeways or major arterial highways in Irvine. The Irvine Municipal Code identifies designated truck routes, listed in Table 5-3.

**Table 5-4**  
**Designated Truck Routes**

Street	Segment Designated as Truck Route
Bake Parkway	Rockfield Boulevard to the eastern City limit
Barranca Parkway	Red Hill Avenue to Jamboree Boulevard
Irvine Boulevard	Culver Drive to Jeffrey Road; Alton Parkway to the eastern City limit
Jamboree Boulevard	Warner Avenue to MacArthur Boulevard
Laguna Canyon Road	Alton Parkway to SR-133
Laguna Freeway (SR-133)	Entire freeway
MacArthur Boulevard	Daimler Street to Campus Drive; Jamboree Boulevard to Ford Road
Red Hill Avenue	Barranca Parkway to I-405
Rockfield Boulevard	Bake Parkway to eastern City limit
Sand Canyon Avenue	I-405 to northern City limit
San Diego Freeway (I-405)	Entire freeway
Santa Ana Freeway (I-5)	Entire freeway
Main Street	Jamboree Boulevard to western City limit
Campus Drive	Jamboree Boulevard to MacArthur Boulevard
Alton Parkway	Sand Canyon Avenue to Irvine Boulevard

*Source: Irvine Municipal Code, Title 6, Division 3, Chapter 5, Article (d).*



Irvine Truck Routes



## 5.6 Air Transportation Facilities

John Wayne Airport (SNA) is adjacent to Irvine at the City's southwestern corner. In past decades, military aircraft also served Irvine from MCAS El Toro. However, the base was decommissioned in 1999, and the property is being redeveloped for other land uses.

### 5.6.1 Regulatory Setting

Regulations related to safety issues in communities near airports are largely focused on carefully managing the types of uses and structures allowed near airports. These include federal and local regulations.

#### 5.6.1.1 Federal Air Regulations

The Federal Aviation Administration (FAA) is charged with the review of construction activities in the vicinity of airports. Its role in reviewing these activities is to ensure that new structures do not result in a hazard to navigation and degrade the safety of the National Airspace System. Federal Air Regulations (FAR) Part 77 are designed to ensure that no hazards are allowed that would endanger the public. Proposed structures are also evaluated against terminal "en route" procedures, to ensure that a structure does not adversely impact flight procedures. Tall structures, buildings, construction cranes, and cell towers near an airport can be hazardous to the navigation of airplanes. Part 77 establishes standards for determining whether objects could obstruct navigable airspace, sets notice requirements of certain types of proposed construction or alterations, and provides for studies to determine potential impacts of a structure on the flight of aircraft.

#### 5.6.1.2 State Regulations

The State Aeronautics Act (Public Utilities Code §§ 21670 et seq.) establishes requirements for airport land use compatibility planning. The California Department of Transportation's *California Airport Land Use Planning Handbook* provides guidelines for preparing airport compatibility plans. The handbook provides guidelines, in part, to define aircraft noise standards and criteria, accident potential zones, building height zones, and designated planning areas. Local consistency with the State Aeronautics Act is embodied in the airport environs land use plan (AELUP) for John Wayne Airport, discussed below.

#### Airport Planning Terms

**Runway Protection Zone.** Often classed the dar zone, a trapezoidal area off each end of a runway used to enhance the protection of people and property on the ground. This area is the innermost area of the safety zones.

**Safety and Compatibility Zones:** Safety and compatibility zones depict which land uses are acceptable and which are unacceptable in various portions of the airport environs. .

**Planning Area.** The planning area sets limits of the area within which proposed land use projects are to be referred to the ALUC for review. It encompasses the furthest extent of the 60 CNEL contour, the FAR Part 77 Notification Surface, and the runway safety zones associated with the airport.

**Airport Influence Area.** The area in which current or future airport-related noise, over-flight, safety, and/or airspace protection factors may significantly affect land uses or necessitate restrictions on uses. For SNA, the airport influence area is designated by the ALUC as its *planning area boundary*.

The AELUP for John Wayne Airport is a 20-year land use compatibility plan for the airport to safeguard the general welfare of the inhabitants within its vicinity and ensure its continued operation. The plan seeks to protect the public from the adverse effects of aircraft noise, to ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents, and to ensure that no structures or activities adversely affect navigable airspace. Prepared by the Orange County Airport Land Use Commission, the AELUP was last amended in 2008. The AELUP includes the following:

- Planning guidelines, including standards for aircraft noise and building heights.
- Maps showing height restriction zones, notification areas, and safety zones.
- Compatibility guidelines for each safety zone (in relation to the zone's proximity from the airport runway).

### **5.6.1.3 General Plan and Zoning Code**

The General Plan, Safety Element refers to the most current available Airport Environs Land Use Plan (AELUP) for land use compatibility and land use intensity. Land use regulations and development standards in Chapter 3-37 of the Irvine Zoning Code require that proposed developments with heights over 200 feet apply for approval from the FAA and the Orange County ALUC. Standards for the Irvine Business Complex Residential Mixed-Use Overlay District also identify maximum heights for buildings based on their proximity to the airport.

The circulation element of the general plan also contains policies related to air transportation, including but not limited to:

- Promote coordination between the airport and public transit (Policy B-7 [a])
- Require mitigation of airport-related environmental impacts (Policy B-7 [b]).
- Promote alternatives to SNA, including other airports (Policy B-7 [d]) and
- Promote high-speed ground transportation (Policy B-7 [f]).



## 5.6.2 Existing Conditions

John Wayne Airport (SNA) is one of the busiest commercial airports in the state, serving more than 10 million total passengers in 2015, setting a new record. The airport is served by seven airlines—Alaska, American, Delta/Delta Connection, Frontier, Southwest Airlines, United/United Express, and Westjet. SNA currently has 20 commercial and 6 commuter gates. Two cargo airlines also operate at the airport. SNA is one of only two general aviation airports in Orange County. Therefore, SNA is also home to 450 general aviation aircraft.

Community safety hazards from airports are largely a factor of the potential for injuries, fatalities, and destruction of property from the crash of an aircraft. Ground and air movement of aircraft is influenced by a variety of factors, including human skills and judgment; weather; visibility; communication between pilot and aircraft control; and more unpredictable factors such as the flight patterns of birds. Air crashes can occur during take-off and landing even in highly controlled conditions.

Avoidance and/or minimization of airport safety hazards are typically achieved through the following means:

- Ensuring that lighting and runway markings are clear and in good working order to aid aircraft movement in all weather conditions.
- Limiting population-intensive uses under the approach/departure zones to minimize casualties in the event of a crash.
- Reducing visual and physical obstructions (e.g., tall buildings, drones, etc.) so that pilots can successfully maneuver aircraft.

John Wayne Airport has been historically surrounded by office and airport-oriented commercial uses (e.g., hotels and restaurants). However, in the past 10 years, residential uses have been introduced into the area along Jamboree Boulevard. Areas of Irvine directly under the airport's flight path consist almost entirely of office parks. Compliance with applicable height restrictions has given the IBC a midrise urban character, with a high rise corridor along the I-405 freeway between Jamboree Road and MacArthur Blvd.

Figure 5-4 illustrates the airport safety zones from John Wayne Airport and the area in Irvine encompassed by the relevant zones.

Figure 5-5

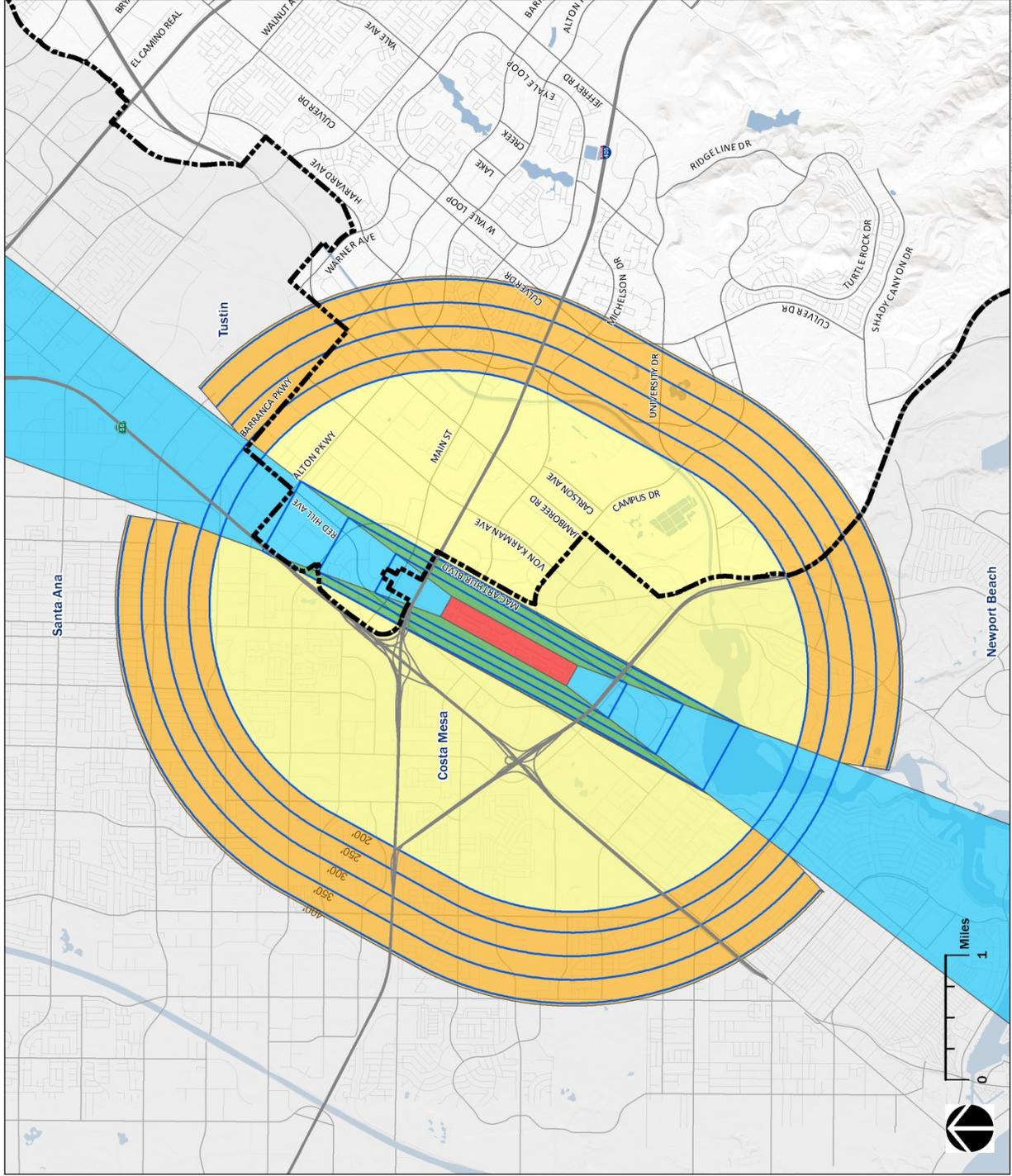
# AIRPORT SAFETY ZONE AND HEIGHT RESTRICTION

## LEGEND

Elevation Contours in feet above mean sea level

### Airport Surfaces

- Horizontal Surface - Elevation 206 Feet AMSL
- Departure Surface - Slope 50:1 (Horizontal:Vertical)
- Transitional Surface - Slope 7:1 (Horizontal:Vertical)
- Conical Surface - Slope 20:1 (Horizontal:Vertical)
- Runway - Elevation 54 Feet AMSL



Source:  
City of Irvine, 2014  
Orange County Airport Land Use Commission, 2008



# IRVINE

GENERAL PLAN 2035

GIS 05.07 - Airport Safety Zone and Height Restriction 05/2022



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## 5.7 Transportation Management

Transportation demand management (TDM) is a set of strategies that aims to reduce travel demand for private automobiles. The concept is increasingly used throughout California and the world as an alternative to increasing roadway capacity, which can be expensive and result in adverse environmental impacts. TDM measures include promotion of carpooling programs; increasing public transit service; subsidizing transit use; expanding pedestrian and bicycle infrastructure; and financial disincentives to driving (such as tolls and congestion pricing).

Like TDM, transportation system management (TSM) is a group of strategies designed to increase the efficiency of a transportation system. Only instead of aiming to reduce the number of cars on the road, TSM aims to make roadways more efficient. TSM measures include intersection improvements, signal timing projects, freeway ramp meters, and traffic data monitoring. TSM measures may be somewhat controversial because improvements in efficiency may come at the expense of bicyclists, pedestrians, and other non-auto transportation.

Efforts are ongoing to implement transportation management goals. One such example is the Spectrumotion, a nationally recognized private, nonprofit transportation management association that was formed to reduce traffic congestion in the Irvine Spectrum. The Spectrumotion promotes, markets, and subsidizes alternatives to solo commuting for those who live and work in the Irvine Spectrum and assists the business community in complying with requirements related to trip reduction.



## 5.8 Opportunities and Constraints

Although Irvine’s circulation system accommodates a variety of travel modes, reliance on the automobile and traffic congestion continues to define the City’s overall transportation network and lifestyle. This presents opportunities and challenges for improving mobility in Irvine.

### 5.8.1 Opportunities

Given that Irvine is approaching buildout, opportunities to improve mobility must focus on expanding multimodal opportunities, improving the existing roadway system, and system demand management.

**Multimodal Transportation.** New state law related to complete streets, transit-oriented planning, CEQA streamlining for infill projects, and multimodal traffic analysis metrics present opportunities to diversify travel modes in Irvine. The state and SCAG have both renewed their commitments to the growth of transit access and walkable communities in the region. Irvine has remaining developable land in key locations that are ideal for walkable, transit-oriented development.

**Arterial Roadway Improvements.** Irvine’s master-planned network of highly connective arterial roadways provides excellent systemwide coverage and allows adaptation over time as transportation modes change. Should such design solutions be deemed appropriate, the wide rights-of-way of these streets could accommodate or be repurposed to increase space for pedestrian, bicycle, or public-transit infrastructure.

**Active Transportation Plan.** The City has demonstrated its ongoing commitment to active, multimodal transportation with the preparation of its draft Active Transportation Plan. This plan includes a thorough analysis of existing barriers to active transportation and identifies key focus areas and recommendations that can be incorporated into the general plan policy and network update.

**System Improvements.** As Irvine’s transportation network is predominantly auto-oriented, it is essential to continue to work on system level improvements. Irvine’s citywide traffic management study is proposing a wide array of system improvements to coordinate signals, improve transit options with OCTA, and make other system changes to improve the efficiency of the existing roadway network and multimodal opportunities for residents and the workforce in Irvine.

### 5.8.2 Constraints

Irvine's constraints to improving mobility include regional traffic, land use patterns, and bus service options.

**Congested Freeways.** The Costa Mesa, Santa Ana, and San Diego freeways are three of the most congested freeways in the nation. During peak commute times, these busy roadways often create spillover congestion on the City's arterial surface streets. Further growth in the City and region will require both additional, costly improvements to these freeways and alternative methods for moving people and goods through and throughout the region.

**Congested Arterial Roadways.** Normal intracity traffic is often exacerbated by regional commuters who, frustrated by congestion on the freeway, look for alternative routes through central Orange County. Congestion on Irvine's arterial highways poses a number of air quality, noise, and safety concerns, especially in residential areas. City roadway improvements (e.g., signal synchronization) can help improve the situation, but traffic congestion will require more regional solutions.

**A Commercial Airport Landlocked by Urban Land Uses.** The location of John Wayne Airport creates economic investment in the IBC and offers Irvine residents a convenient point of departure, but also generates impacts related to aesthetics, noise, safety, and traffic. The John Wayne Airport Master Plan contains a range of programs to address these concerns. The City of Irvine and its neighbors will need to seek a continued balance between the benefits of convenient air travel and associated impacts due to its proximity.

**Lack of Bus Service in Northern Irvine.** As described earlier in this chapter, OCTA bus route expansions have not kept pace with growth of the City, particularly in northern Irvine. The new communities of Orchard Hills, Portola Springs, Stonegate, Woodbury, and the Great Park Neighborhoods have robust pedestrian and bicycle amenities but lack local bus service. The City can advocate for additional routes in northern Irvine as part of the OCTA's short-range (5-year) transportation plan.



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# Chapter 6. Public Facilities and Services

## 6.1 Introduction

Public facilities and services consist of the places and programs that support the basic needs of citizens and create a viable, sustainable, healthy, and cohesive community. The exceptional quality of Irvine’s public facilities and services set the city apart from other communities and are a primary reason people choose to live and work in Irvine. This chapter provides an overview of the type of public facilities and services.

Public services in Irvine are provided by state and local public agencies, quasi-public entities, and private utility companies. These services range from public safety to education, from arts and culture to social services, and many others. In addition to public services, the City of Irvine has taken great care to not only provide the complement of public facilities distributed throughout the city, but also to continue to make investments that keep the facilities in excellent condition.

This chapter discusses key public facilities and services, organized into three broad topics:

- Water, wastewater, and storm drainage utilities
- Municipal waste, energy, and telecommunications
- Public/community services, including police, fire, and health infrastructure and services

Opportunities and constraints related to the provision of public services and facilities are identified at the end of the chapter.



Many City services are provided at City Hall



## 6.2 Water Utilities

California is in its third year of one of the most severe droughts in the state's recorded history. The drought and its impact on California's lakes, rivers, and groundwater have generated concern regarding the continued availability of water in southern California. This section provides an overview of Irvine's water utility planning.

### 6.2.1 Regulatory Setting

Water resource protection for groundwater in California is governed by a complex network of state and federal laws and regulations. This section addresses the quality and supply of drinking water; later sections address protection of surface waters.

#### 6.2.1.1 California Urban Water Management Planning Act

The Urban Water Management Planning Act of 1983, California Water Code Sections 10610 et seq., requires all urban water suppliers in California to periodically prepare a plan that: (1) plans for water supply and reliability of each source of water over a 20-year period in 5-year increments; 2) identifies and quantifies adequate water supplies, including recycled or non-potable water, for existing and future demands in normal, single-dry, and multiple-dry years; and 3) implements conservation and the efficient use of water supplies. Significant new requirements for quantified demand reductions were added by the Water Conservation Act of 2009 (SBX7-7), which amends the act and adds new water conservation provisions to the Water Code.

#### 6.2.1.2 Senate Bills 610 and 221

The state passed Senate Bill (SB) 610 and SB 221, which improve the link between information of water supply availability and certain land use decisions made by cities and counties. Both statutes require detailed information regarding water availability to be provided to decision-makers prior to approval of specified large development projects. Under SB 610, water supply assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects subject to CEQA. Under SB 221, approval by a city or county of certain residential subdivisions requires a verification of sufficient water supply—a fail-safe to ensure that water is available to serve a new large subdivision before construction begins.

## **6.2.1.3 20x2020 State Water Conservation Plan**

The 20x2020 Water Conservation Plan was issued by the Department of Water Resources (DWR) in 2010 pursuant to SB 7, dubbed “SBX7-7.” SBX7-7 mandated water conservation in urban communities and authorized the DWR to prepare a plan implementing water conservation requirements for urban communities. In addition, it required agricultural water providers to prepare agricultural water management plans, measure water deliveries to customers, and implement other efficiency measures. SBX7-7 requires urban water providers to adopt a water conservation target of 20 percent reduction in urban per capita water use by 2020 compared to 2005 baseline use.

## **6.2.1.4 Governor’s Drought Declaration**

In 2015, Governor Brown declared a statewide drought. Subsequent executive orders required the State Water Resources Control Board to impose restrictions to achieve a statewide 25 percent reduction in potable urban water usage through February 28, 2016. These restrictions required water suppliers to California’s cities and towns to reduce usage compared to the amount used in 2013. These restrictions should consider the relative per capita water usage of each water suppliers’ service area, and require that those areas with high per capita use achieve proportionally greater reductions than those with low use. The order is also intended to increase enforcement to prevent wasteful water use, streamline the state’s drought response, and invest in new technologies that will make California more drought resilient.

## **6.2.1.5 Sustainable Groundwater Management Act (SGMA)**

The SGMA addresses the sustainable management of groundwater in California. This legislation is the result of severe water shortages in California, long-term issues with land subsidence, and overdrafting of groundwater aquifers. DWR identified the status of water basins by overdraft and priority levels (e.g., very low, low, medium, or high). While the Orange County Water District’s (OCWD) water basin is not in overdraft, OCWD prepared a groundwater management plan to further long-term groundwater sustainability. The plan describes basin hydrogeology, water supply monitoring, management and operation of recharge facilities, groundwater replenishment system, seawater intrusion and barrier management, and water quality protection.



### **6.2.1.6 Federal and California Safe Drinking Water Acts**

The Safe Drinking Water Act (SDWA) of 1974 is the federal law that protects public drinking water supplies throughout the nation. Under the SDWA, the USEPA sets standards for drinking water quality, maximum contaminant levels (MCL) that cannot be exceeded, and requires ways to treat water to remove the contaminants. The California SDWA authorizes the SWRCB to establish MCLs for drinking water that are at least as stringent as those developed by the EPA, as otherwise required by the federal SDWA. To implement this mandate, water providers like Irvine Ranch Water District (IRWD) are required to ensure that drinking water supplied to customers is in compliance with applicable state and federal standards and to demonstrate, through a consumer confidence report provided to customers, that their drinking water meets all federal and state standards for water quality.

### **6.2.1.7 Other IRWD Local Plans**

IRWD prepares two planning documents to guide water supply decisions in its service area, which includes Irvine:

- **Water Resources Master Plan.** IRWD prepares a comprehensive document compiling data and analyses that IRWD considers necessary for its water planning needs. This detailed document is IRWD's primary resource when planning water resources and infrastructure.
- **Urban Water Management Plan.** This document is required by the California Water Code and based on the Water Resources Master Plan, with certain elements required by the water code. It is updated every five years, and the latest revision was prepared in 2015.
- **Consumer Confidence Report.** IRWD produces a consumer confidence report to comply with the 1996 amendments to the Safe Drinking Water Act (SDWA § 1414(c)), which requires that a community water system (including IRWD) provide a water quality report to its customers each year.

## 6.2.2 Existing Conditions

IRWD provides water supply and wastewater collection, treatment, and disposal services for Irvine. IRWD has facilities worth over \$1 billion that include more than 1,500 miles of drinking water pipelines, more than 900 miles of sewer pipes, many reservoirs, and water recycling facilities. The following describes water and wastewater services provided.

### 6.2.2.1 Water Supply

IRWD’s current water supply includes imported water (27 percent of total), local groundwater and captured surface water supplies (50 percent), recycled water (23 percent), and supplemental imported water supplied by the Metropolitan Water District. Table 6-1 shows IRWD’s projections for its water supplies and demand; IRWD currently has adequate supplies to meet demands through 2035.

**Table 6-1  
Projected IRWD Water Demand and Supply (in acre-feet)**

	Planning Year				
	2015	2020	2025	2030	2035
<b>Potable Water Supply</b>					
Potable Purchased or Imported Water	12,790	41,929	41,929	41,929	41,929
Potable Groundwater	46,770	53,171	65,523	65,523	65,523
<b>Non-potable Supply</b>					
Purchased or Imported Water	5,906	17,826	17,826	17,826	17,826
Surface Water from Irvine Lake	2,826	—	—	—	—
Groundwater	4,063	3,514	3,514	3,514	3,514
Recycled Water	22,866	28,757	28,757	28,757	28,757
<b>Water Demand</b>					
Potable & Raw Water	64,154	71,086	77,700	80,645	81,966
Recycled Water	26,249	25,359	28,261	28,786	29,311
<b>Total Demand</b>	<b>90,403</b>	<b>96,445</b>	<b>105,961</b>	<b>109,431</b>	<b>111,277</b>
<b>Total Supply</b>	<b>95,220</b>	<b>145,197</b>	<b>157,549</b>	<b>157,549</b>	<b>157,549</b>

Source: IRWD Urban Water Management Plan, 2016.

The City’s water facilities are illustrated in Figure 6-1.



### 6.2.2.2 Recycled Water

Water recycling is an essential part of IRWD’s water supply portfolio, as it reduces the demand for high-quality drinking water. IRWD’s recycled water program began with the recycling of sewage to serve agriculture. Today, new developments must install dual plumbing that allows recycled water to be used for landscaping, toilets, and other uses not requiring potable water. IRWD recycled water serves many state-approved uses, including landscape irrigation, toilet flushing, cooling towers, industrial processes, composting, grading, and compaction.



Michelson Water Recycling Plant

IRWD maintains an extensive infrastructure system for recycled water. This includes a recycled water pipeline system that includes more than 500 miles of dual distribution pipelines. Water is recycled at the Michelson Water Recycling Plant (MWRP) and Los Alisos Water Recycling Plant (LAWRP). The MWRP has a permitted tertiary treatment capacity of 28 mgd and recycles 90 percent of the plant’s sewage inflow. To support the over 5,400 recycled water users, IRWD has 15 reservoirs with storage capacity of 4,536 acre-feet of recycled water.

### 6.2.2.3 Water Conservation

IRWD employs various regulatory and financial incentives to reduce the demand for water resources. Historically, water demands in IRWD’s service area have decreased due to conservation campaigns, tiered and allocation-based rate structures, and advances in water-saving technologies. Despite an increase of 13,579 water accounts from 2005 to 2010, IRWD systemwide water use declined by 1,838 acre-feet. This reduction in water use is likely due to the drought and IRWD’s allocation-based water rate structure, which charges customers a higher rate for using more water than necessary.

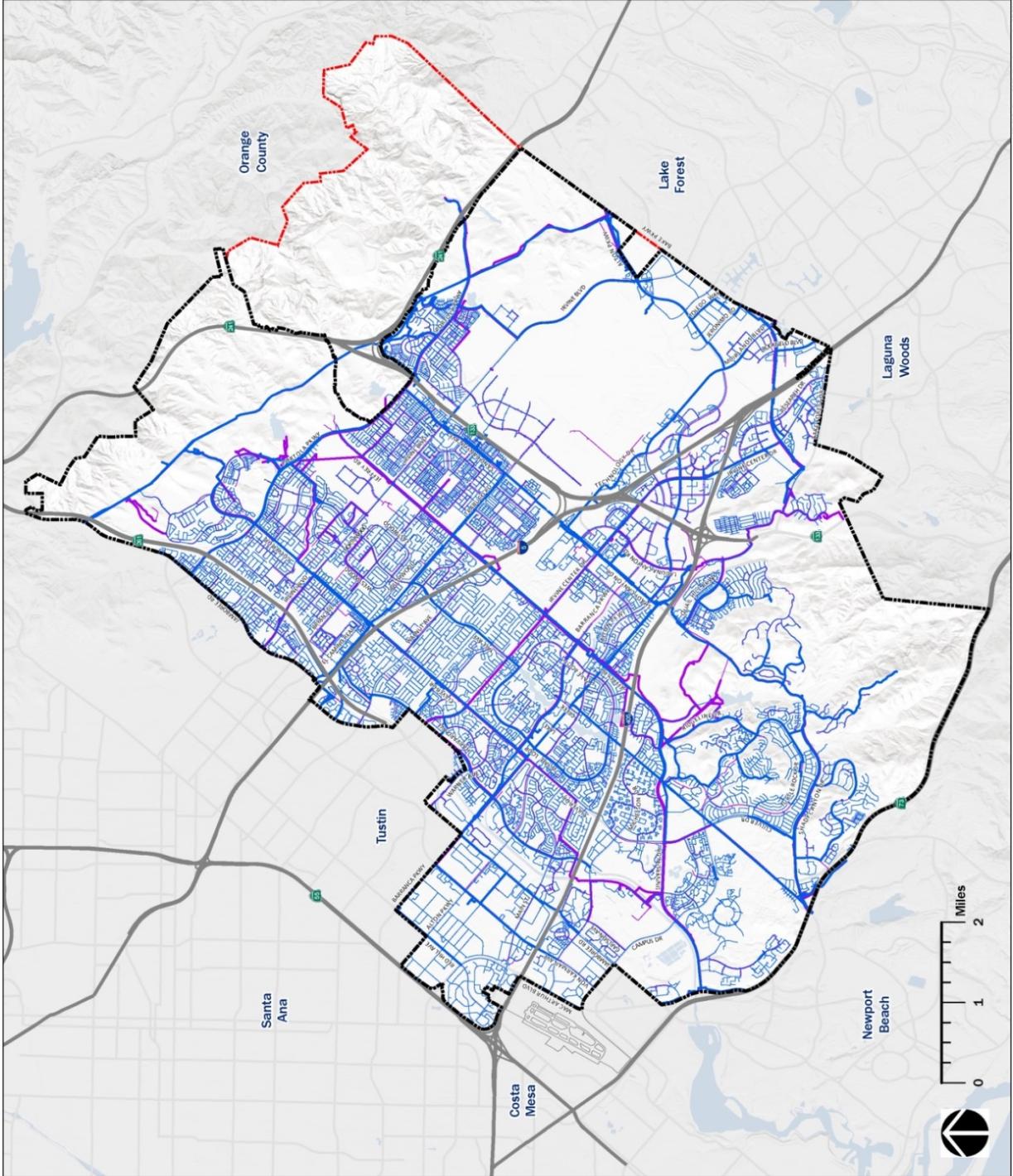
As documented, IRWD currently has sufficient water supplies to meet its mandated conservation requirements for single- and multiple-year droughts. It has also adopted a water conservation target of 20 percent reduction in urban per capita water use by 2020 compared to 2005 baseline use, in accordance with SBX7-7. Irvine has been successful in meeting its conservation targets. However, if the state also allowed the City to take credit for recycled water meeting 28 percent of IRWD’s service demand, the City would easily meet its conservation targets.

Figure 6-1

# WATER SYSTEM

## LEGEND

- DRINKING WATER
  - 1 - Distribution Main
  - 2 - Transmission Main
- RECLAIMED WATER
  - 1 - Distribution Main
  - 2 - Transmission Main
- City Boundary
- Sphere of Influence



Source: City of Irvine, 2014; Irvine Ranch Water District, 2014





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## 6.2.2.4 Drinking Water Quality

The Irvine Ranch Water District strives to provide residents and business consumers with safe drinking water supplies. IRWD, OCWD, and the Metropolitan Water District of Southern California (MWD) conduct extensive testing for regulated and unregulated chemicals in their water supplies. OCWD manages the quality of the groundwater basin, MWD supplies imported treated surface water, and IRWD operates a surface water treatment plant and several ground water treatment plants.

Communities are required to adhere to stringent state regulations regarding primary and secondary drinking water standards. Primary standards are legally enforceable standards that are needed to protect public health. Secondary standards affect the color, appearance, and taste of drinking water, but are not health-related standards. Adherence to standards is measured in terms of maximum contaminant levels allowed in drinking water. Progress toward public health goals, as described below, is also required to be reported.

The EPA, the Office of Environmental Health Hazard Assessment, and the SWRCB Division of Drinking Water have set voluntary drinking water quality goals for some contaminants. The most common measure is public health goals (PHGs). Water quality goals are often set at such low levels that they are not achievable in practice and are not directly measurable. Nevertheless, these goals provide useful guide posts and direction for water management practices. IRWD strives to meet PHGs although state and federal law do not require adherence.

IRWD produces an annual consumer confidence report that tracks the quality of Irvine’s drinking water. IRWD continues to meet and/or exceed all primary and secondary drinking water standards that are required by state and federal law. Information on consumer confidence reports can accessed at IRWD’s website at: <http://www.irwd.com/services/water-quality-report>.

### Water Quality Terms

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to PHGS as economically and technologically feasible.

**Primary Drinking Water Regulations.** Legally enforceable primary standards and treatment techniques that apply to public water systems and protect public health by limiting the levels of contaminants in drinking water.

**Secondary Maximum Contaminant Level (MCLs):** The type and maximum level of contaminants that are known to affect the odor, taste, and appearance of drinking water.

**Regulatory Action Level:** The concentration of a particular contaminant, which, if exceeded, triggers treatment or other requirements.

**Public Health Goal (PHG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.



## 6.3 Wastewater Collection and Disposal Utilities

Wastewater is water that has been discharged from homes, businesses, or other land uses after it has been used for one of many purposes. In urban areas, wastewater is typically conveyed away from its source via a sanitary sewer system and treated at a wastewater treatment plant.

### 6.3.1 Regulatory Setting

#### 6.3.1.1 SWRCB Waste Discharge Requirement

The State Water Resources Control Board adopted Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, Water Quality Order No. 2006-0003, on May 2, 2006. This law provides a consistent, statewide approach to address sanitary sewer overflows. The Sanitary Sewer Systems WDR requires public agencies that own or operate sewer systems to develop and implement sewer system management plans (SSMP). The SSMP documents an agency's program to properly operate and maintain its sanitary sewer system. IRWD prepared and adheres to its SSMP, last amended in 2013.

#### 6.3.1.2 General Plan

The Integrated Waste Management Element sets forth Objective H-3 to control wastewater and storm runoff in a manner to minimize impact on adjacent existing or planned land uses.

- Minimize changes in hydrology and pollutant loading and requiring structural and nonstructural BMPs among others (Policy e), and encouraging the use of water quality wetlands, swales, and other similar measures.
- Wastewater. Control wastewater and storm runoff in a manner to minimize the impact on adjacent existing or planned land uses.
- Require a NPDES permit wherever surface water is collected anywhere for discharge as a point source and incorporate the use of alternative best management practices to control and minimize urban runoff (Policy (d)).

## 6.3.2 Existing Conditions

Wastewater in Irvine travels through IRWD's collection system to the Michelson Water Reclamation Plant, where it is treated through the reclamation process for use in landscaping, agricultural irrigation, and other non-potable water uses. However, one part of the City, the Irvine Business Complex, is not within the IRWD collection system. The IBC is in the Orange County Sanitation District (OCSD), tributary zone No. 7, and wastewater generated in the IBC flows to OCSD treatment facilities.

### 6.3.2.1 IRWD Sewer System

IRWD's sewer collection system stretches approximately 963 miles, covering Irvine and portions of surrounding communities. The sewer system contains 24 lift stations, of which 12 are major facilities. The system also includes siphons to convey wastewater flows under man-made and natural obstructions, and diversion structures to divert or split upstream flows into two separate downstream pipelines. Wastewater is conveyed by sewer mains that range from 4 to 60 inches wide; the 32-inch trunk lines are the most critical pipelines.

IRWD has an extensive dual distribution system, which delivers recycled water from its two recycling treatment plants, the Michelson Water Recycling Plant (MWRP) and Los Alisos Water Recycling Plant (LAWRP). The MWRP was recently expanded to accommodate 28 million gallons per day (mgd). IRWD also owns and operates the LAWRP in Lake Forest, which is a separate sewage treatment system with tertiary treatment capacity of 5.5 mgd. Treated effluent from all plants meets water quality standards in the California Administrative Code, Title 22, Division 4, for use as recycled water.

Overall, the system is very highly managed and is in relatively "young health" by sewer system standards. In addition, when specific plans or major projects are processed, IRWD requires subarea master plans that identify projected water and sewer demands, required sewer and water infrastructure, and conformance with the sewer collection system master plan. This process enables IRWD to manage the sewer and water systems in a comprehensive manner. As such, there appears to be sufficient capacity to accommodate current and future sewer flows.



The IRWD has completed a Sewer Collection System Master Plan to plan for continuous high levels of customer service and accommodate future service demands. As part of this effort, a hydraulic capacity model was used to determine the existing capacity and future capacity based on long-term growth projections. Although IRWD has not experienced any capacity-related sewer overflows, 12 specific capital improvement projects were identified to improve capacity to meet future needs. Since the 2006 study, four of the highest priority deficiency projects have been implemented; the other projects are deferred indefinitely. These remaining projects are being monitored with flow sensors at strategic locations, and IRWD is using real data (not modeled results) to evaluate capacity as compared to future growth in these areas.

In addition to the 2006 capacity study, IRWD prepared a 2013 SSMP as part of separate requirements enforced by the SWRCB. The SSMP serves as a separate guidance document that covers operations and maintenance, design and performance provisions, overflow emergency response plans, Fats Oils and Grease (FOG) Program, system evaluation and capacity assurance plan, monitoring, and measurement and program modifications. The periodic update of this document ensures the entire system is being operated and maintained and is continually being upgraded for future conditions (Fusco Engineering 2014).

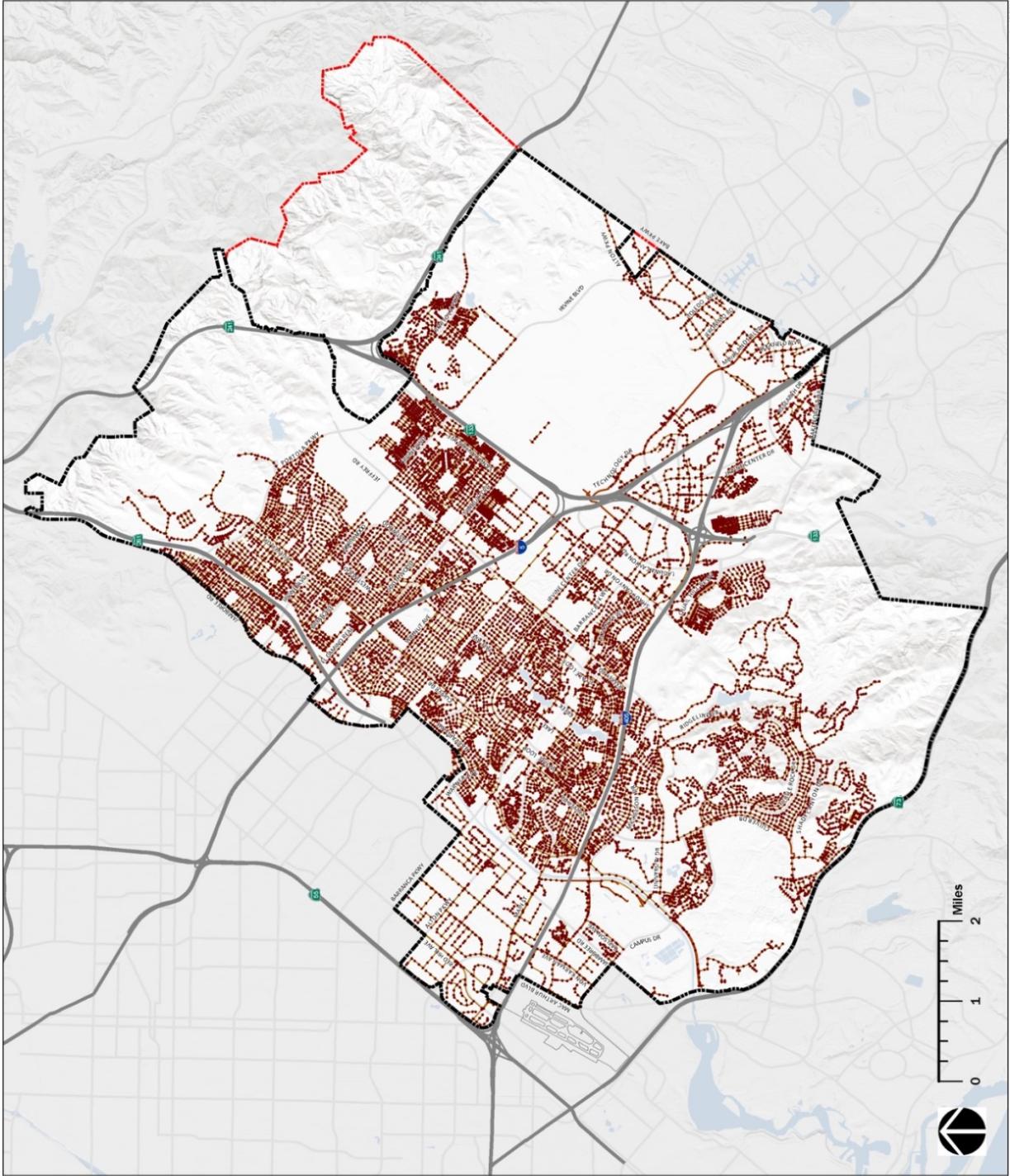
Figure 6-2 shows the existing public sewer system in Irvine.

Figure 6-2

# SEWER SYSTEM

## LEGEND

- Manholes
- Sewer Force Mains
- Sewer Gravity Mains
- City Boundary
- Sphere of Influence



Source: City of Irvine, 2014; Irvine Ranch Water District, 2014



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## 6.4 Storm Drainage Utilities

Stormwater is generated by precipitation. It is essential for the replenishment of groundwater, which is used for trees, agriculture, and human consumption. However, urban environments, including buildings, roads, infrastructure, and graded land, prevent stormwater from being absorbed into the ground. This generates stormwater runoff, which, if not effectively managed, can lead to flooding, erosion, and/or pollution of downstream waterways. Urban runoff can contain pollutants such as pesticides, fertilizer, and animal waste. Stormwater management is an important task for municipalities in eliminating hazards to buildings, property, human safety, and water quality.

### 6.4.1 Regulatory Setting

#### 6.4.1.1 Federal Clean Water Act

The Federal Clean Water Act (CWA) is the primary federal law that protects the quality of the nation's surface waters, including lakes, rivers, aquifers, and coastal areas. The CWA is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which established the basic structure for regulating pollutant discharges to navigable waters of the United States. The CWA is based on the concept that all discharges into the nation's waters are unlawful unless specifically authorized by permit. Under the CWA, the EPA sets national standards and effluent limitations, but delegates responsibilities to the SWRCB and its regional boards.

The Federal Clean Water Act Section 303(d) requires that states identify waters that do not or are not expected to meet water quality standards (beneficial uses, water quality objectives and the antidegradation policy) with the implementation of technology-based controls. Once a water body has been placed on the 303(d) list of impaired waters, states are required to develop a total maximum daily load (TMDL) to address each pollutant causing impairment. A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including: discharges from wastewater treatment facilities and runoff from homes, forested lands, agriculture, roadways, legacy uses, septic systems, etc. .



Irvine's storm drainage system drains to San Diego Creek, which carries stormwater to Upper Newport Bay and the Pacific Ocean.

#### **6.4.1.2 Porter-Cologne Water Quality Control Act**

California state law (Porter-Cologne Water Quality Control Act, California Water Code Section 13000 et. seq.) requires the regional water board to formulate and adopt water quality control plans, or basin plans, for all areas within its region. The basin plans set forth beneficial uses of the waters, water quality objectives, and an implementation for achieving specified water quality standards. The basin plan also contains a monitoring plan for determining the effectiveness of the plan. The Santa Ana Regional Water Quality Control Board (RWQCB) has developed a basin plan for the Santa Ana River groundwater basin, a region that also includes Irvine. The plan is periodically updated and is undergoing its triennial review.

#### **6.4.1.3 National Pollutant Discharge Elimination System**

Established by the CWA, Section 402(p), the National Pollutant Discharge Elimination System (NPDES) requires a permit for stormwater discharges from point sources—municipal separate storm sewer systems, industrial activities, construction activities, and designated dischargers that are significant contributors of pollutants to waters of the United States. The NPDES permit requirement also includes “nonpoint-source” pollution to control the introduction of bacteria, sediment, oil and grease, heavy metals, pesticides, fertilizers, and other chemicals into rivers, lakes, bays, and oceans from nondiscrete sources. In Orange County, the NPDES program is implemented through the Municipal Separate Storm Sewer System (MS4) program.

#### **6.4.1.4 Orange County MS4 Permit**

To comply with state requirements, the County of Orange (principal permittee), Orange County Flood Control District, and the incorporated cities applied for a MS4 permit from the Santa Ana RWQCB. As part of its 2016 MS4 permit (R8-2016-0001), signatories agreed to adhere to a stormwater quality management program. Collectively, these agencies prepared a Drainage Area Management Plan (DAMP). Any priority development project that meets the criteria in Section XII.B.2 of the Orange County MS4 Permit must demonstrate compliance with the MS4 permit and implement a water quality management plan. The City has adopted a local implementation plan that is consistent with the DAMP to comply with the MS4 permit.

## 6.4.2 Existing Conditions

Irvine lies within the 154-square mile Newport Bay Watershed, which is defined by the foothills of the Santa Ana Mountains to the east (Loma Ridge) and the San Joaquin Hills to the west and southwest. There are four sub-watersheds that make up the Greater Newport Bay Watershed: Peters Canyon Wash, Upper San Diego Creek, Lower San Diego Creek, and Newport Bay.

### 6.4.2.1 Impaired Waterways in Irvine

The watershed was historically home to agricultural uses, but now contains the cities of Irvine, Tustin, Santa Ana, Costa Mesa, Lake Forest, Laguna Hills, Orange, and Newport Beach, and unincorporated areas. Because of its historical agricultural uses and present urbanized uses, including industry and commerce, many of the waterways are impaired. TMDL allocations have been developed for the Newport Bay and San Diego Creek watersheds for nutrients, sediment, and toxics; there is also a fecal coliform TMDL for Newport Bay. Additional TMDLs are pending.

Table 6-2 provides a list of impaired waterways in Irvine, type of contaminants causing the impairment, and estimated date for addressing the TMDL requirements.

**Table 6-2  
Impaired Waterbodies in Irvine**

Water Body	Contaminants	Est. TMDL Completion
Borrego Creek	ammonia (unionized); indicator bacteria	2021
Peters Canon Channel	DDT, Bacteria, pH, toxaphene	2019–2021
San Diego Creek Reach 1	Fecal coliform; nutrients; pesticides; sedimentation; selenium; toxaphene	2007–2021
San Diego Creek Reach 2	Indicator bacteria, nutrients, sedimentation, unknown toxicity	2021–
Serrano Creek	Ammonia (unionized); pH; indicator bacteria	2021

*Source: State Water Resources Control Board (SWRCB), 2012. 2012 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)*



### 6.4.2.2 Dry Weather Urban Runoff

Dry-weather urban runoff is typically contaminated water that finds its way into storm drains from urban areas. It is composed primarily of runoff from excess landscape irrigation, washing of vehicles, hosing down paved areas, storm drain infiltration, natural groundwater from sub-drain systems, and a variety of other sources from urban activity. The flow can be filled with pathogens, toxics, pesticides, and other materials that can contaminate downstream waters. Dry-weather urban runoff does not include stormwater. A key strategic objective of the IRWD is to minimize and improve the quality of dry weather runoff



Natural Treatment System, IRWD

As authorized by the California Water Code, IRWD has the authority to acquire, construct, operate, maintain, and furnish facilities for the diversion and treatment of dry weather urban runoff. IRWD has developed an innovative Natural Treatment System to provide natural treatment of dry-weather runoff flows in order to provide riparian habitat and water-quality benefits throughout the watershed. Low-flow natural and urban runoff is diverted into man-made wetlands within the San Diego Creek Watershed. In these wetlands, contaminants are removed and prevented from reaching the Upper Newport Bay.

### 6.4.2.3 Groundwater Quality

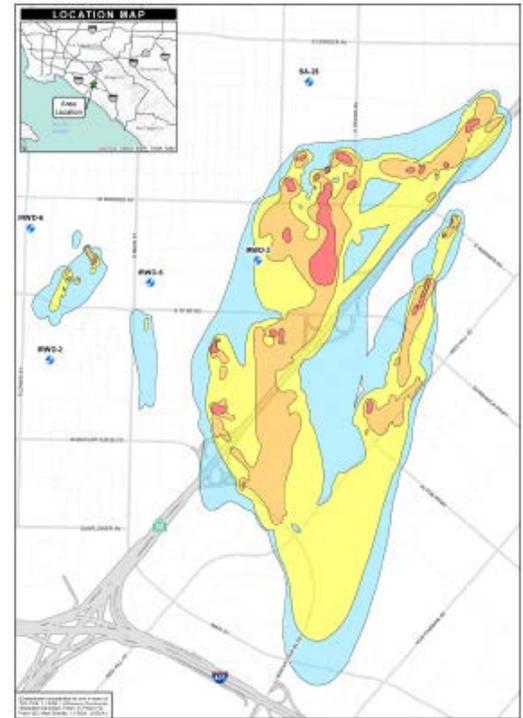
Portions of the groundwater table beneath Irvine have high salts levels because of the natural geology and the history of agricultural use. The Irvine Desalter Project (IDP) includes five wells located near the I-5 freeway in Irvine. Salty water is pumped from these wells and sent to the IDP treatment facility. The treatment process uses reverse osmosis, decarbonation, and disinfection to make the water suitable for drinking purposes. The purified water provides 5,100 acre-feet or 1.6 billion gallons of drinking water, enough for 50,000 people per year.

The City's El Toro Groundwater Remediation program is designed to address trichloroethylene (TCE) in the groundwater basin beneath the former El Toro MCAS. TCE is a volatile organic compound that was used as a solvent for aircraft cleaning prior to the development of stricter environmental regulations. The IRWD, OCWD, and federal authorities are pumping water from a three-square-mile plume, treating the water, and returning the cleaned water to irrigate landscaping. This program provides 1.3 billion gallons of clean water annually.

# PUBLIC FACILITIES AND SERVICES

Nitrate is one of the most common and widespread contaminants in groundwater supplies. Elevated levels of nitrate originate from fertilizer use, animal feedlots, wastewater disposal systems, and other sources. Plants and bacteria break down nitrate but excess amounts can leach into groundwater. Certain portions of Irvine have nitrate levels in excess of MCLs established in state law. IRWD Wells 21 and 22 contain nitrate at levels exceeding the primary MCL of 10 mg/L and total dissolved solids concentrations above the secondary MCL. IRWD has therefore constructed a reverse osmosis treatment facility to reduce concentrations in the water to meet state water quality standards before conveying water to the potable supply distribution system.

Selenium is a naturally occurring micronutrient found in soils and groundwater in the Newport Bay Watershed. Selenium is essential for reproductive health and immune system function in humans, fish, and wildlife. However, selenium bio-accumulates in the food chain and can cause public health concerns. Prior to urban development, the Irvine Subbasin contained an area known as the Swamp of the Frogs. Runoff from local foothills over thousands of years accumulated selenium-rich deposits in the swamp. To make this region suitable for farming, drains and channels were constructed. This mobilized selenium from sediments into the shallow groundwater. The Nitrogen and Selenium Management Program was formed to develop and implement a work plan to address selenium and nitrate in the watershed to comply with the requirements of NPDES Permits issued by the Santa Ana RWQCB.



Santa Ana/Tustin/Irvine Plume

## 6.4.2.4 Regional Flood Control Master Plan

Stormwater runoff and flood protection in Irvine is managed by the City of Irvine and the Orange County Flood Control District. The City is responsible for the public storm drain system that collects and conveys stormwater runoff from development to the regional flood control facilities. The City is also responsible for the design review and approval of private storm drain systems that tie into City's storm drain system. The Orange County Flood Control District (OCFCD) is responsible for operations and maintenance of the regional flood control facilities that ultimately deliver the runoff to the downstream receiving waters.

Unlike many other cities in Orange County, Irvine was designed as one of the first master planned cities in the country. The City is divided into planning areas, and, as they were developed, each required



implementation of the necessary storm drain system for the full buildout of the planning area. This was repeated for all planning areas, resulting in a well-functioning system. If deficiencies are identified, they are most likely due to the conveyance capacity of San Diego Creek or the regional flood control system that drains into it.

The 1999 Regional Flood Control Master Plan for San Diego Creek serves as the comprehensive engineering and flood protection document for the City's regional flood control facilities. The OCFCD and Irvine use the master plan to regulate peak flow discharges and ensure that runoff is managed in accordance with the design parameters in the master plan. When the City processes major land use changes within the watershed, detailed studies and addendums to the master plan are required.

The City does not use a master plan of drainage for its storm drain facilities, nor does it collect a dedicated storm drain fee for future long-term replacement. Instead, it relies on the regional flood control master plan and other funding mechanisms within the public works department for long-term care of the storm drain system. In addition, the City pays its fair contribution for any large-scale OCFCD flood control improvements that benefit the City (Fusco Engineering 2014).

Irvine contains both natural areas where stormwater can be recharged into the ground and urbanized areas that are dominated by impervious (nonporous) surfaces and other hardscapes. However, most waterways in the City are channelized for flood control purposes. Because growth in Irvine has been master planned, stormwater infrastructure has been improved incrementally as the City has grown, keeping pace as development has occurred. Deficiencies in the system are limited. Periodically, the Army Corps scours the San Diego Creek channels to reduce sedimentation and ensure the proper functioning of channels.

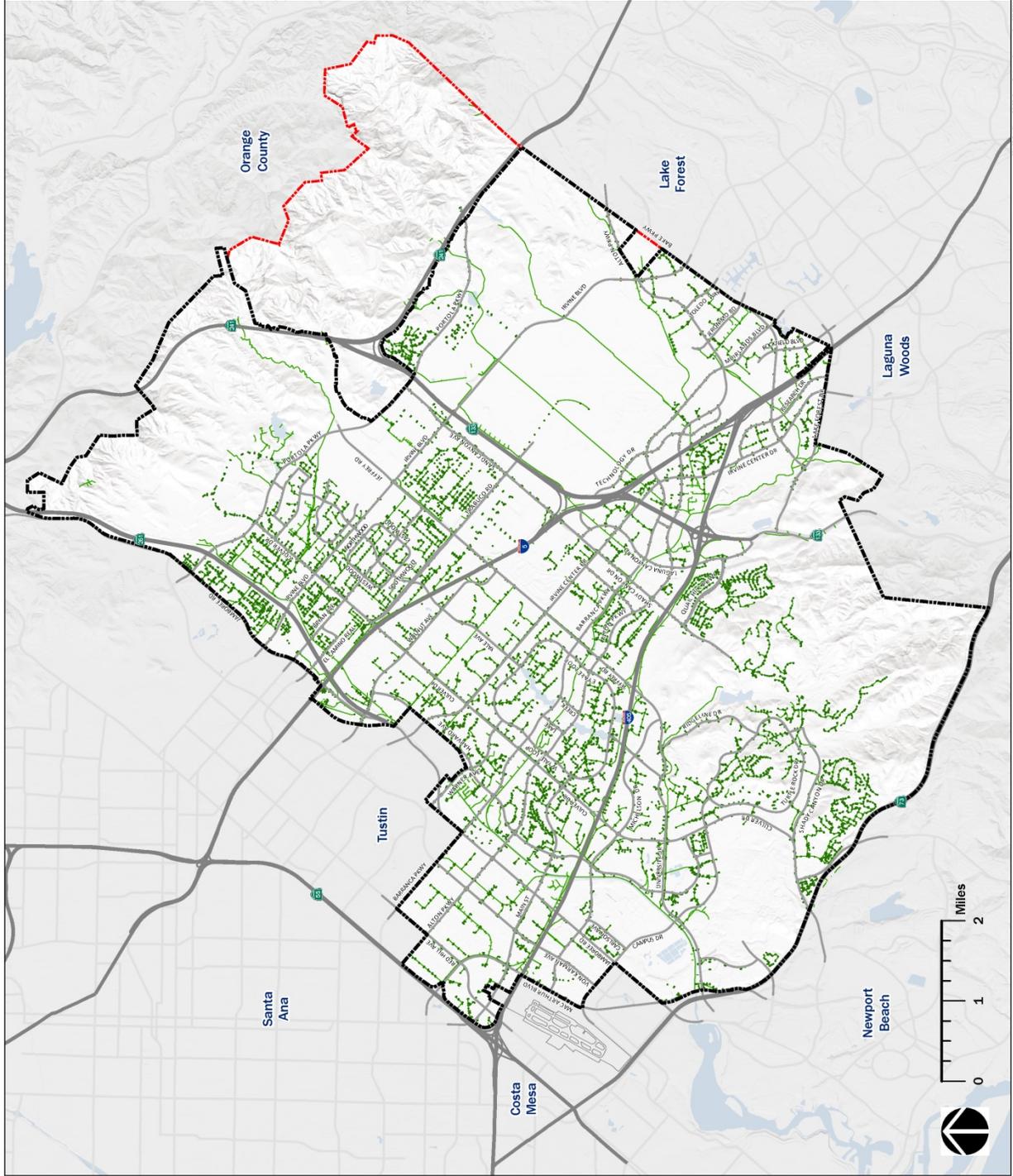
Figure 6-3 shows major flood channels and waterways in Irvine.

Figure 6-3

# STORM DRAINAGE SYSTEM

## LEGEND

- Catch Basins
- Storm Drains
- - - City Boundary
- - - Sphere of Influence



Source: City of Irvine, 2014; Irvine Ranch Water District, 2014



001-02.0 - Figure 6-3 - Storm Drainage System.mxd 3/2/2015



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## 6.5 Municipal Waste

Over the past several decades, managing municipal and hazardous waste has become critically important for municipalities to protect the environment and reduce the need for new landfills. This section describes City and regional efforts to manage municipal wastes. Hazardous waste is discussed in Chapter 7, *Public Safety*.

### 6.5.1 Regulatory Setting: Solid Waste

Regulations aimed at minimizing the generation of waste and promoting recycling have been adopted at the state and local levels.

#### 6.5.1.1 Assembly Bill 939

In 1989, the State Legislature passed Assembly Bill 939 (AB 939), the Integrated Waste Management Act, which required cities and the county to prepare, adopt, and submit a Source Reduction and Recycling Element that describes local conditions and municipal programs relating to waste disposal, source reduction, recycling, composting, solid waste capacity, education/public information, funding, special waste, and household hazardous waste to ensure sufficient waste disposal and recovery processing capacity. In addition, AB 939 mandated that each city achieve a waste diversion goal of 50 percent through source reduction, recycling, and composting activities by January 1, 2000. In October 2011, Assembly Bill 341 established a statewide waste diversion goal of 75 percent by 2020. In addition, AB 341 requires mandatory commercial waste recycling by California businesses.

#### 6.5.1.2 Irvine Zero Waste Resolution

The City has been a leader in meeting source reduction and recycling goals since the enactment of AB939. To demonstrate its commitment to resource efficiency, Irvine has also adopted a resolution to support Zero Waste principles in 2007. Zero waste means making the most efficient use of natural resources to reduce waste as much as possible in order to protect and sustain the environment. The City encourages Zero Waste practices through curbside recycling, parks recycling, recycling at City facilities, and the City's purchasing policy to buy recycled products. Information on the City's Zero Waste program can be found online at: [www.cityofirvine.org/environmental-programs/what-zero-waste](http://www.cityofirvine.org/environmental-programs/what-zero-waste).

#### Municipal Waste Terms

**Green Waste.** Waste generated from maintaining landscaping, including grass and tree clippings.

**Integrated Waste Management.** A system for reducing, collecting, recycling, and disposing of waste products generated by residential, institutional, commercial, and industrial land uses.

**Waste Diversion:** The prevention and reduction of generated waste through source reduction, recycling, reuse, or composting.

**Zero Waste:** An ideology or goal that seeks to avoid sending any refuse to landfills. Zero waste strategies focus on reusing all materials and products.



### **6.5.1.3 Construction & Demolition Debris Ordinance (2007)**

The City of Irvine has adopted a construction and demolition (C&D) recycling ordinance. Under this ordinance, projects are required to recycle or reuse 75 percent of concrete and asphalt, and at least 65 percent of all debris generated. Covered projects include new residential and nonresidential development and most projects involving nonresidential demolition and/or renovation in accordance with requirements of the California Green Building Standards Code. Applicants for projects are required to submit a waste management plan to the City prior to obtaining permits for construction, demolition, or renovation activities covered by the ordinance.

### **6.5.1.4 Irvine Sustainability Community Initiative**

The Irvine Sustainable Community Initiative (Initiative Ordinance 10-11) was adopted as Initiative Measure S in 2010. The ordinance was adopted to ratify and implement policies in support of renewable energy and environmental programs for a sustainable community. It outlines the City's direction for continuing to develop and implement programs geared toward green building, renewable energy, and sustainability. For example, the City would continue to develop and implement recycling, zero waste, or other innovative onsite business programs to divert waste from landfills and also continue to develop and implement the use of native, California-friendly, and drought-tolerant landscaping.

### **6.5.1.5 General Plan Integrated Waste Management Element**

The City's existing general plan contains a chapter on integrated waste management. The goal of the element is to encourage solid waste reduction and provide for the efficient recycling and disposal of refuse and solid waste material without deteriorating the environment. The element addresses a range of waste management issues, including:

- Solid waste management and hazardous waste. Cooperate in guiding a solid waste disposal system within the County that will meet the needs of the City and protect the City from damage by unplanned disposal of refuse and
- Solid waste facility siting requirements. Control the siting of solid waste disposal facilities to minimize impact on adjacent or existing planned land uses.

## 6.5.2 Existing Conditions

### 6.5.2.1 Trash Collection

The City grants a single waste hauler an exclusive franchise to collect trash and recyclable materials from homes in Irvine, and additional franchises for the collection of commercial waste. Once collected, nonhazardous municipal solid waste (MSW) is transported directly to local landfills for disposal or to transfer stations where materials are sorted for recycling. A regional waste transfer station, Sunset Environmental, is located in Irvine. The facility serves waste hauling companies, businesses (such as construction firms), and local residents.

Household hazardous waste, including automotive fluids, batteries, paint, and pesticides, must be handled and processed separately from nonhazardous MSW and taken to special facilities. Electronic discards, or e-waste, is one of the fastest growing segments of the waste stream. Electronics include: cell phones, smart phones, PDAs, pagers, computer equipment, photocopiers, printers, telephones, televisions, etc. Household hazardous wastes and e-waste should not be disposed at the landfill and should be dropped off at the County of Orange Household Hazardous Waste Center at 6411 Oak Canyon Road in Irvine.



Bowerman Landfill

### 6.5.2.2 Landfills

OC Waste & Recycling is the county agency that owns, regulates, and operates three landfills to serve Orange County's solid waste disposal needs. The City of Irvine disposes of the majority of its solid wastes at the Frank R. Bowerman Landfill at 11002 Bee Canyon Access Road. As of 2013, the landfill had 205 million cubic yards of remaining capacity and is anticipated to close in 2053. Although the landfill is permitted to accept a maximum daily load of 11,500 tons of solid waste, the landfill currently accepts an average of 6,400 tons of waste per day.

Frank R. Bowerman Landfill installs and maintains a number of environmental protection technologies to protect the water, air, and habitat from the potential effects of the disposal of waste at the landfill. Environmental programs implemented include, but are not limited to, composite liner system to protect groundwater; landfill gas monitoring, recovery, and control systems; groundwater monitoring wells and collection systems; leachate collection and recovery system, etc.



### 6.5.2.3 Waste Diversion

The City of Irvine is committed to reducing the amount of solid waste that is transferred to and disposed at landfills. This is accomplished largely through waste (source) reduction and waste diversion methods such as recycling and composting. By reducing the overall generation of solid waste and diverting a large percentage of what is generated, communities can lower their overall rate of waste disposal. Additional recycling and source reduction efforts are managed by local companies.

As of 2014, there were approximately 40 programs in place in the City for diversion of solid waste from landfills. These include programs for composting, food waste diversion, household hazardous waste, recycling, source reduction, and special waste materials such as construction and demolition debris (CalRecycle, 2015).

- 12 certified used oil collection centers
- 6 approved e-waste collection centers
- 1 approved tire collector/hauler
- 1 household hazardous waste collection center

As summarized in Table 6-3, Irvine has remained in constant compliance with AB 939 waste diversion requirements. In 2014, the Irvine population disposed of 5.4 pounds per day (ppd), and businesses disposed of 5.9 ppd, well below AB 939 disposal limits.

**Table 6-3**  
**Progress toward Meeting Waste Reduction Goals**

Reporting Year	Per Capita Population (lbs/day)		Per Capita Employment	
	Target	Actual	Target	Actual
2010	10.1	5.7	9.3	6.6
2011	10.1	5.6	9.3	6.0
2012	10.1	5.5	9.3	5.8
2013	10.1	5.7	9.3	6.2
2014	10.1	5.4	9.3	5.9
2015	10.1	5.5	9.3	6.0

*Source: CalRecycle, 2016.*

## 6.6 Electricity and Natural Gas

### 6.6.1 Regulatory Setting

#### 6.6.1.1 California Building and Energy Efficiency Standards

California's Building and Energy Efficiency Standards, commonly known as Title 24, are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The 2013 Building and Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent more efficient for nonresidential construction. The 2013 standards, which took effect on January 1, 2014, require more efficient windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption in homes and businesses.

#### 6.6.1.2 California Renewable Portfolio Standard

The California Air Resources Board's Renewable Portfolio Standard (RPS) is a foundational element of the state's emissions reduction plan. In 2002, Senate Bill 1078 established the California RPS program, requiring 20 percent renewable energy by 2017. In 2006, Senate Bill 107 advanced the 20 percent deadline to 2010, a goal that was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II. On September 15, 2009, Governor Arnold Schwarzenegger signed Executive Order S-21-09, directing CARB to adopt regulations increasing RPS to 33 percent by 2020. These mandates apply directly to investor-owned utilities.

#### 6.6.1.3 California Energy Efficiency Strategic Plan

The California PUC's Long-Term Energy Efficiency Strategic Plan presents a roadmap for all new residential and commercial construction to achieve a zero-net-energy standard. Updated in 2011, this plan is the state's first integrated framework of goals and strategies for saving energy, covering government, utility, and private-sector actions. The energy efficiency strategy plan also outlines how the state of California can meet the goal of reaching zero net energy in new residential construction by 2020 and in new commercial construction by 2030. The City's response to the importance of energy efficiency is embodied in its own Energy Efficiency Plan, discussed later in this section.



#### **Solar Power Incentives**

Irvine has been working to facilitate the use of solar power. The City recently streamlined its permitting process and waived the fees for many solar installations. According to the Go Solar California Initiative, a significant number of solar systems have been installed. These include:

+ 1,400 electrical vehicle hookups; the vast majority are residential projects.

+ 3,700 solar rooftop installations; the vast majority are part of residential developments

Although few in number, commercial, industrial, nonprofit, and government systems generate half of the total energy from solar installations.

#### **6.1.2.4 Federal Energy Regulatory Commission**

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas terminals and interstate natural gas pipelines, and licenses hydropower projects. Licensing hydroelectric under the authority of FERC includes input from state and federal energy, environmental protection, fish and wildlife, and water quality agencies. The California Energy Commission's Systems Assessment and Facilities Siting Division provides coordination to ensure that needed energy facilities are authorized in an expeditious, safe, and environmentally acceptable manner.

#### **6.1.2.5 California Energy Commission**

CEC is California's primary energy policy and planning agency. Created by the California Legislature in 1974, CEC has five major responsibilities: 1) forecasting future energy needs and keeping historical energy data; 2) licensing thermal power plants 50 MW or larger; 3) promoting energy efficiency through appliance and building standards; 4) developing energy technologies and supporting renewable energy; and 5) planning for and directing state response to energy emergencies. In 2003, the CEC adopted an energy action plan that focuses on energy efficiency as the primary way for the state to meet its future energy needs. A 2008 update incorporated actions in the context of global climate change.

#### **6.6.1.6 California Public Utility Commission**

The CPUC is responsible for regulating privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CPUC oversees the permitting and construction of electric and gas infrastructure and serves the public interest. The Infrastructure Permitting and California Environmental Quality Act Section of CPUC's Energy Division conducts and manages environmental reviews of infrastructure projects that are required to file for permits at the CPUC. Senate Bill 350 (2015) requires the CPUC to focus energy procurement decisions on reducing GHG emissions by 40 percent by 2030, including efforts to achieve at least 50 percent renewable energy procurement, doubling of energy efficiency, and promoting transportation electrification.

## 6.1.2.7 Existing Plan: Energy Element

The City has adopted an energy element as part of its general plan. The inclusion of a stand-alone energy element provides a basis for long-range planning to ensure better reliability, availability, and affordability of energy in the City. The energy element contains goals related to consumption reduction, efficiency, and use of renewable energy. The primary goal in the element is to promote energy conservation and the use of renewable energy sources in the City in a cost-effective way.

Energy element objectives and policies include, but are not limited to:

- Objective I-1: Maximize energy efficiency through land use and transportation planning.
- Objective I-2: Promote energy savings in buildings constructed prior to 1978 through retrofit programs.
- Objective I-3: Address conservation and maximize energy efficiency of City's facilities and operations by use of recycled materials, renewable sources, and conservation measures.



UCI Solar Generation 3.2 MW project saves the equivalent energy to power 1,800 homes.

## 6.6.1.3 Irvine Energy Plan

The City of Irvine adopted an Energy Plan in 2008. The Energy Plan describes which City facilities and activities require energy and how much they consume. The plan also identifies policies and programs that can reduce the City's energy use in the future. Strategies include more energy-efficient vehicles and buildings, replacement of old appliances, better tracking of energy use, and use of renewable energy technologies such as photovoltaic solar systems. Specific goals of the Energy Plan include:

- Involve 100 percent of Irvine residents and businesses in the energy plan.
- Irvine will reduce its energy use in buildings citywide 30 percent by 2015 compared to 2003 levels.
- Increase the percentage of renewable energy used by new buildings citywide.
- Reduce GHG emissions to 1990 levels by 2020.



## 6.6.2 Existing Conditions

### 6.6.2.1 Energy Consumption

Electricity in the City of Irvine is supplied by Southern California Edison (SCE), and natural gas is supplied by the Southern California Gas Company (SoCal Gas). Irvine's energy is consumed by residential, commercial, industrial, agricultural, and transportation uses. The commercial sector is the largest electricity consumer in Irvine. Natural gas is mostly consumed by the residential sector. Lighting and heating are the principal end uses of electricity and natural gas in the residential and commercial sectors. As part of the EIR for the General Plan, a broader portrait of energy consumption will be provided to understand the impacts of future land uses in Irvine.

### 6.6.2.2 Utility Infrastructure

Major utility corridors mapped by the California Energy Commission consist of electrical transmission lines owned by SCE. The largest of these is a 220- to 287-kilovolt overhead transmission line that zig-zags through the City. In western Irvine, the transmission line is located in the middle of Barranca Parkway. It then travels north parallel to Harvard Avenue and eastward parallel to the train track used by Metrolink and Amtrak. Power substations in Irvine consist of SCE's Cabrillo, Estrella, Irvine, Santiago, Smithtool, and University substations. Major electrical transmission lines and substations can be accessed at [http://www.energy.ca.gov/maps/infrastructure/3P\\_Enlg.pdf](http://www.energy.ca.gov/maps/infrastructure/3P_Enlg.pdf).

With respect to natural gas, two SoCal Gas natural gas major distribution pipelines travel through Irvine. The first is a 33- to 42-inch-diameter pipeline that travels in a southwest/northeast direction through the Irvine Business Complex. The second natural gas transmission pipeline is 13 to 18 inches in diameter and traverses Irvine in a northwest-southeast direction, roughly paralleling the I-5 freeway, along an easement for the Como channel. SoCal Gas is responsible for ensuring the operation, maintenance, and repair of these lines. Major natural gas transmission lines and their general locations in Irvine are mapped at: <https://www.npms.phmsa.dot.gov/PublicViewer/>.

## 6.7 Communications Infrastructure

Irvine is home to the world's greatest technology companies and is known for its forward thinking and innovation. In order to ensure that the City can continue being an exceptional place to work and live, state-of-the-art telecommunications services are essential. While the City does not directly supply telecommunication services, it plays an important facilitator role by coordinating with providers, allowing access to public rights-of-way, and ensuring that proposed improvements or changes in service meet community expectations.

### 6.7.1 Regulatory Setting

#### 6.7.1.1 The Federal Telecommunications Act of 1996

The Federal Telecommunications Act (FTA) was passed in an effort to deregulate the telecommunications industry and accelerate the deployment of advanced information technology by the private sector. In addition to opening up the market to numerous providers, the FTA prohibits state or local statute or regulation from either prohibiting or having the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service. However, Section 332 of the FTA states that nothing in the act shall limit or affect the authority of a local government over decisions regarding the placement, construction, and modification of personal wireless service facilities.

#### 6.7.1.2 California Public Utilities Commission

The California Public Utilities Commission (CPUC) develops and implements policies for the telecommunications industry, including ensuring fair, affordable universal access to necessary services; developing clear rules of the game and regulatory tools to allow flexibility without compromising due process; removing barriers that prevent a fully competitive market; and reducing or eliminating burdensome regulation that impede access to communications. CPUC administers universal service programs, consumer programs, licensing, registration, and franchising. As telecommunications cross communities, CPUC regulations preempt many local regulations. However, cities can place regulations on facility siting and aesthetics.



### **6.7.1.3 General Plan**

The existing General Plan Circulation Element contains a section on telecommunications. Objective B-8, Telecommunications Program, is to “promote the use of telecommunications by Irvine residents, employers, employees, and students as a means to reduce air and noise pollution generated by auto traffic.” Policies include:

- Policy (a): Encourage the private sector to participate in, and to be the primary provider of, telecommunications infrastructure and services for the community.
- Policy (b): Ensure leading edge telecommunication services are available to all businesses and residents, and are considered in planning development and infrastructure improvements
- Policy (c): Encourage productive communications between public and private sector agencies with regard to telecommunications issues and services.
- Policy (d): Protect the public’s assets (i.e., streets, parks) against unmitigated impacts of telecommunications infrastructure development.
- Policy (e): Retain and ensure the community’s high standards for aesthetics, now and in the future.
- Policy (f): Ensure that adequate and secure bandwidth for Public Safety and other City communications are continuously.

### **6.7.1.4 Strategic Technology Plan**

In 2016, the City adopted its Strategic Technology Plan, which serves as a roadmap for the City’s long-range technology needs to ensure the continued innovation, viability, and sustainability of citywide technology assets. The major focus is the maintenance of current infrastructure and service levels, implementation of funded initiatives, and exploitation of available cloud and virtual technologies where feasible. The plan does not set policy for facilitating the use of broadband or other technologies outside of City Hall. However, Chapter 2-37.5 of the Zoning Code, Wireless Communication Facility Permit, addresses the siting for wireless communication facilities and the various conditional review permit processes and requirements.

## 6.8 Law Enforcement, Fire Protection, and Health Care

The City of Irvine has long been recognized as one of the safest communities in the nation. This distinction has been earned through responsive and effective public safety services and the availability of health care services. This section briefly describes the police and fire protection services and health services provided in Irvine. Safety from hazards is addressed in Chapter 7 of this background report.

### 6.8.1 Regulatory Setting

#### 6.8.1.1 Irvine Police Response Time Goals

The Irvine Police Department (IPD) sets guidelines and goals for responding to emergency and nonemergency calls:

- Response to Priority E (Emergency calls): response within 6 minutes, 85 percent of the time
- Response to Priority I (Crimes in progress): response within 10 minutes, 85 percent of the time
- “Less serious crimes occurring now”: response within 20 minutes, 85 percent of the time
- “Routine calls for service”: response within 60 minutes, 85 percent of the time

#### 6.8.1.2 OCFA Response Time Guidelines

Orange County Fire Authority (OCFA) has guidelines for the provision of services when an emergency call is received:

- First-in engines should arrive on scene to medical aids and/or fires within 5 minutes, 80 percent of the time.
- First-in truck companies should arrive on scene to fires within 12 minutes, 80 percent of the time.
- First-in paramedic companies should arrive on scene at all medical aids within 10 minutes, 90 percent of the time.
- Response times tie in with workload. A unit should have less than 3,500 responses per year to be a reliable asset to meet the response time guidelines.



Irvine Police Department



## 6.8.2 Existing Conditions

### 6.8.2.1 Police Services

The Irvine Police Department operates out of its main headquarters at 1 Civic Center Plaza in Irvine (City Hall). UCI and Irvine Valley College each maintains a campus police department and works with IPD. Additional support facilities for the Irvine Police Department include a communications and emergency operations center and a temporary holding facility that are located at City Hall.

The City of Irvine is divided into three geographic units—Portola, Crossroads, and University—allowing for efficient coverage of services. Each of the areas is led by an area commander, who is supported by a contingent of supervisors, patrol officers, investigators, and civilian support staff—all of whom are tasked with working toward preventing community safety issues and quickly and effectively resolving issues. The City’s problem-oriented policing has a strong record of success.

Irvine is one of the safest cities in America. From 2004 to 2012, it had one of the lowest crime rates among incorporated cities with more than 100,000 residents.<sup>1</sup> The IPD continues to meet its response time standards and is proactive, not only in addressing and preventing crime, but in working with schools to ensure safety. More than a dozen school resource officers at various campuses work with school officials to maintain a safe and healthy learning environment.

The Office of Traffic Safety (OTS) provides a ranking of traffic accidents for cities of similar size throughout California. In 2014, Irvine ranked 48th lowest of 57 cities with respect to traffic-related casualties. Among the different transportation users, however, casualties among bicyclists ranked only 23rd lowest of 57 comparable cities. Although Irvine has a moderate ranking, it is important to note that the OTS does not consider bicyclist usage rates in the ranking system. As a result, cities with higher bicycle usage will naturally show higher collision rates. Still, Irvine fares quite well against comparable cities in the OTS rankings.

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<sup>1</sup> Based on the FBI’s annual Uniform Crime Report. The FBI’s rankings consider “Part 1” crimes, which are murder, rape, robbery, aggravated assault, burglary, larceny-theft, auto theft, and arson.

## 6.8.2.2 Fire Protection

Fire protection in the City of Irvine is provided by the Orange County Fire Authority, a regional fire service agency that serves 23 cities in Orange County and all unincorporated areas. OCFA Reserve Firefighters work 10 stations throughout Orange County. Table 6-4 details fire incident statistics over the past three years. Of particular note, EMS incidents have increased by 20 percent to seven of every ten calls. As is the case for most urban fire departments, emergency medical services are the most frequently requested service from OCFA.

**Table 6-4  
Fire Services for Irvine**

Service Information	2013	2014	2015	Change
Fire Incidents	250	277	223	-11%
EMS Incidents	8,335	9,220	9,980	20%
Other Incidents*	4,067	4,001	3,920	-4%
Total	12,652	13,498	14,123	12%

*Source: OCFA Annual Reports, 2013–2015*



OCFA Station in Irvine

Prompt response to incidents is key to protecting life and property. Response times (from 911 call and first arrival of emergency responders) in Irvine were 8 minutes 39 seconds at the 90th percentile. The response time falls near the middle when compared to other communities served by OCFA. Response times are better in western portions of the City that are closer to stations and firefighting resources. In general, OCFA response times are longer in unincorporated communities and other rural, low-density areas of Orange County.

The Insurance Service Office (ISO) helps establish fire insurance premiums for properties based in part on a city's fire protection. ISO rankings are based on: a city's emergency communications, fire department equipment and operations, and water supply. ISO rates each community's fire suppression system on a 10-point scale, with Class 1 being the highest ranking. Irvine maintains a Class 3 ISO rating. OCFA's ISO rating for its entire service area can be accessed at: <http://www.ocfa.org/Uploads/ISORatingMap.pdf>.



### 6.8.2.3 Emergency Services

Irvine is fortunate to have two hospitals: Hoag Hospital Irvine at 16200 Sand Canyon, and Kaiser Permanente Hospital at 6640 Alton Parkway. These medical facilities provide a variety of inpatient and outpatient services, and both have emergency rooms that serve the community. Hospitals elsewhere in Orange County also serve the City, including Children’s Hospital in Orange, Hoag Hospital in Newport Beach, UCI Medical Center in Orange, and Western Medical Center in Santa Ana.



Kaiser Permanente Hospital

The City of Irvine is also home to a network of emergency care facilities—including approximately a dozen urgent care centers. In addition, several larger medical practices and numerous private doctors’ offices are associated with the major hospitals or stand-alone practices. Irvine also has several specialty medical clinics providing care for children, adults, and seniors. Finally, a unique service in Irvine is the Irvine Animal Hospital, which is open seven days a week.

Table 6-5 summarizes some of the major police, fire, and health care infrastructure available to residents, businesses, and visitors in Irvine. Figure 6-4 maps the locations of these facilities.

**Table 6-5**  
**Police, Fire, and Health Care Infrastructure**

Type of Facility	Number	Description
Hospitals	2	Full service hospitals—Hoag and Kaiser Permanente
Urgent Care Facilities	12	Urgent care centers primarily provided by Hoag Medical Center
Fire Stations	10	All stations are managed by the Orange County Fire Authority
Police Stations	1	1 headquarters; 2 additional sites provided by educational institutions

Source: City of Irvine, 2016





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## 6.9 Opportunities and Constraints

As a master planned community, the City of Irvine has sought to plan for the public facilities, services, and infrastructure necessary to provide the highest quality of life. Opportunities and constraints relative to public facilities and services are described below.

### 6.9.1 Opportunities

**Water/Sewer/Drainage.** The City of Irvine continues to work with the Irvine Ranch Water District, the Orange County Flood Control District, Orange County, and other organizations to provide for a range of water, sewer, drainage, and related services to the community. These include the construction, maintenance, and rehabilitation of infrastructure. Relative to most cities, deficiencies in infrastructure are limited, and all current state mandates appear to be adequately addressed.

**Public Safety.** Irvine is one of the safest large cities in the United States and has maintained this prestigious distinction for over a decade. Low crime means that Irvine is a great place to raise a family. Secondary beneficial impacts of low crime include lower stress, improved health due to the availability of safe outdoor recreational space, higher levels of academic performance, and higher property values. The City has also maintained an exceptional level of protection from fires.

**Infrastructure Financing.** Irvine's budget and strategic business plan provide City departments and decision-makers with a list of City priorities, a long-range forecast of the City's finances, and a capital improvement plan (CIP) for facilities and infrastructure. The CIP is a key tool for planning and managing growth and development. Maintenance of facilities is adequately addressed by the City's asset management plan fund and its infrastructure and rehabilitation fund.

**Telecommunications.** City residents and businesses enjoy relatively good access to advanced telecommunications networks citywide. However, there may be deficiencies in the Irvine Business Complex, southeast Irvine, and other locations surrounding the Spectrum area. While Google initially proposed a plan for installing fiber optic across Irvine, that option is no longer being pursued. The City may wish to study further to determine if and where underground infrastructure deficiencies exist and feasible opportunities for improvement.



## 6.9.2 Constraints

**Availability of Water Supplies.** California has periodically wrestled with drought, including in the past five years. Although local agencies and water purveyors in California have historically been resourceful in acquiring and allocating water supplies to meet the needs of a growing state, such efforts are likely to become increasingly contentious as finite water resources are sought to serve competing interests (i.e., agriculture versus urban customers). Growing cities like Irvine will need to continually adapt to the changing regulatory framework for water.

**Water Quality Goals.** The water quality field continues to evolve, with surface, subsurface, and drinking water quality standards now centralized in the State Water Resources Control Board. While Irvine has made great strides, the City will need to continue pursuing efforts to clean up stormwater channels and underground water supplies in accordance with state and federal law. And while Irvine’s drinking water meets all state and federal standards, increasing state mandates may place additional requirements on treating water supplies statewide.

**Landfill Capacity.** The Frank R. Bowerman Landfill is not anticipated to close for another 39 years. However, there is no replacement landfill under development in Orange County. Irvine continues to meet its waste diversion requirements in accordance with state law. However, it is important that cities in Orange County continue to reduce waste consumption and increase waste diversion so that the lifespan of area landfills is extended as long as possible until alternative sites are found.

**Health Care Infrastructure.** The passage of the Affordable Care Act transformed the health care industry. In addition to expanding health insurance, many hospitals began to establish clinics and urgent care centers outside of the traditional hospital walls to provide services in a more convenient and cost-effective setting. The health care industry will likely continue to experience fluctuations, which could affect the provision of medical care to the community.

# Chapter 7.

# Public Safety

## 7.1 INTRODUCTION

Irvine is well known as a safe place to live, work, or visit. However, public safety involves more than crime prevention, the strength of police protection, and the availability of emergency services. Potential risks to health, life, and property also involve man-made and natural hazards. Irvine, like much of southern California, is subject to many hazards. Among others, these include seismic activity and geology, flooding, wildland fires, hazardous materials, and climate change. Man-made hazards are also prevalent throughout southern California.

Ensuring public safety is fundamental to the mission of the City of Irvine. All the benefits and public goods that comprise Irvine’s high quality of life—its culture, civic life, strong and vibrant neighborhoods, education and employment, recreation and services, and economic prosperity—are difficult to achieve when health and safety could be compromised. Moreover, resilience and public safety go hand in hand. Resiliency is about strengthening and maintaining Irvine’s ability to prosper, to maintain continuity of services, and to deal with unplanned events without major impacts to property, citizens, its economy, or services.

Maintaining a safe and resilient city requires active commitment. This requires: 1) a clear understanding of the public safety threats; 2) proactive and intentional efforts to protect against hazards; and 3) strengthening of infrastructure, systems, and procedures as needed. By maintaining awareness of public safety hazards and proactively addressing hazards through planning, prevention, and mitigation, Irvine can ensure a greater level of resiliency should incidents arise.

This chapter on public safety attempts to provide a foundation for the General Plan Safety and Seismic Element and the General Plan Environmental Impact Report to achieve these ends.



## 7.2 GEOLOGIC & SEISMIC HAZARDS

This section describes the relevant geologic and seismic hazards for the City's General Plan and Environmental Impact Report. Geological and seismic hazards include, but are not limited to, surface fault rupture, ground shaking, landslides, liquefaction, and subsidence.

### 7.2.1 Regulatory Setting

The regulatory setting for geologic and seismic safety includes federal, state, and local regulations. This section describes codes that protect people, property, and infrastructure from seismic and geologic hazards.

#### 7.2.1.1 California General Plan Guidelines

California Government Code Section 65300 outlines requirements for the preparation of general plans. Consistent with the code, a city's general plan must have a safety element that includes plans for protection of the community from any unreasonable risks associated with the effects of known seismic and geologic hazards locally or in the region. It must include mapping that identifies known seismic and geologic hazards consistent with maps produced by the California Geologic Survey. The safety element must also address evacuation routes, military installations, peak load water supply requirements, and minimum road widths and clearances around structures as those items relate to identified seismic and geologic hazards.

#### 7.2.1.2 Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was enacted to address the hazard of surface fault rupture by prohibiting the location of structures for human occupancy across the trace of an active fault. The act requires the State Geologist to delineate "earthquake fault zones" along faults deemed to be "recent," "sufficiently active," and/or "well defined." The State Geologist distributes earthquake fault zone maps to local agencies for use in planning and regulating the construction of structures and infrastructure. The act requires that cities withhold development permits for sites within an Alquist-Priolo Earthquake Fault Zone until geologic investigations demonstrate that the sites are not threatened by surface displacements from faults. Structures for human occupancy are not allowed within 50 feet of the trace of an active fault.

#### Seismic and Geologic Hazard Terms

**Fault:** A fracture in the earth's crust forming a boundary between masses of rock or soil where movement between those masses has occurred.

**Surface fault rupture:** When movement on a fault displaces the ground surface or triggers surface rupture along a series of faults.

**Liquefaction:** Strong ground shaking in sediment layers that are saturated with groundwater and that lose strength and behave as a fluid.

**Landslides:** A downward movement of soil and/or rock. If this includes water, mud, or debris, it is referred to as a mud/debris flow.

**Subsidence:** The gradual settling or sinking of the ground surface with little or no horizontal movement. Subsidence generally occurs in semiconsolidated sand and silt soils.

**Corrosive soils.** Soil types that, because of their chemical properties, are known to corrode concrete foundations, steel, or other metals.

## **7.2.13 Seismic Hazards Mapping Act**

The Seismic Hazards Mapping Act addresses earthquake hazards other than surface-fault rupture, including liquefaction and seismically-induced landslides. The California Geological Survey prepares seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. These maps are provided to local government to assist in planning, land use, and development decisions and to encourage land-use management policies and regulations to reduce and mitigate hazards. Section 2697(a) of the act states that, prior to the approval of a plan located in a seismic-hazard zone, cities must require a geotechnical report defining and delineating any seismic hazard.

## **7.2.14 California Building Code**

The California Building Standards Code (CBC), also known as Title 24 of the California Code of Regulations, reflects various building standards that have been derived from different sources, including the International Building Code. The CBC protects occupants and property from damage by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures in accordance with the latest seismic safety standards. Chapter 18 of the CBC also specifies the required level of soil investigation required to improve foundation systems and reduce seismic hazards. The City has adopted the CBC with various local amendments identified in Title 5, Division 9 of the City's Municipal Code.

## **7.2.15 Other State Laws**

Additional building codes address special facilities, including but not limited to: schools, hospitals, and emergency infrastructure. The Field Act of 2010 applies to the design, construction, and renovation of all K–12 school buildings and community college buildings in California. The Alquist Seismic Safety Act establishes a hospital safety standard and requires that each general acute-care hospital facility must attain required structural improvements by 2030 or be subject to closure. Hospitals in Irvine currently meet this standard, although some facilities in surrounding cities have yet to attain required improvements. Additional state laws and regulations address the construction and rehabilitation of dams, essential facilities, and critical facilities.



### 7.2.16 Existing General Plan

The existing seismic element aims to “minimize the loss of life, disruption of goods and services, and destruction of property associated with an earthquake.” Policies in the seismic element promote identification of potential seismic hazards, the development of an emergency response strategy that protects public health and safety, and citizen participation to increase awareness of seismic hazards.

Seismic element policies D-2 (a) and D-2 (b) outline requirements for preparation of geotechnical reports during the development review process. Requirements are tailored to seismic response areas (SRAs). SRAs are defined below.

- SRA 1: Potential soft or loose soils/high groundwater. This is one of the two areas considered to have a greater potential for ground failure due to liquefaction. However, liquefaction is not expected to occur during all earthquakes or in the entire SRA.
- SRA 2: Denser soils/deeper groundwater. The predominant potential seismic hazard in this area is ground motion. Ground breakage and/or ground failure is not expected to characterize this area. Localized liquefaction is remote.
- SRA 3: Shallow alluvium over and abutting bedrock. Ground motion is the primary potential seismic hazard. As a slope increases in this area, slope instability potential also increases. Localized liquefaction potential is remote.
- SRA 4: Highlands characteristically over 20 percent slope. In general, this area is potentially less stable than SRA 3 due to the steeper incline. Liquefaction potential is extremely remote.
- SRA 5: Less stable geologic formations. These are areas representing existing mapped landslide areas, and potential for slope instability is higher than in SRA 4.

SRA 1 and SRA 2 cover central Irvine, where most urban land uses are located. SRAs 3, 4, and 5 apply to highlands in the northern foothills and San Joaquin Hills. Policies in the seismic element also require site studies for key public facilities and infrastructure (Policy D-2 [d]) and adherence to applicable building codes and standards (D-2 [h] and D-2 [i]).

## 7.2.17 Municipal Code

The Irvine Municipal Code contains provisions that protect the community from geologic and seismic hazards. Some of the primary mechanisms for addressing seismic and geologic hazards are as follows:

- **Hillside Overlay District.** Substantial analysis is required prior to the approval of development applications in areas that require special consideration to safeguard against unstable slopes, erosion, and deterioration. Development plans must meet additional submittal requirements, including a conceptual grading plan, slope analysis, a conceptual drainage and flood control plan, and a preliminary geological and soils report.
- **Grading and Excavation Regulations.** Grading and excavation regulations are intended to protect against geologic hazards. Regulations control excavation, grading and earthwork, and construction including fills and embankments; establish administrative procedures for issuance of permits and maintenance of property; and provide for approval of plans and inspection of grading construction.
- **Building Code Amendments.** The City has also adopted local amendments to its building code based upon local geologic and seismic considerations in Irvine. These include:
  - Prohibiting use of underground metallic gas pipe or certain galvanized piping underground due to the presence of highly corrosive soils.
  - Mandating that projects where concrete is exposed to sulfate-containing solutions or soils must conform to UBC Table A-3 requirements.
  - Requiring electrical system infrastructure to be undergrounded to minimize potential damages from overhead wiring on private properties during earthquakes.
  - Requiring indoor fire sprinkler systems to reduce the potential of fire resulting from earthquakes, particularly in situations where first responders are delayed.



## 7.2.2 Existing Conditions

Irvine is located in a broad, flat valley that is the southernmost extension of the coastal plain that straddles Los Angeles and Orange counties. In Irvine, the valley’s flat topography is the result of sediment eroded from the Santa Ana Mountains and San Joaquin Hills that has been deposited by San Diego Creek, its tributaries, and other natural watercourses. Soils largely consist of unconsolidated and semiconsolidated alluvial sediments. All areas in the City of Irvine consist of sedimentary rocks and soils from the Cenozoic Era, which covers the period between 65 million years ago and the present.

No active surface faults are mapped or known to cross Irvine, and the City is not in an Alquist-Priolo Earthquake Fault Zone. However, the City is in a seismically active region. Known faults in the region include: the Newport-Inglewood fault, the San Jacinto Fault, and the Whittier-Elsinore Faults. Two blind thrust faults are of concern: the San Joaquin Hills and Puente Hills. Of particular interest is the San Joaquin Hills fault, which is recognized as active by the California Geological Survey but is not an Alquist-Priolo Earthquake Fault Zone. In addition, many inactive faults underlie Irvine, particularly in the San Joaquin Hills.

Table 7-1 lists major earthquakes in the region during the last 100 years. The magnitude for each event is expressed by the moment magnitude scale (MMS), a measure of the energy released from an earthquake.

**Table 7-1  
Large Earthquakes in Recent History**

Year	Earthquake/Fault(s)	Magnitude (MMS)
1933	Long Beach / Newport-Inglewood Fault Zone	6.3
1954	San Jacinto/San Jacinto Fault	6.4
1971	San Fernando/San Fernando Fault	6.6
1987	Whittier Narrows / Elysian Thrust Fault	5.9
1992	Landers / multiple faults	7.4
1994	Northridge / Northridge-Pico Thrust Fault	6.6

Source: Southern California Earthquake Center, SCEDC (2013).

## 7.2.2.1 Geologic and Seismic Hazards in Irvine

Geologic and seismic hazards in Irvine are referenced in Figure 7-2. The most well-known geologic and seismic hazards in Irvine and the surrounding region are generally discussed below.

### Ground Shaking

Irvine is likely to experience strong ground shaking from local faults. These include the San Joaquin Hills Blind Thrust, Elsinore, Whittier, and Newport Inglewood faults. Distant faults, such as the San Jacinto Fault or Puente Hills Blind Thrust fault, would also be expected to impact the City as well. The final estimated ground motions depend on site-specific conditions, earthquake fault, and the distance from the epicenter of the earthquake. Studies produced for the Orange County Hazard Mitigation Plan document that earthquakes along several of these faults could produce multibillion dollar damage to structures and infrastructure throughout Orange County, including Irvine.

### Liquefaction

Liquefaction generally occurs where: 1) there is a relatively shallow groundwater table, 2) soils of granular material occur at depths of less than 50 feet, and 3) silt and clay content is less than 30 percent. Seismic hazard zones maps prepared by the State of California indicate that a large swath of Irvine falls within the “Zones of Required Investigation” for liquefaction. The area is primarily north of I-405 and south of I-5. Seismically induced ground settlement can occur in loose to moderately dense sandy soils, which are also located in Irvine. Liquefaction and settlement can cause damages to foundations and infrastructure.

### Landslides and Mudflows

Landslides are downward movements of a mass of earth, rock, or combination of the two. Slope failures are similar to landslides but often affect larger areas and are the result of deeper weaknesses in soil stability. Localized landslides may occur due to the gradual process of slope failure. Mudflows are more likely following heavy rains or fires. All of these geologic hazards have the potential to result in damage to structures and property. They can occur due to natural causes (e.g., earthquakes and flooding), human activities (such as inappropriately sited development), or a combination of the two.





Some portions of Irvine fall within a Zone of Required Investigation for earthquake-induced landslides, as shown on the State of California Seismic Hazard Zones, Tustin and El Toro Quadrangle maps. Areas with SRA 4 and SR 5 are considered the most susceptible to slope instability and landslides. These areas are concentrated in the San Joaquin Hills and in the foothills of the Santa Ana Mountains. Development within SRA 4 and SRA 5 has generally been avoided, and both of these areas are largely protected as permanent open space.

### Subsidence and Unstable Soils

Subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement. Subsidence generally occurs in semi-consolidated sand and silt soils, which are not common in Irvine. Expansive soils experience considerable swelling and shrinking when they are wetted and dried. Soils with significant amounts of clay particles, which are common in Irvine, are susceptible to expansion. Land subsidence may also occur in areas experiencing historically high levels of groundwater extraction, particularly overdraft conditions. According to DWR's Groundwater Information Center, the areas within the designated Coastal Plain of Orange County have experienced land subsidence, although the risk in Irvine is very low.

### Corrosive Soils

Corrosive soils contain chemical constituents that can react with construction materials, such as concrete and ferrous metals, and may damage foundations and buried pipelines. Corrosivity of soils is generally related to soil resistivity, presence of chlorides and sulfates; oxygen content; and pH (acidity). High sulfate soils, such as gypsum, are harmful to concrete. Low pH and/or low resistivity soils could corrode buried or partially buried metal structures. Irvine soils have low corrosive properties for concrete, with patchy areas of moderate corrosivity. In contrast, the majority of Irvine soils are classified as having moderate to high corrosive properties for steel and other metals.

The following figures show the location of seismic response areas (Figure 7-1), geologic hazards (Figure 7-2), and soil hazards (Figure 7-3).

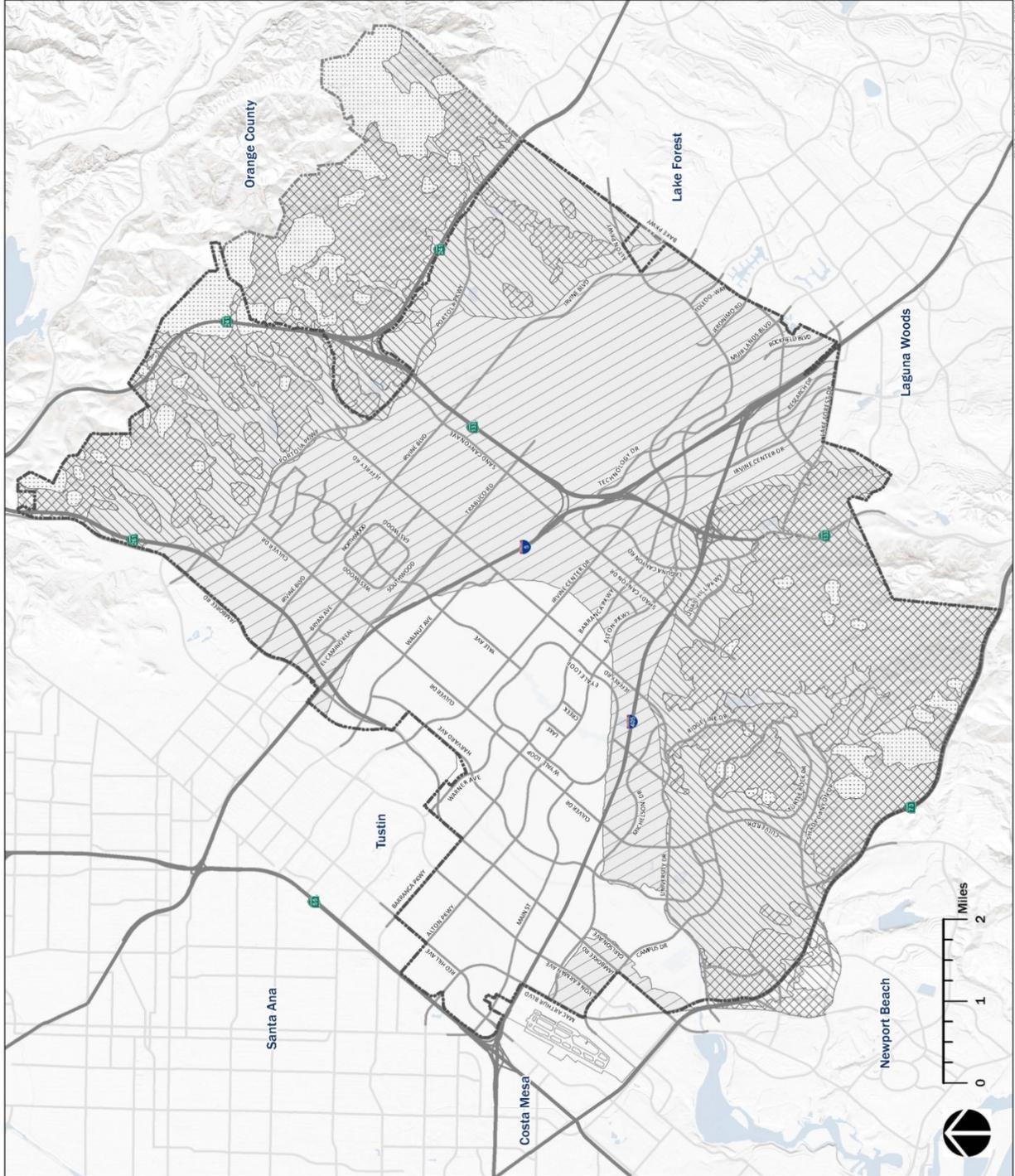
Figure 7-1

# SEISMIC RESPONSE AREAS

## LEGEND

-  SRA-1, Soft Soils/High Ground Water
-  SRA-2, Denser Soils/Deeper Ground Water
-  SRA-3, Alluvium/Shallow Bedrock
-  SRA-4, Highlands Over 20 Percent Slope
-  SRA-5, Less Stable Geologic Formations
-  City Boundary
-  Sphere of Influence

Notes:  
 Seismic Response Area (SRA): refers to designated areas that are used to identify the potential geologic and seismic risks in Irvine and associated land use, building, and design requirements for development.



Source: City of Irvine, 2014





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Figure 7-2

# GEOLOGIC HAZARDS

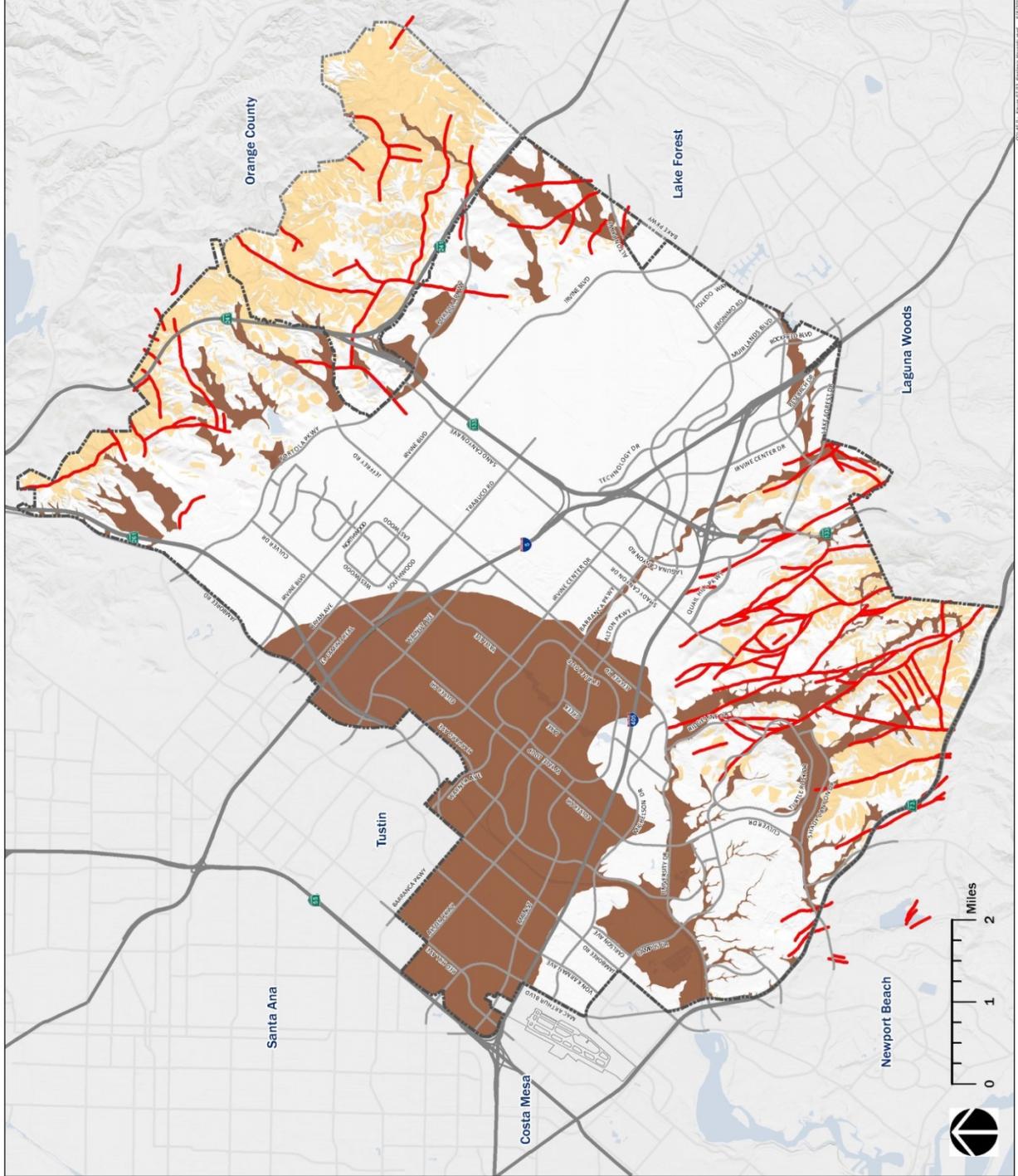
## LEGEND

- Earthquake-induced Landslide Zone
- Liquefaction Zone
- Faults
- City Boundary
- Sphere of Influence

**Notes:**  
**Liquefaction Zone:** refers to areas where historic occurrences of liquefaction, or where local geological, geotechnical, and groundwater conditions indicate a potential for permanent ground displacement such that mitigation as defined in the Public Resources Code Section 2693(c) would be required.

**Earthquake-Induced Landslide Zone:** refers to areas where previous occurrence of landslide movement, or local topographic, geological, or geotechnical and subsurface water conditions indicate a potential for permanent ground displacement such that mitigation as defined in the Public Resources Code Section 2693(c) would be required.

Source: Department of Conservation, Seismic Hazard Zone (2001)



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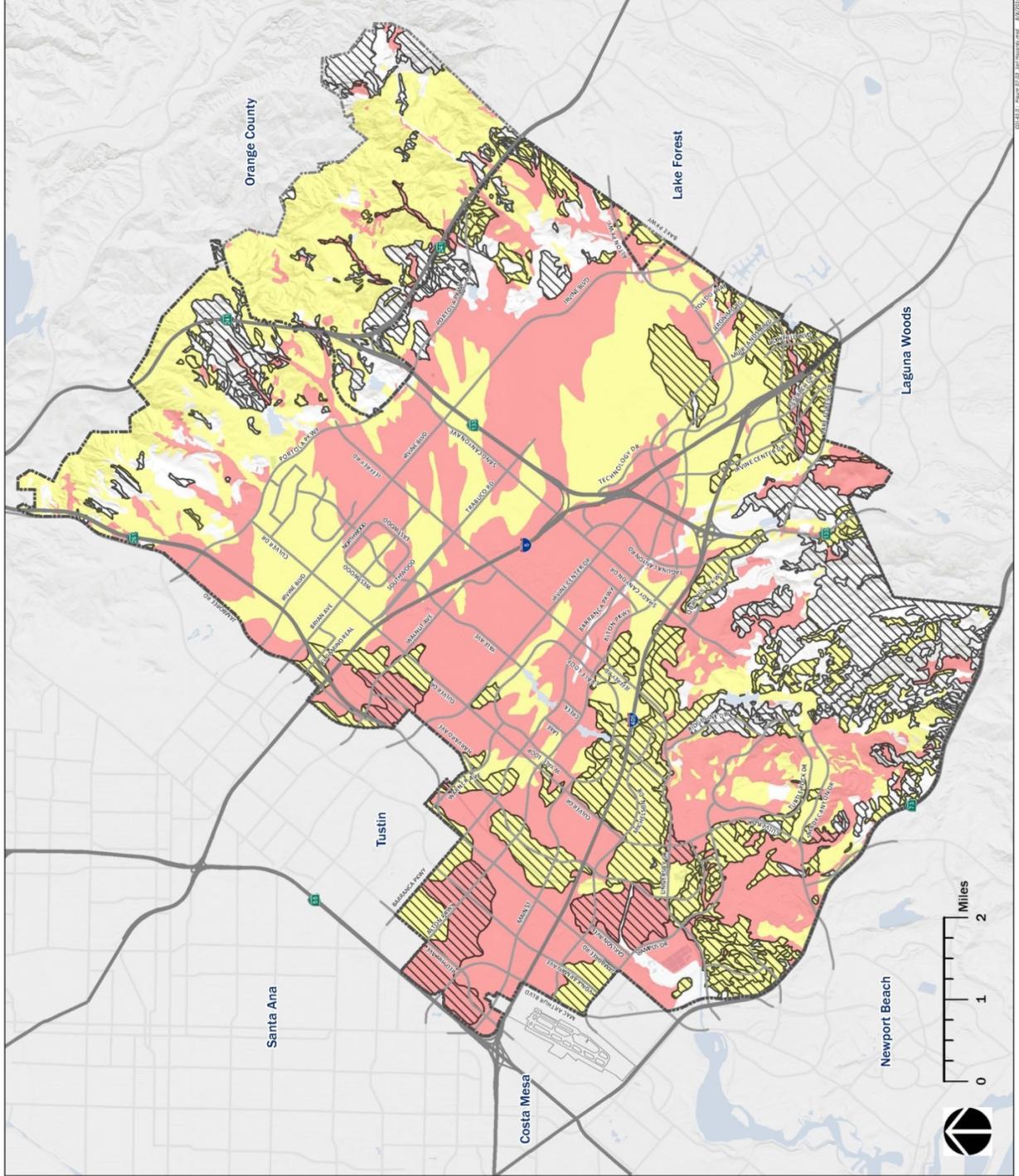
Figure 7-3

# SOIL HAZARDS

## LEGEND

-  Soil that is Moderately Corrosive to Concrete
-  Soil that is Highly Corrosive to Steel
-  Soil that is Moderately Corrosive to Steel
-  City Boundary
-  Sphere of Influence

**Notes:**  
 Risk of Corrosion refers to potential soil-induced electro-chemical or chemical action that corrodes or weakens concrete or uncoated steel. Areas delineated for corrosive soils may require mitigation as determined by the City Building Official.



Source:  
 United States Department of Agriculture, Natural Resource Conservation Service, 2003



00102137 - Figure 7-3 (S) - Corrosive Soils - 06/20/2011



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## 7.3 FLOOD HAZARDS

Flood hazards include risks to property, life, and the environment caused by heavy rainfall, dam inundation, tsunamis, mudflows, and structural damage to above-ground water storage reservoirs.

### 7.3.1 Regulatory Setting

The regulatory setting for flood hazards includes federal, state, and local regulations. This section describes codes that protect people, property, and infrastructure from flood and dam inundation hazards.

#### 7.3.1.1 National Flood Insurance Program

The National Flood Insurance Act of 1968 mandates that the Federal Emergency Management Agency (FEMA) evaluate flood hazards. FEMA provides flood insurance rate maps (FIRMs) for local and regional planners to identify potential flood areas based on the current conditions and promote sound land use and floodplain development. FEMA conducts engineering studies to delineate special flood hazard areas (SFHAs) on a community's flood insurance maps. The most recent FIRM maps covering Irvine were completed and published in 2009.

The Flood Disaster Protection Act of 1973 requires owners of all structures in SFHAs to purchase and maintain flood insurance as a condition of receiving federal financial assistance, such as FHA-insured mortgages. Community members within designated areas are able to participate in the National Flood Insurance Program, which is required to offer federally subsidized flood insurance to property owners in communities that adopt and enforce floodplain management ordinances that meet minimum criteria established by FEMA.

#### 7.3.1.2 US Army Corps of Engineers

The US Army Corps of Engineers (Corps) is a federal agency that designs and constructs flood protection systems to reduce the risks of flooding. The Corps operates a flood risk management program that aids state and local governments in reducing and planning for flood risks. Furthermore, it implements construction and engineering projects related to flood risks, including dams, levees, and floodwalls. The Corps has built several dams and flood control channels that protect Irvine from flooding or inundation during storm events.



### 7.3.13 California Department of Water Resources

The California Department of Water Resources (DWR), Division of Flood Management, collects climate data, conducts flood forecasting, plans flood emergency response activities, and coordinates collaboration between federal, state, and local governments related to flood events. The Statewide Flood Management Planning Program produces reports on minimizing flood risks and implements flood planning tasks outlined in the California Water Plan. DWR has also identified potential 100-year floodplains that have yet to be formally mapped by FEMA.

The Division of Dam Safety is responsible for reviewing and approving plans and specifications for the design of dams and overseeing construction to ensure compliance with approved plans and specifications. Reviews include site geology, seismic setting, site investigations, construction material evaluation, dam stability, hydrology, hydraulics, and structural review of appurtenant structures. In addition, Division engineers inspect dams on a yearly schedule to ensure structures are maintained in a safe manner.



Almost all watercourses in Irvine, including San Diego Creek, are channelized to manage stormwater and minimize flood hazards.

### 7.3.14 California General Plan Guidelines

In the latter part of 2007, the California Legislature passed five interrelated flood legislation bills supporting the integration of local land use planning and state floodplain mitigation actions. The primary bill was AB 162, which among other measures, requires cities to:

- Employ the land use element to identify, set aside, and annually review areas subject to flooding as identified by floodplain mapping prepared by the Federal Emergency Management Agency and the California Department of Water Resources
- Identify in the conservation element (or other general plan element) the rivers, creeks, streams, flood corridors, riparian habitat, and land within a community that may accommodate floodwaters for the purposes of stormwater management
- Establish in the safety element (and other elements that must be consistent with it) a set of comprehensive goals, policies, and feasible implementation measures for protection of the community from unreasonable risks of flooding

## 7.3.15 Existing General Plan

The safety element of the existing general plan maps flood zones, but it does not include policies specifically relating to flood hazards. The conservation and open space element includes policies related to avoidance and minimization of flood hazards. These policies:

- Outline requirements for development in dam inundation areas (Policy L-4 [d]).
- Promote development of flood control channels and preservation of natural waterways (Policy L-5 [a]).
- Ensure that development in hillsides is sited to minimize flood hazards downstream.

As previously mentioned, new state law requires that the safety element, open space and conservation element, housing element, and land use element contain extensive information on flooding hazards in accordance with guidance in Government Code Section 65302. All will be incorporated into the updated General Plan.

## 7.3.16 City Zoning Code

Chapter 5-2 of the City's Zoning Code establishes the City's Floodplain District, an overlay zoning designation designed to limit potential impacts to property, life, and public safety in areas subject to special flood hazards. This section of the zoning code functions as the City's Floodplain Management Ordinance. Two floodplain overlay designations are provided—FP1 and FP2. The geographic range of the area subject to the ordinance is based on FEMA-defined hazard areas, which is specifically the 100-year floodplain (special flood hazard zones).

The Floodplain Management Ordinance sets forth development and land use regulations that apply within the 100-year flood hazard zones. This includes standards for subdivisions, permitted and prohibited land uses, detailed standards of construction, and permitting requirements. The Floodplain Management Ordinance does not address the 500-year floodplain, which covers a large part of Irvine. Department of Water Resources maps also show possible but undetermined zones where 100-year flooding may still occur but have not been mapped by FEMA. The Zoning Code also does not address these areas of concern.



## 7.3.2 Existing Conditions

Irvine is in the San Diego Creek Watershed, which is part of the larger Santa Ana River Basin. The San Diego Creek Watershed covers 112 square miles in central Orange County. Its main tributary, San Diego Creek, drains from the Santiago Hills into the Upper Newport Bay. Smaller tributaries include Serrano Creek, Borrego Canyon Wash, Agua Chinon Wash, Bee Canyon Wash, Peters Canyon Wash, Sand Canyon Wash, Bonita Canyon Creek, and the Santa Ana Delhi Channel. Generally, these waterways convey stormwater discharge through the City to the Pacific Ocean and are not known to cause flooding. However, some areas of the City are subject to flooding in certain cases.

Although Irvine has been carefully master planned, it is still subject to potential flood hazards due to its topography, weather, and drainage patterns. As described below, primary flood hazards include dam inundation, riverine flood, mud/debris flows, and urban floods.

### 7.3.2.1 Dam Inundation Areas

Irvine has seven dams within the community that are used for the storage of recycled and potable water. These dams could, in the event of a complete failure, inundate portions of the community. In order for cities to plan appropriate responses to dam inundation scenarios, the California Department of Water Resources rates dams in three categories based on the size of the dam and amount of water retained.

These hazard ratings are summarized below and in Table 7-2.:

- **High Hazard:** a dam for which there exists a potential for loss of human life and significant damage to structures and infrastructure resulting from complete failure of the dam
- **Significant Hazard:** a dam for which significant damage to structures or infrastructure is expected to occur, but no loss of human life resulting from complete failure of the dam
- **Low Hazard:** a dam for which loss of life is not expected nor is significant damage to structures and public facilities as a result of the complete failure of a dam

#### Flooding Hazard Terms

**Dam inundation zone:** A defined area downstream from any dam or impounded water that could be flooded in the event of a sudden or complete failure of the structure.

**Floodplain:** An area adjacent to a river, stream, lake, or water body that is subject to flooding. FEMA identifies floodplains and provides maps to local planners to protect public safety.

**Special Flood Hazard Area:** Areas that could be inundated by a flood having a 1 percent chance of being equaled or exceeded in any given year. This is often referred to as the 100-year flood.

**Moderate Flood Hazard Areas:** Moderate flood hazard areas represent areas between the limits of the base 100-year flood and the 0.2 percent annual chance (or 500-year) flood.

**Urban Flood:** Urban flooding is the inundation of land or property in a built environment, caused by rainfall overwhelming the capacity of drainage systems, such as undersized storm sewers.

**Table 7-2  
Dam Inundation Potential in Irvine**

Dam Name	Drainage	Year Built	Storage (ac-feet)	Hazard Rating
Irvine Lake	Santiago Creek	1933	25,000	High
Peters Canyon	Peters Canyon	1932	1,090	High
Rattlesnake Canyon	Rattlesnake Creek	1959	1,480	High
San Joaquin	Trib. of Bonita Creek	1966	3,036	High
Sand Canyon	Sand Canyon	1912	960	High
Syphon Reservoir	Trib. of Newport Bay	1949	578	Significant
Villa Park	Santiago Creek	1963	15,600	High

Source: California Department of Water Resources

Note: Irvine Ranch Water District reservoirs are used for storing recycled water.

Additional dams and/or reservoirs exist in Irvine, but are not shown above because such facilities do not meet the size or carrying capacity threshold to merit a hazard.

One of the largest dams affecting Orange County is Prado Dam, located at the juncture of Corona and Chino Hills. The Prado Dam collects water from the Santa Ana River, which emanates from the national forest and travels downstream to the dam. A breach of this facility would flood portions of San Bernardino and Riverside counties and travel downstream, affecting communities in Orange County. Since improvements to the dam were made in 2011, publicly available data does not demonstrate which cities are subject to inundation, although older inundation maps suggest that it could affect Irvine. The Army Corps of Engineers is currently assessing potential inundation paths.

To prevent potential flooding, Irvine has more than a dozen detention or retarding basins. These are generally an excavated area installed on, or adjacent to, tributaries of rivers, streams, or other water bodies to protect against flooding and, in some cases, downstream erosion by storing water for a limited period of time. Detention basins are stormwater best management practices that provide general flood protection. The basins are typically built during land development projects such as residential subdivisions, shopping centers, or roadways. The ponds help manage excess urban runoff generated by constructed impervious surfaces such as roads, parking lots, and rooftops.



### **7.3.2.2 Flood Hazards**

Most of the City's urban land uses are not within 100-year flood zones. Shown in Figure 7-3, the 100-year flood zone consists of narrow corridors that follow the channelized tributaries of San Diego Creek, including Peters Canyon Wash, Sand Canyon Wash, and the segment of San Diego Creek that traverses the middle of the City. In some parts of Irvine, these corridors broaden to larger areas, including parts of William R. Mason Regional Park and office parks in the Walnut Planning Area.

Irvine is subject to three primary flood hazards. The upland areas are most susceptible to mud/debris flows, where water flowing from the hillsides can pick up debris and transport it downstream. Along the rivers, excessive rainfall can overflow existing riverbeds and channels, leading to riverine flooding. Built-out portions of Irvine are also subject to flooding in certain locations. Urban flooding occurs when channels or street debris basins become blocked and water overflows onto sidewalks, below grade areas, or adjacent properties.

Larger portions of the City of Irvine are within the moderate (500-year) flood hazard zone. This includes an area of land bounded by Tustin Ranch Road south of the I-5 on the westernmost border and Peters Canyon Wash, extending along Jamboree Road in a southwesterly direction to Alton Parkway in the IBC. Smaller pockets within the 500-year floodplain include the northern end of John Wayne Airport and pockets along San Diego Creek and Sand Canyon Wash.

The California Department of Water Resources has identified additional potential 100-year flood zones where the precise elevations have not been determined. These areas are located primarily along streams that are in the Santa Ana Mountains in northeastern Irvine. These areas are also subject to flood-related hazards, including debris flows, landslide, fires, and other potential hazards discussed in this chapter.

Figures 7-4a and 7-4b on the following pages show the locations of the 100-year and 500-year floodplains and dam inundation areas in Irvine.

Figure 7-4a

# FLOOD HAZARDS

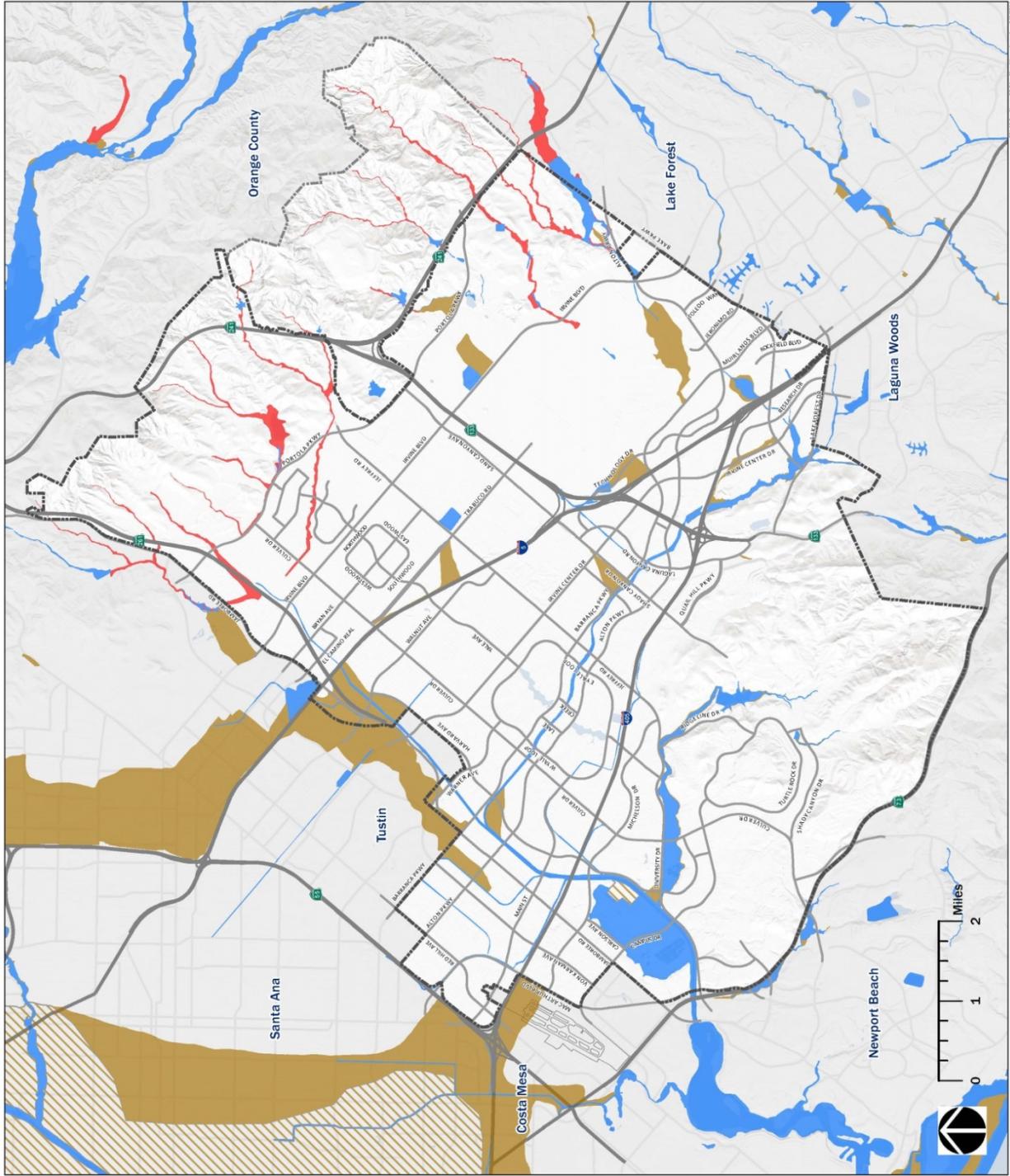
## LEGEND

- █ 100-Year Flood Zone
- █ 500-Year Flood Zone
- █ DWR Awareness Floodplain
- City Boundary
- Sphere of Influence

**Notes:**  
 100-year floodplain: Includes areas subject to a 100-year flood (and denoted as a special flood hazard areas) as defined by the Federal Emergency Management Agency and where the National Flood Insurance Program floodplain management regulations must be enforced and where the mandatory purchase of flood insurance applies.

500-year floodplain: Includes areas between the limits of the 100-year floodplain and subject to a 500-year flood as defined by the Federal Flood Insurance Regulations and the Federal Emergency Management Agency. This area is also referred to as a moderate flood hazard area according to FEMA and flood insurance regulations may apply.

DWR Awareness floodplain: includes areas defined by the Department of Water Resources as having a potential for a 100-year flood that may warrant further studies to assess the risk of flooding. This map is not a regulatory map.



Source:  
 Department of Water Resources (DWR, 2016)  
 Federal Emergency Management Agency (FEMA, 2016)



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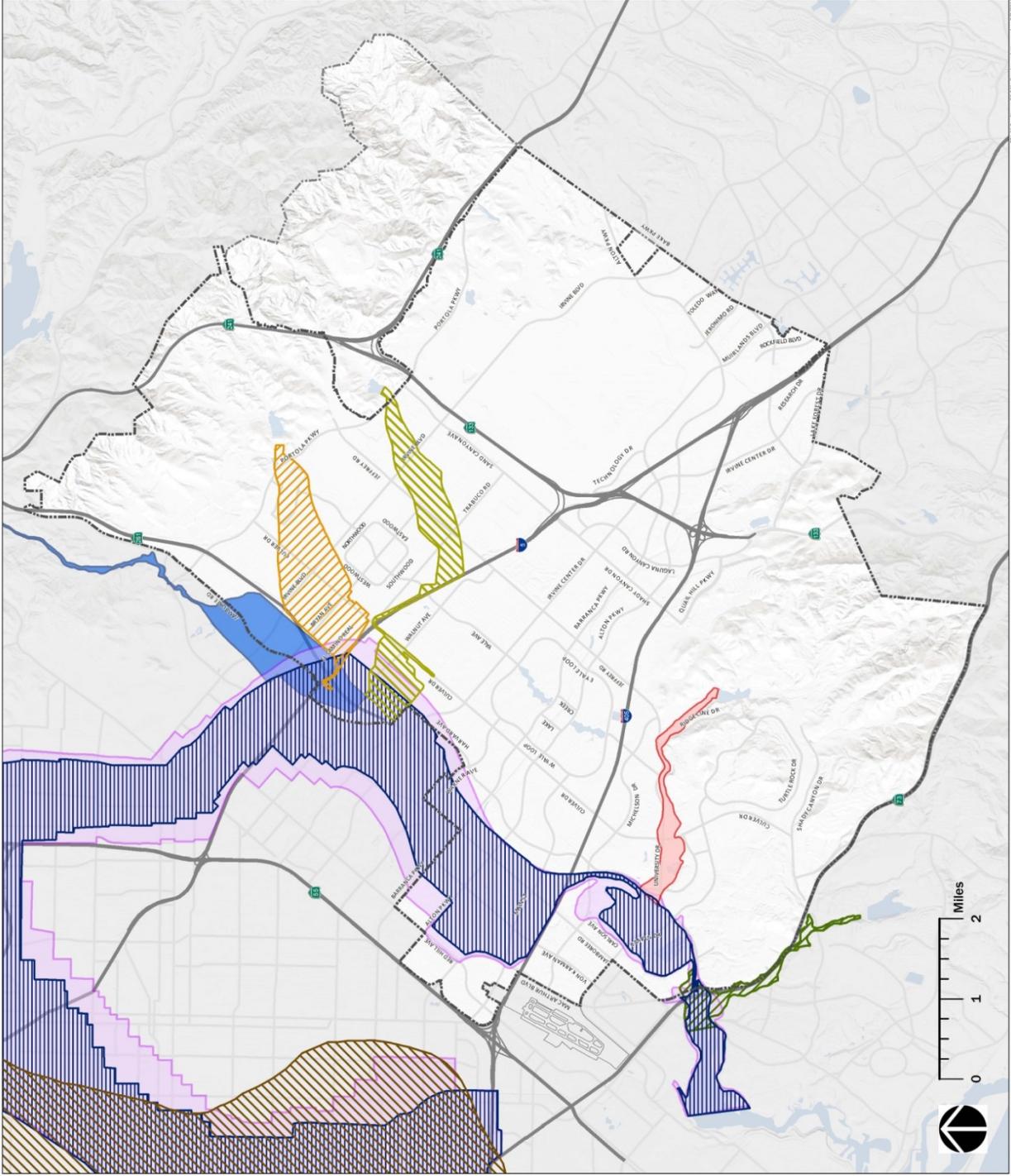
Figure 7-4b

# DAM INUNDATION

## LEGEND

-  Peters Canyon Reservoir
-  Rattlesnake Canyon Reservoir
-  Sand Canyon Reservoir
-  Santiago Dam
-  San Joaquin Reservoir
-  Syphon Canyon Reservoir
-  Prado Dam
-  Villa Park Dam
-  City Boundary
-  Sphere of Influence

Notes:  
 Official Prado Dam Inundation Maps are currently being updated to reflect improvements constructed by the Army Corps of Engineers.



Source:  
 Department of Water Resources (DWR, 2015)





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## 7.4 FIRE HAZARDS

This section covers a variety of fire-related hazards. This includes wildfires, urban fires, emergency medical services, and other issues associated with serving one of the largest urban areas in California.

### 7.4.1 Regulatory Setting

The regulatory setting for fire hazards includes federal, state, and local regulations. This section describes codes that protect people, property, and infrastructure from wildland and urban fires. Effective 2015, significant changes in state law address fire safety in the general plan.

#### 7.4.1.1 CAL FIRE and Office of the State Fire Marshal

The California Department of Forestry and Fire Protection (CAL FIRE) is dedicated to the fire protection and stewardship of over 31 million acres of California's wildlands. The Office of the State Fire Marshal (OSFM) supports CAL FIRE's mission to protect life and property through fire prevention engineering, law and code enforcement, and education. OSFM provides fire prevention by enforcing fire-related laws in state-owned or -operated buildings, investigating arson fires, licensing those who inspect and service fire protection systems, approving fireworks for use in California, regulating the use of chemical flame retardants, evaluating building materials against fire safety standards, regulating hazardous liquid pipelines, and tracking incident statistics for local and state government emergency response agencies.

#### 7.4.1.2 Fire Plans

The California Fire Plan is the state's road map for reducing the risk of wildfire through planning and prevention in order to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. The California Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and CAL FIRE. State-level fire plans are typically less applicable at the jurisdiction level unless there are substantial wildland-urban interface areas, but the overarching framework for firefighting is germane. These fire plans generally promote and support a three-part strategy to: 1) restore and maintain landscapes; 2) create or retrofit fire-adapted communities; and 3) ensure the ability to have an effective response to wildfire.



### 7.4.13 Fire Codes

The California Fire Code (Title 24 California Code of Regulations, Part 9) is based on the 2012 International Fire Code. The Fire Code contains fire-safety-related building standards referenced in other parts of Title 24 of the California Code of Regulations. Due to the topography and climate conditions in Irvine, the City and Orange County Fire Authority (OCFA) have made several amendments to the building code to address local fire concerns. These include requirements for emergency helicopter landings in certain buildings, automatic sprinkler systems in all new buildings with a Group R rating, and fuel modification standards for buildings and structures within or adjacent to defined very high fire hazard severity zones or other areas that are wildlands. The 2016 triennial update of the California Building Code is currently under review, and the City will be considering local amendments.

### 7.4.14 Local Fire Plans

The OCFA is contracted by the State of California to provide wildland fire prevention, management, and suppression services for State Responsibility Areas in the county. OCFA has adopted fire plans that dictate how fire services are provided in Irvine or nearby areas. Recent plans include the following:

- OCFA Unit Strategic Fire Plan
- Standards of Coverage Plan
- Orange County Nature Reserve Tactical Fire Suppression Plan
- Irvine Ranch Conservancy Wildfire Ignition Strategy

OCFA has published “Guideline B-09: Fire Master Plans for Commercial and Residential Development.” This document provides standards for access to structures, hydrant quantity and placement, water availability and fire flow, and fire safety regulations. In SRA areas, adherence to “Guideline B-09A: Fire Safe Development in State Responsibility Areas” is also required. This document provides guidelines for emergency access and egress, building signage, water standards, and fuel modification standards for structures in SRA lands.

For further information regarding OCFA’s fire protection and emergency services, see Chapter 6 of this report.

#### Fire Hazard Terms

**Fuel Modification:** The practice of thinning or removing combustible vegetation to protect structures on property in an area susceptible to fire. Fuel modification sometimes involves installing irrigation systems on the site and/or replacing natural vegetation with fire resistant plants.

**Wildland/Urban Interface (WUI):** The line, area, or zone where structures meet or intermingle with undeveloped wildland or vegetative fuels. These areas are at a high risk from wildfires spreading to structures, homes, and other personal property.

**Very High Fire Hazard Severity Zone (VHFSZ):** A designated area in which the type and condition of vegetation, topography, fire history, and other relevant factors demonstrate an increased possibility of uncontrollable wildland fire.

**Wildfire Risk Area:** Land that is covered with vegetation and which is so situated or is of such inaccessible location that a fire would present an abnormally difficult job of suppression or would result in great or unusual damage. This includes VHFSZ, WUI, and similarly hazardous areas.

**Fire Responsibility Areas.** Fire responsibility areas are divided into state responsibility areas (SRAs) and local responsibility areas (LRAs) depending on the party financially responsible for fire suppression.

## 7.4.15 California General Plan Guidelines

Senate Bill (SB) 1241 amended Government Code § 65302 in 2014. SB 1241 requires that revised safety elements address wildfire risks. Cities must submit the revised safety element to the Board of Forestry and Fire Protection for consideration and comments prior to its adoption and must respond to comments. In summary, SB 1241 requires the following changes:

- Identify wildfire hazards with the latest state-prepared, very high fire severity zone maps from the Board of Forestry and Fire Protection, US Geological Survey, and other sources
- Demonstrate that the City or contract agency and associated codes satisfactorily address adequate water supply, egress requirements, vegetation management, street signage, land use policies, and other criteria to protect from wildfires
- Establish in the safety element (and other elements that must be consistent with it) a set of comprehensive goals, policies, and *feasible* implementation measures for protection of the community from unreasonable risks of wildfire

## 7.4.16 Existing General Plan

The safety element's policies related to wildland fire hazards include policies that promote the establishment of fuel modification standards (Policy J-1 [c]) and require new development proposals to be reviewed by OFCA (Policy J-1 [e]). The public facilities and services element reiterates OCFA service policies based on National Fire Protection Association standards, including response for fire and basic life safety, advanced life support, and other service priorities. Supplemental regulations are in the City's municipal code, zoning code, and building code, and OCFA plans.

The general plan contains revised mapping in accordance with SB 1241 that was prepared concurrent with the prior housing element. However, the Board of Forestry and Fire Protection did not issue regulations implementing the full scope of SB 1241 until 2015. Subsequent Board guidelines and OPR General Plan Guidelines will require amendments to the Irvine General Plan Safety Element.



Some neighborhoods in northern Irvine are in areas known to experience wildfires.



## 7.4.2 Existing Conditions

Most of Irvine is in a broad, flat valley between the Santa Ana Mountains and San Joaquin Hills that is almost entirely covered with urbanized land uses and lacks vegetative fuel that is susceptible to fire. However, the northern third and southern third of the City include canyons, ridges, and hillsides covered in coastal sage scrub, chaparral, and oak woodlands. The dry grasses and woody shrubs in these areas are highly flammable. Fires remain a danger in Irvine and the region. Table 7-3 lists major fires in Orange County near Irvine.

**Table 7-3**  
**Wildland Fires History in Orange County**

Year	Name/Location	Acres Burned
2014	Silverado Canyon (north of Irvine)	1,000
2008	Freeway Complex (Yorba Linda, Anaheim Hills)	30,000
2007	Santiago (Santiago and Silverado Canyons)	28,000
1993	Laguna Beach	17,000
1967	Paseo Grande (Santa Ana Mountains)	51,000
1948	Green River (Santa Ana, Silverado, & Modjeska canyons)	53,000

Source: *Orange County Register*, September 14, 2014.

Fire hazard severity zones are determined by the State of California to identify areas most susceptible to wildfire. OCF and the City of Irvine have adopted the state’s designations for fire hazards; however, the City has modified the fire hazard zones to include an additional 100-foot buffer for vegetation management in certain locations. Generally, very high fire severity zones are at the City’s periphery—including portions of the San Joaquin Hills, foothills along the northern boundary of the City and its sphere of influence, and the undeveloped grasslands northeast of the Great Park site. The first of these areas extends the farthest into the City and contains the largest amount of urban land uses, including new residential areas in Shady Canyon, portions of Turtle Rock, and the chain of open space areas that parallel University Drive east toward UCI.

Figure 7-5 shows the City’s adopted wildland fire hazard map.

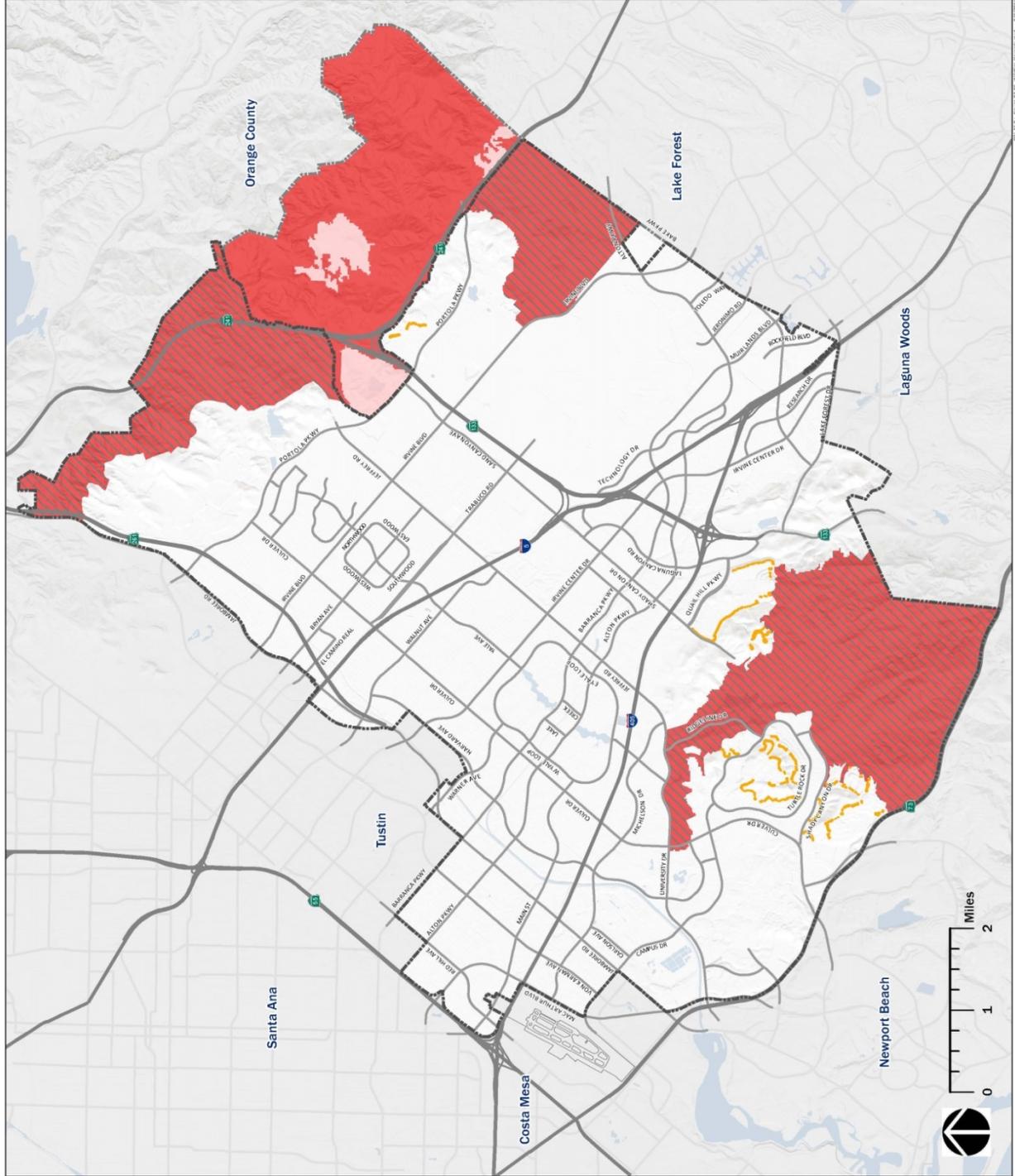
Figure 7-5

# WILDFIRE HAZARDS

## LEGEND

- Local Responsibility Area
- City-adopted Very High Fire Severity Zone
- City-adopted 100-foot buffer zone
- State Responsibility Area
- OCFA-adopted Very High Fire Severity Zone
- OCFA-adopted High Fire Severity Zone
- OCFA-adopted Moderate Fire Hazard Severity Zone
- City Boundary
- Sphere of Influence

Notes:  
 100 Foot Buffer Zone: is that area on private property within 100 feet of a fuel modification or open space containing native or hazardous vegetation, and which is designated on Irvine's Wildland Fire Hazard Map.



Source:  
 City of Irvine, Wildland Fire Hazard Map (City of Irvine, 2012)  
 Unincorporated Area, Ember/Fire Hazard Severity Zone Map (OCFA, 2012)



# IRVINE

GENERAL PLAN 2035



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## 7.5 HAZARDOUS MATERIALS AND SITES

Hazardous materials refer generally to hazardous substances that exhibit corrosive, poisonous, flammable, and/or reactive properties and have the potential to harm human health and/or the environment. Hazardous materials are used in products (household cleaners, industrial solvents, paint, pesticides, etc.) and in the manufacturing of products (e.g., electronics, newspapers, plastic products). Hazardous materials can include petroleum, natural gas, synthetic gas, and toxic chemicals that are used in agriculture, commercial, and industrial uses; businesses; hospitals; and households. Accidental releases of hazardous materials have many causes, including highway incidents, warehouse fires, train derailments, shipping accidents, and industrial incidents.

### 7.5.1 Regulatory Setting

Federal, state, and local programs regulate the use, storage, and transportation of hazardous materials and hazardous waste. These regulations can reduce the danger that hazardous substances may pose to people, businesses, and the environment.

#### 7.5.1.1 Federal Regulations

##### Resource Conservation and Recovery Act of 1976

The RCRA is the principal federal law that regulates the generation, management, treatment, storage, or disposal of hazardous waste. The RCRA gave the EPA the authority to control hazardous waste “from cradle to grave,” that is, from generation to transportation, treatment, storage, and disposal. The RCRA also set up a framework for the management of nonhazardous wastes. The 1986 amendments to RCRA enabled the EPA to address environmental problems from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites. The federal Hazardous and Solid Waste Amendments are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include increased enforcement authority for the EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.

#### Hazardous Materials Terms

**Hazardous Material:** Any material that because of its quantity, concentration, or physical or chemical characteristics poses a significant present or potential hazard to human health and safety or the environment. Substances that are flammable, corrosive, reactive, oxidizers, radioactive, combustible, or toxic are considered hazardous.

**Household Hazardous Waste:** Household hazardous waste refers to post-consumer waste that qualifies as hazardous waste when discarded. These products may exhibit many of the same characteristics as fully regulated hazardous waste.

**Superfund Site** A Superfund site is any land in the nation that has been contaminated by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment.

**Medical Waste.** Medical waste means any biohazardous, pathology, pharmaceutical, or sharps waste; trace chemotherapy waste; or trauma scene waste not regulated by the RCRA. Medical waste is generated at health care facilities and laboratories.

**Certified Unified Program Agency.** Refers to a designation granted by the State of California to agencies that are delegated to address hazardous materials programs required by CalEPA.



## Comprehensive Environmental Response, Compensation, and Liability Act of 1980

The CERCLA of 1980, commonly known as the Superfund, was enacted to protect the water, air, and land resources from the risks created by past chemical disposal practices such as abandoned and historical hazardous wastes sites. CERCLA authorized the EPA to seek out the parties responsible for any release and ensure their cooperation in the cleanup. This federal law created a tax on certain industries that went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. CERCLA also enabled the revision of the National Contingency Plan, which provided guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The National Contingency Plan established the National Priority List of sites, known as Superfund sites.

## Superfund Amendments and Reauthorization Act

CERCLA was amended by the Superfund Amendments and Reauthorization Act in 1986. The Superfund Amendments and Reauthorization Act (SARA) reauthorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Title III of SARA authorized the Emergency Planning and Community Right-to-Know Act.

## Emergency Planning & Community Right to Know

EPCRA was enacted to help communities protect public health, safety, and the environment from chemical hazards by requiring businesses to report the locations and quantities of chemicals stored onsite. These reports help communities prepare to respond to chemical spills and similar emergencies. EPCRA requires manufacturers to report releases to the environment (air, soil, and water) of more than 600 designated toxic chemicals; report offsite transfers of waste for treatment or disposal; implement pollution prevention measures and activities; and participate in chemical recycling. The EPA maintains a database of information on toxic chemical releases and other waste management activities reported by certain industry groups and federal facilities. This online, publicly available, digital database is called the Toxics Release Inventory and was expanded by the Pollution Prevention Act of 1990.

## Toxic Substances Control Act of 1976

The Toxic Substances Control Act of 1976 gave the EPA the ability to track the 75,000 industrial chemicals produced or imported into the US. The EPA screens these chemicals, can require reporting or testing of any that may pose an environmental or human health hazard, and can ban the manufacture and import of chemicals that pose unreasonable risk. Also, the EPA has mechanisms in place to track new chemicals that industry develops each year with either unknown or dangerous characteristics. It then can control these chemicals as necessary to protect human health and the environment. The act supplements other federal statutes, including the Clean Air Act and the Toxics Release Inventory under EPCRA.

## Hazardous Materials Transportation Act of 1975

The HMTA of 1975 is the principal federal law regulating the transportation of hazardous materials by ground, air, sea, or rail. The HMTA was passed to improve uniformity of existing regulations for transporting hazardous materials and to prevent spills and illegal dumping that endanger life, property, and the environment. In accordance with Title 49 of the US Code, regulations are enforced through procedures and policies, material designations and labeling, packaging requirements, and uniform operational rules. In 1990, Congress enacted the Hazardous Materials Transportation Uniform Safety Act to further align local, state, and federal regulations affecting hazardous wastes.

## Natural Gas Pipeline Safety Act (NGPSA, 1968); Hazardous Liquid Pipeline Safety Act (HLPSA, 1979) as amended

The NGPSA authorized USDOT to develop, prescribe, and enforce federal safety standards for the transportation of flammable, toxic, or corrosive natural gas by pipeline as well as the transportation and storage of liquefied natural gas. The HLPSA extended the act to regulate the transportation of hazardous liquids (crude oil, petroleum products, anhydrous ammonia, and carbon dioxide) by pipeline. Both acts are codified under 49 U.S.C. Chapter 601. Due to pipeline accidents, Congress passed the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, which established integrity management regulations for high and moderate consequence areas, maximum allowable operating procedures, and enhanced reporting requirements.



### **7.5.12 Regulatory Agencies**

#### **US Environmental Protection Agency**

The EPA is the primary federal agency that regulates hazardous materials and waste. The EPA is responsible for researching and setting national standards for a variety of environmental programs, and it delegates to states the responsibility for issuing permits and monitoring and enforcing compliance. EPA programs promote handling hazardous wastes safely, cleaning up contaminated land, and reducing trash. Under RCRA and in cooperation with state and tribal partners, the EPA's Waste Management Division manages a hazardous waste program, an underground storage tank program, and a solid waste program that includes development of waste reduction strategies such as recycling.

#### **California Department of Toxic Substances Control**

DTSC is responsible for carrying out the RCRA program in California to protect people from exposure to hazardous wastes. DTSC regulates hazardous waste, cleans up existing contamination, and looks for ways to control and reduce the hazardous waste produced in accordance with California Health and Safety Code Division 20, Chapter 6.5 and the Hazardous Waste Control Regulations (Title 22, CCR, Divisions 4 & 4.5). DTSC implements permitting, inspection, compliance, and corrective action programs to ensure the proper handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning for hazardous waste in accordance with state and federal law.

#### **California Environmental Protection Agency**

CalEPA was created to protect human health and the environment and to assure the coordinated deployment of state resources. CalEPA's unified program includes six programs:

- Underground Storage Tank
- Aboveground Petroleum Storage Tank
- Hazardous Waste
- Hazardous Materials Disclosure
- Business Emergency Plan
- California Accidental Release Prevention (CalARP)

OC Environmental Health is the local Certified Unified Program Agency responsible for implementing these programs.

## 7.5.2 Existing Conditions

Because Irvine has substantial industrial uses and a decommissioned military base (MCAS El Toro), and is adjacent to a second military base (MCAS Tustin), it is home to hazardous waste sites. Developers and builders must survey, identify, and, where necessary, remediate their project sites consistent with CEQA and the regulations listed above.

### 7.5.2.1 Hazardous Material Sites

Irvine has retail, commercial, and industrial businesses that generate, store, use, transport, recycle, or dispose of hazardous materials (see Table 7-4). These materials are regulated by local, state, and federal laws and applicable agencies discussed earlier in this section. Recognizing that generators produce waste in different quantities, Cal EPA established two categories of generators in the regulations—large and small quantity generators (distinguished by whether they produce 1000 kg or more of hazardous waste per month).

**Table 7-4  
Facilities Using Hazardous Materials**

Facility Descriptions	Number of Facilities
Facilities that produce and release toxic air pollutants	28
Hazardous Materials Generators	431
Transporters of Hazardous Materials	11
Treatment, Storage, and Disposal Facilities	2
Sites on the Final National Priorities List	2
Open Cases of Leaking Underground Storage Tanks	42

Source: Local, state, and federal agency databases.

Additional local regulations related to hazardous materials and sites are in Chapter 2-13 of the City’s zoning code. The purpose of this chapter is to establish uniform standards; land use regulations; and a permit process for controlling the location, design, maintenance, and safety of off-site hazardous waste facilities. Title 4, Division 17 of the Irvine Municipal Code outlines the City’s requirements for identifying and disclosing the use or storage of hazardous materials in Irvine.



El Toro Marine Base 2011.

Photo Credit: D Ramey Logan, Wikipedia

## MCAS El Toro

Military operations at the former MCAS El Toro concluded in 1999. During its 55 years, the air station activities, operation, and maintenance of military aircraft and vehicles required the use of hazardous materials—petroleum-based products such as aviation and vehicular fuels; engine and lubricating oils; solvents, cleaners, paints, and thinners; pesticides and herbicides; chlorinated/halogenated compounds, including trichloroethylene and polychlorinated biphenyls; some radioactive materials; ordnance munitions; and propellants. Permitted hazardous waste storage areas at the former air station held hazardous, flammable, and unused chemical material and wastes. In 1985, a three-square-mile TCE plume was discovered that is about 150 feet deep beneath the former base and 300 to 700 feet deep offsite.

Despite its former role as a major site of substantial contamination and hazardous material use, much of the MCAS El Toro site's contamination and hazards have been remediated over the past two decades, including the demolition of hundreds of buildings, removal of contaminated soil, and extensive treatment of groundwater. In 2014, 1,900 acres of the 4,700-acre site were removed from the overall site's Superfund designation. Remediation activities are ongoing, and it has been determined by regulators that local groundwater is not affected by the TCE plume. The MCAS site is currently being developed as the Orange County Great Park and surrounding Great Park Neighborhoods.

## San Onofre Nuclear Generating Station

The San Onofre Nuclear Generating Station (SONGS), located south of San Clemente, is a nuclear power plant owned and operated by Southern California Edison (SCE) since 1968. In recent years, the SONGS facility experienced equipment failures, causing a shutdown. On June 7, 2013, SCE announced the permanent decommissioning of the facility. As regulated by the NRC, the decommissioning process involves the removal and disposal of radioactive plant materials and components, removal and safe storage of spent fuel, and eventually the termination of the plant's license. Current plans are to store spent fuel in steel canisters at SONGS pending transfer to the US Department of Energy.

## 7.6 AIR QUALITY

Air quality in southern California has consistently improved over the past few decades and continues to improve with changes in technology. However, the region still experiences some of the worst air pollution in the nation. This section provides background information regarding air quality for the Irvine General Plan and Environmental Impact Report.

### 7.6.1 Regulatory Setting

The state and federal government have adopted ambient air quality standards (AAQS) for criteria air pollutants. In addition, both the state and federal government regulate toxic air contaminants (TACs). Development in Irvine is subject to regulations adopted by the South Coast Air Quality Management District (SCAQMD), the California Air Resources Board (CARB), and the EPA. Federal, state, regional, and local laws, regulations, plans, or guidelines that are potentially applicable to the proposed project are summarized below.

#### 7.6.1.1 Clean Air Act (Ambient Air Quality Standards)

The Clean Air Act (CAA), originally passed by Congress in 1963, is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the EPA to establish National Ambient Air Quality Standards (AAQS) to protect public health by regulating the emissions of hazardous air pollutants. The CAA required that states develop state implementation plans to achieve the minimum federal standards. The CAA allows states to adopt more stringent standards or include other pollution species, which occurred with the passage of the California Clean Air Act in 1988.

California and the federal government have established health-based AAQS for seven “criteria” air pollutants—ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), coarse and fine inhalable particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and lead (Pb). In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are intended to provide a margin of safety by protecting sensitive receptors” most susceptible to respiratory distress, such as asthmatics, the elderly, young children, and people already weakened by other disease.

#### Air Quality Terms

**Sensitive Receptors:** Refers to land uses that are more sensitive to air pollution than others. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases.

**Criteria Air Pollutants.** Pollutants for which standards have been established. Carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), coarse inhalable particulate matter (PM<sub>10</sub>), and fine inhalable particulate matter (PM<sub>2.5</sub>) are considered criteria air pollutants.

**Toxic Air Contaminants.** An air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health.

**Attainment Status.** Federal and state ambient air quality standards have been set to protect public health. “Attainment” status for a pollutant means that the air district meets standards set by the EPA (federal) and CalEPA (state).



### **7.6.12 Toxic Air Contaminants**

The California Health and Safety Code defines a TAC as an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to Section 112(b) of the federal Clean Air Act (42 U.S. Code § 7412[b]) is a toxic air contaminant. Under state law, CalEPA, acting through CARB, is authorized to identify a substance as a TAC if it is an air pollutant that may cause or contribute to an increase in mortality or serious illness, or may pose a present or potential hazard to human health.

California regulates TACs through the Tanner Air Toxics Act and Air Toxics “Hot Spot” Information and Assessment Act of 1987. The Tanner Act set up a formal procedure for CARB to designate TACs. Once a TAC is identified, CARB adopts an “airborne toxics control measure” to reduce exposure to a safe level. If no safe threshold exists, the measure must incorporate best available control technology to minimize emissions. TACs from individual facilities are also quantified. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, must communicate results to the public.

### **7.6.13 Indoor Air Quality**

Poor indoor air quality has been tied to adverse health symptoms such as headaches, fatigue, trouble concentrating, and irritation of the eyes, nose, throat, and lungs. Specific diseases such as asthma have also been linked to indoor air environments (e.g., mold and mildew) or certain chemical properties. In addition, exposures to certain chemical or naturally occurring substances, such as asbestos and radon, can lead to cancer after many years. The EPA has not set regulatory standards for all indoor contaminants, although the state has adopted regulations covering indoor air quality for workplaces (California Labor Code §§ 6300, California Code of Regulations, and OSHA standards). Figure 7-6 on the following page shows areas in Irvine where ground conditions have indicated a potential for radon exposure at action levels.

Figure 7-6

# RADON POTENTIAL

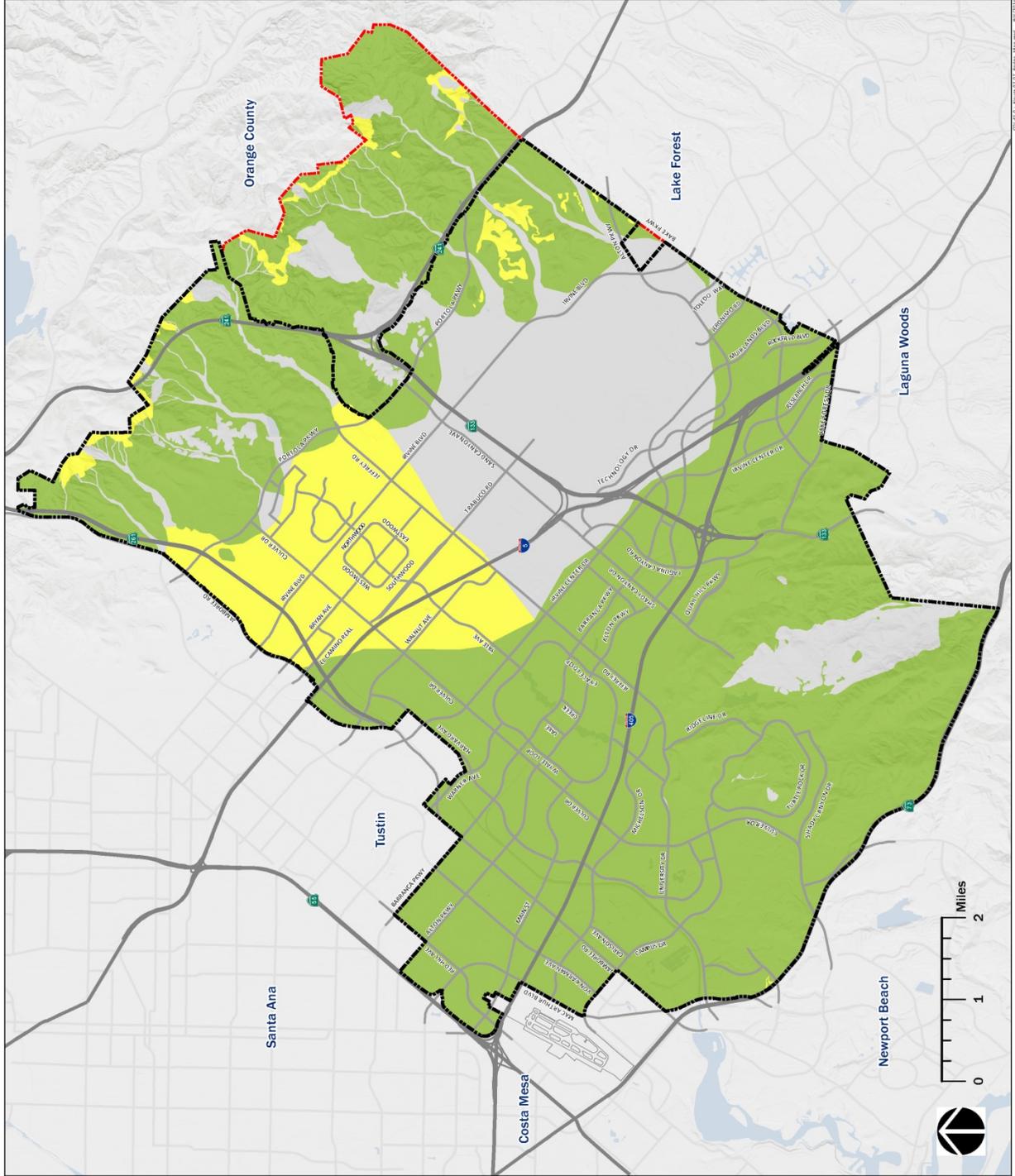
## LEGEND

- Radon Zone Definitions**
- Low Potential for Indoor Radon Levels Above Four PicoCuries per Liter\*
  - Moderate Potential for Indoor Radon Levels Above Four PicoCuries per Liter\*
  - Unknown Potential for Indoor Radon Levels Above Four PicoCuries per Liter\*
- City Boundary**
- Sphere of Influence**

**Notes:**  
 This map identifies areas where geologic conditions are more likely to produce excessive radon levels. This map is intended to be advisory only. This map is not intended for determining which buildings have excessive indoor radon levels. Besides geology, local variability in such factors as soil permeability, weather and climatic conditions, building design and condition, and building usage also influence indoor radon levels. Consequently, building specific radon levels can only be determined by indoor radon testing.

\* The United States Environmental Protection Agency recommends action be taken to reduce radon in homes with an average annual level higher than four picocuries per liter (4 pCi/L).

Source: California Department of Public Health, Indoor Radon Program, 2015  
 California Geological Survey, Mineral Resources Program, 2015



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#### 7.6.14 South Coast Air Quality Management District

SCAQMD first adopted guidelines for evaluating air quality impacts in 1993 in the *CEQA Air Quality Handbook*. Since then, SCAQMD has amended several chapters of the *Handbook* online. These guidance documents, along with others that define localized significance thresholds and outline guidelines for health risk assessment, are available at: [www.AQMD.gov/CEQA/hdbk.html](http://www.AQMD.gov/CEQA/hdbk.html). Air quality analyses conducted in the City of Irvine adhere to SCAQMD's guidelines.

##### Air Quality Management Plan

The federal Clean Air Act requires that each area that does not attain National Ambient Air Quality Standards to develop and implement an emissions reduction strategy to achieve attainment in a timely manner. SCAQMD is responsible for preparing the air quality management plan (AQMP) for the South Coast Air Basin in coordination with the Southern California Association of Governments. SCAQMD's 2012 AQMP attempted to use the latest science and analytical tools and strategies to control pollution from all sources—stationary sources, on- and off-road mobile sources, and area sources. It also highlights the urgent need to engage in interagency coordinated planning to identify additional strategies, especially for mobile sources, to meet all federal criteria air pollutant standards within the time frames under the CAA. The plan also identifies emerging issues—ultrafine particulate matter (PM<sub>1.0</sub>), near-roadway exposure, and energy supply and demand.

Because of the continued inability of the region to attain all the air quality objectives in the 2007 and 2012 AQMPs, the 2016 AQMP will develop more integrated strategies to meet the National AAQS for 1-hour and 8-hour ozone and the 24-hour and annual PM<sub>2.5</sub> emissions. A significant challenge will also be reducing NO<sub>x</sub> emissions sufficiently to meet the ozone and PM<sub>2.5</sub> emission standards. The primary challenge is that mobile sources contribute to 88 percent of the region's NO<sub>x</sub> emissions, and SCAQMD has limited authority to regulate mobile sources. This will require a greater focus on proven strategies and less reliance on future technologies that may not be financially feasible.



## 7.6.2 Existing Conditions

Air quality in the South Coast Air Basin generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions (i.e., stagnant air). However, the air quality in Orange County as a whole is significantly better than in other parts of the basin, such as the Los Angeles metropolitan region and the Inland Empire.

### 7.6.2.1 Nonattainment Areas

The AQMP provides the framework for air quality basins to achieve attainment of the state and federal ambient air quality standards. The South Coast Air Basin is classified as attainment or nonattainment for particular pollutants, depending on whether they meet the AAQS. Severity classifications for ozone nonattainment range from marginal, moderate, and serious to classifications of severe and extreme. The attainment status for the South Coast Air Basin is shown in Table 7-5.

**Table 7-5  
Attainment Status of Criteria Pollutants  
in the South Coast Air Basin**

Pollutant	State of California Standards	Federal Ambient Air Quality Standards
Ozone (1-hour)	Extreme Nonattainment	No federal standard
Ozone (8-hour)	Extreme Nonattainment	Extreme Nonattainment
PM <sub>10</sub>	Serious Nonattainment	Attainment
PM <sub>2.5</sub>	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO <sub>2</sub>	Attainment	Attainment/Maintenance
SO <sub>2</sub>	Attainment	Attainment
Lead	Attainment	Nonattainment (L.A County only)
All others	Attainment/Unclassified	Attainment/Unclassified

*Source: California Air Resources Board, 2015*

### 7.6.2.2 Orange County Air Quality Index

Although the air basin is a nonattainment area, Orange County's air quality is considerably better due to a combination of pollutant sources, topography, and meteorological conditions. The EPA uses the Air Quality Index (AQI) to report air quality for five pollutants—ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. The AQI excludes toxic air contaminants. Criteria air pollutant levels are converted into four rankings.

- Good. Air quality is considered satisfactory, and air pollution poses little or no risk to people.
- Moderate. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people.
- Unhealthy for Sensitive Groups. Although general public is not likely to be affected, people with lung disease, older adults and children are at a greater risk from exposure.
- Very Unhealthy. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.

Orange County has significantly better air quality, with 35 percent of the days reporting good air quality and 59 percent of days reporting moderate air quality (Table 7-6). Los Angeles and Inland Empire regions show the majority of days with moderate to unhealthy air quality.

**Table 7-6**  
**Percentage of Days Annually by Air Quality Index in 2015.**

AQI Value	Rating of Air Quality	Orange County	Los Angeles-Long Beach-Anaheim CMSA	Inland Empire
0-50	Good	35%	6%	7%
51-100	Moderate	59%	57%	47%
150-200	Unhealthy	5%	47%	45%
200+	Very Unhealthy	0%	<1%	2%

Source: <https://www.epa.gov/outdoor-air-quality-data/>



## 7.7 OPPORTUNITIES AND CONSTRAINTS

Irvine is located within a region that regularly experiences natural and human-caused hazards. Although the City is well positioned to withstand these dangers, safety risks continue to be a consideration. The City has a variety of opportunities and constraints to address the safety risks and remain most resilient to disruption.

### 7.6.1 Opportunities

**Earthquake Susceptibility.** A large percentage of buildings in Irvine were built after modern statewide earthquake codes were passed in the 1980s/1990s. Implementation of these codes has made the City's homes and businesses well suited to weather a large earthquake. Compliance with state and federal building and retrofit standards helps to ensure that the City's bridges, hospitals, and local schools meet the latest earthquake safety standards.

**Flooding Concerns.** Because most of Irvine has channelized waterways, existing flooding and dam inundation hazards are limited except during severely inclement weather. New development, infrastructure, or conditions could change this situation, but most of Irvine is likely to remain at low risk for significant flooding. Should flooding or dam inundation occur, the area most susceptible is western edge of Irvine.

**Climate Change and Resiliency.** Effective January 1, 2017, AB 379 requires that the safety element address climate adaptation and resiliency strategies. This review shall consider advice provided in the OPR General Plan Guidelines and shall include: 1) a vulnerability assessment, 2) a set of adaptation and resilience goals, policies, and objectives based on the vulnerability assessment; and 3) a set of feasible implementation measures to carry out goals, policies, and objectives.

**GIS Mapping Technology.** The State of California and federal government are continuing to update their GIS services to provide updated mapping on a range of potential hazards. As the City updates its GIS system, Irvine has the opportunity to incorporate the latest GIS layers, providing a solid database for updates of other planning efforts, including its hazard mitigation plans.

## 7.6.2 Constraints

**Wildfire Hazards.** Many of the Irvine areas planned to accommodate additional development in the near future are near “very high” fire severity zones. The continuation of existing land use patterns, coupled with periodic concerns with drought, will require special attention to the design of the wildland/urban interface in the City.

**Air Quality Impacts.** Irvine is in a region where many people travel long distances to work, school, and other activities—generating pollution, greenhouse gases, noise, and traffic. Even if automobile dependency is reduced in Irvine, residents will continue to experience the adverse effects of air pollutants, although to a lesser degree than in other cities.

**Soil Hazards.** Irvine is subject to soil hazards—specifically, soil corrosivity for metal and concrete as well as potential concerns with radon, a documented cause of cancer. Through proper building design and construction codes, these hazards can be mitigated. The City could investigate potential building code modifications during the triennial updates of the building codes to address the mitigation of soil hazards.



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# Chapter 8.

# Conservation and

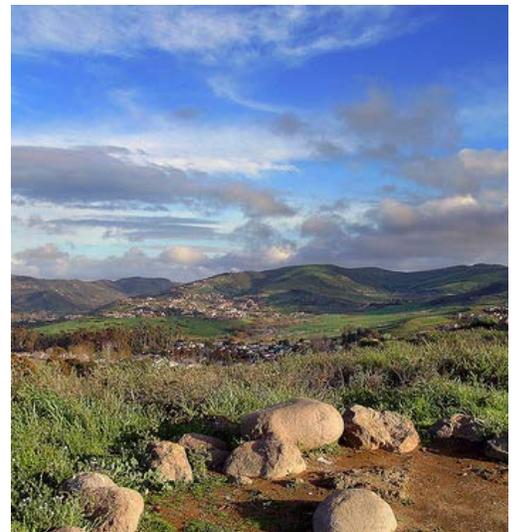
# Open Space

## 8.1 Introduction

Preserving open space resources has long been a priority in Irvine, dating back to the early days of the Irvine Ranch and its later development into an urban community. The City has taken great care to preserve its open space resources for its intrinsic value and benefits. Forty years after incorporation, these vast open space areas provide habitat and thriving areas for species and distinguish the City of Irvine from many contemporary urban communities.

Since the 1970s, California law has required general plans to include an open space and conservation element for the protection of natural resources that benefit the environment and communities. The City's general plan strives to reflect this commitment, and this chapter addresses the following resources:

- Biological resources. Open spaces that provide habitat (including rivers, streams, wildlands, and associated preservation areas) for diverse plant and wildlife species.
- Cultural resources. Open space lands for the preservation and protection of paleontological, Native American prehistoric, archaeological, cultural, spiritual, and ceremonial places.
- Natural resources. Especially agricultural lands, areas required for recharge of groundwater basins, and areas containing major mineral deposits of regional significance.
- Visual resources. Open space lands (e.g., valleys, mountains, ridgelines, and other resources) that offer outstanding scenic views as well as passive park and recreational purposes.



Irvine offers stunning views of open space



## 8.2 Biological Resources

This section describes biological resources in Irvine—first, by providing an overview of regulations affecting the preservation of biological resources, and second, by describing and mapping the important biological resources in Irvine.

### 8.2.1. Regulatory Setting

#### 8.2.1.1. Federal Endangered Species Act

The Federal Endangered Species Act (FESA) of 1973, as amended, was adopted to protect and conserve any species of plant or animal that is endangered or threatened with extinction and the habitats in which these species are found. The U.S. Fish and Wildlife Service (USFWS) is the lead agency responsible for implementation. The USFWS maintains a list of endangered species of birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. FESA requires federal agencies, in consultation with the USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "taking" of any listed species.

#### 8.2.1.2. Clean Water Act of 1972

The Army Corps of Engineers regulates discharges of dredged or fill material into "waters of the United States." Generally, this includes all wetlands, lakes, rivers, streams, sloughs, natural ponds, or other water bodies that meet specific criteria for navigability. In accordance with Section 404, a permit is required for any filling or dredging of these waters. The permit review process entails an assessment of potential adverse impacts to Corps wetlands and jurisdictional waters and compliance with required mitigation measures. Section 401 specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide certification of compliance with the Clean Water Act. In California, the Regional Water Quality Control Board must certify that the project will comply with water quality standards.

### 8.2.1.3. Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act of 1918 (MBTA) is the federal law that affirms and implements the United States' commitment to international conventions with Canada, Japan, Mexico, and Russia for the protection of shared migratory bird resources. The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. It prohibits the take, possession, import, export, transport, sale, purchase, barter, or offering of these items, except under a valid permit or as permitted in the implementing regulations. USFWS administers permits to take migratory birds in accordance with the regulations promulgated by the MBTA.

### 8.2.1.4. California Fish and Game Code, Section 1600

Section 1600 of the California Fish and Game Code requires that a project proponent notify the California Department of Fish and Wildlife (CDFW) of any proposed alteration of streambeds, rivers, and lakes. The intent is to protect habitats that are important to fish and wildlife. CDFW may review a project and place conditions on the project as part of a Streambed Alteration Agreement. The conditions are intended to address potentially significant adverse impacts within CDFW's jurisdictional limits. The only exceptions are immediate emergency work necessary to protect life or property, public service facilities needed for disaster recovery, or restoration of existing highways

### 8.2.1.5. California Endangered Species Act

The California Endangered Species Act (CESA) states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, plants, and their habitats, either threatened with extinction or experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. The CESA prohibits take and protects state-listed endangered and threatened species of fish, wildlife, and plants and species petitioned for listing (state candidates) at the discretion of the Fish and Game Commission. In addition, some sensitive mammals and birds are protected as Fully Protected Species. California Species of Special Concern are species designated as vulnerable to extinction due to declining population levels, limited ranges, and/or continuing threats. This list of species of special concern is primarily a working document for the CDFW's California Natural Diversity Database.

#### Biological Resource Terms

**Critical Habitat.** Specific geographic areas determined to be essential for the conservation and management of listed species, and that have been formally described in the Federal Register.

**Endangered Species.** An animal or plant species in danger of extinction throughout all or a significant portion of its range, often due to climate change or human activity.

**Habitat Conservation Plan (HCP).** A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. An HCP is required before an incidental take permit may be issued.

**Sensitive Species:** A plant or animal species that can only survive within a relatively narrow range of environmental conditions in order to prevent them from becoming threatened or endangered.

**Take.** Refers to actions that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct.

**Threatened Species.** A plant or animal species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.



#### **8.2.1.6. Existing General Plan**

Irvine's existing general plan established a Preservation land use designation to identify lands that contain visually significant ridgelines, biotic communities of high significance, geologic constraints, and cultural resources. This designation covers more than 11,000 acres, or nearly one-quarter of the land mass in the City of Irvine. The conservation and open space element identifies goals, objectives, and policies to maintain and preserve these resources.

Key objectives and policies include, but are not limited to, the following:

- Objective L-1: Establish a program to permanently protect and preserve designated conservation and open space areas. Supporting policy addresses implementation of the phased dedication and compensating development program.
- Objective L-2: Maintain and preserve areas with significant, diverse biotic communities. Supporting policies address preservation of natural resource areas identified in the Master Environmental Assessment and development in biotic resource areas.
- Objective L-3: Participate in the NCCP/HCP to accomplish multi-species and multi-habitat conservation. Supporting policies ensure compliance with and implementation of the NCCP, including review of project proposals, payment of mitigation fees, and acquisition.

#### **8.2.1.7. Zoning Code**

In Chapter 8-16 of the Zoning Code, Open Space Management and Conservation Plan (OSMCP), the City requires the preparation of such plans for qualified development projects. The OSMCP shall be utilized as the primary implementation tool for complying with biotic policies identified in biotic resources objectives L-2(a) and L-2(b) of the conservation and open space element, the timing and phasing of mitigation measures, and the responsibilities for implementation. This plan shall be prepared in conjunction with a concept plan and/or zone change application and in accordance with the City's guidelines for open space management and conservation plan reports. In addition, the plan will address "transition zones" described in the zoning code.

## 8.2.2. Existing Conditions

The City of Irvine lies within the coastal and foothill region of central Orange County. The major landforms are: 1) Santiago Hills; 2) Northern Flatlands; 3) Central Flatlands; and 4) San Joaquin Hills.

**Santiago Hills:** The Santiago Hills consist of moderately steep to steep, unbuildable slopes, canyons, plateaus, and narrow ridges, which reach an elevation of 1,700 feet. Eroded sandstone gorges known as the “sinks” are the most significant physical feature in the southeast corner. Other important features are the canyons—Aqua Chignon, Bee, Hicks, Little Joaquin, Rattlesnake, and Round. Santiago Hills have retained most of their natural biotic character; their biotic communities are freshwater marsh, coastal sage scrub, oak woodland, and grassland.

**Northern Flatlands:** The flatlands extend from the Santiago Hills to the Santa Ana Freeway. This area is nearly flat, gradually sloping from the northeast to the southwest and traversed by many streams that are part of the San Diego Creek Watershed that originates in the Santiago Hills. The natural biotic communities have been altered by agricultural activities, except near the perimeters. This area hosts orchards, row crops, eucalyptus windrows, and nonnative ornamental vegetation.

**Central Flatlands:** The central flatlands are also a portion of the Tustin Plain between I-5 and the San Diego Freeway (I-405). The area is extremely flat and crossed by San Diego Creek and Peters Canyon Wash. The natural biotic communities have—for the most part—been altered by agricultural activities and urban development. The primary biotic communities are farmland/rural and urban, except for the riparian community in Planning Areas 12 and 13.

**San Joaquin Hills:** The San Joaquin Hills consist of rolling terrain with moderately steep slopes, canyons, narrow ridges, and spectacular rock outcroppings, many of which contain eroded sandstone caves. Wildlife habitats and vegetation types include both rare and common wildlife and plant species. Critical habitat for California gnatcatcher and cactus wren is in the northeastern and southeastern corners of the City and unincorporated Orange County. Detailed information regarding plant communities, natural habitats, and sensitive species will be prepared in a subsequent phase of the General Plan Update.



### 8.2.2.1. Irvine Open Space Initiative

In 1988, Irvine residents approved the “Irvine Open Space Initiative.” This landmark initiative created the framework to preserve large, contiguous open space areas for conservation and open space as phased master-planned growth occurred in other areas of the City. This initiative set the stage for the preservation of significant natural open space resources that are home to a variety of wildlife species and habitats, including sensitive species. The Irvine Open Space Preserve, as it now is known, protects more than 93,000 acres of land from the “mountains to the sea,” linking the Cleveland National Forest, San Joaquin Marsh, Laguna Coast Wilderness Park, and other resources.

The City has committed to protect and manage the Irvine Open Space Preserve consistent with the California Natural Community Conservation Planning Act of 1991. The City and many other local governments and public and private agencies adopted the Orange County Central/Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) to cover this area. Of the NCCP/HCP acres in Irvine, 10,587 are designated for the habitat reserve system, and 813 acres are nonreserve lands called special linkages. The special linkages contain biological value that could enhance connectivity between elements of the reserve system. The NCCP/HCP provides regulatory coverage for 39 individual species and four “covered” habitats. The City is required to implement the NCCP/HCP and review project proposals for consistency with the plan.



Irvine Preserve

The Irvine Ranch Conservancy was established in 2005 to help care for the 50,000 acres of permanently protected wildlands and parks on the historic Irvine Ranch. The organization works with its partners to enhance the public’s appreciation, understanding, and connection to the land, while assisting in aspects of stewardship. The conservancy contributes its resources, expertise, and energy to achieve the best possible balance of preservation and public participation. In 2006, the US Department of Interior designated 37,000 acres of protected wildlands and parks on the Irvine Ranch a National Natural Landmark, recognizing the exceptional value of these lands to the entire nation.

## 8.2.2.2. Natural Resource Areas

The City of Irvine’s natural resource areas contain key landforms, valleys, canyons, and other natural areas with extensive biological resources, including sensitive species. These areas also provide opportunities for passive recreation. Key open space resources are summarized below. A full range of resources can be found in the NCCP.

### Irvine Open Space Preserve

The Irvine Open Space Preserve includes thousands of acres of native habitat, providing linkages between natural resources found in the region, including the Cleveland National Forest, the San Joaquin Marsh, and the Laguna Coast Wilderness Park, among many others. The preserve consists of a mosaic of native habitats, including chaparral shrub thickets, riparian wetland, native grass meadows, oak woodlands, and extremely rare coastal sage scrub. It is a wildlife sanctuary that is home to deer, bobcats, mountain lions, coyotes, and hundreds of endangered birds, mammals, and reptiles. The preserve also provides a rare recreational opportunity for Irvine’s residents and visitors who may explore the land through myriad activities—from hiking, biking, and equestrian treks, to painting, to stewardship and restoration programs, or peaceful solitude.

### Limestone Canyon and Whiting Ranch

Limestone Canyon Regional Park and Whiting Ranch Regional Parks, located north of the SR-241, stretch from Irvine to the Cleveland National Forest. The two parks combined contain 4,300 acres of riparian and oak woodland canyons, grassland hills, and slopes of coastal sage scrub and chaparral. Both parks are within the Irvine Open Space Preserve and have management plans that guide their preservation and use. These parks contain important habitat occupied by target species, biodiversity habitat (including significant oak woodlands and other sensitive species habitat), and habitat linkages that lead to the Cleveland National Forest. Both parks also have scenic rock formations, including the Red Rock Canyon and the Sinks. Intermittent streams such as Borrego Creek, Serrano Creek, Santiago Creek, Agua Chinon Creek, and others meander through the parks, each hosting an abundance of plant, riparian, and wildlife species.



Limestone and Whiting Ranch Regional Park



### **Shady Canyon, Bommer Canyon, and Quail Hill**

Irvine’s southern border has three large natural areas—Quail Hill, Shady Canyon and Bommer Canyon—all part of the area encompassed by the Orange County Central/Coastal Subregion NCCP/HCP. These areas offer abundant natural wilderness areas; trails for hiking, walking, and bicycling; and a variety of native plant and animal species. A wildlife corridor is also planned for both Shady Canyon and Bommer Canyon that allows the movement of wildlife through Laguna Canyon. These areas are home to a variety of habitats and species, some of which are protected under the NCCP/HCP for the Irvine Preserve.

### **Irvine Wildlife Corridors**

A wildlife corridor is an area of land that connects different wildlife habitats (refuges, parks, rivers, etc.) that might otherwise be separated by human development. Wildlife corridors allow animals to migrate to and from locations, protecting the integrity of habitat and species. Irvine has several wildlife corridors—Hicks Canyon, Rattlesnake Canyon, Loma Ridge, Limestone Canyon, and upper Borrego Canyon form wildlife corridors that stretch to the Cleveland National Forest. Wildlife corridors are also preserved along the Eastern Transportation Corridor at Agua Chinon and the SR-241/133 interchange.

Historically, a wildlife corridor also connected lands in Irvine’s northern sphere (e.g., “Santiago Hills”) to coastal lands along the Pacific Ocean. In 2013, the Irvine City Council adopted the Irvine Wildlife Corridor Plan, taking a step toward creating a wildlife corridor that would link protected lands in the Laguna Coast to wilderness areas that include the Cleveland National Forest, Whiting Ranch, and Limestone Canyon. This plan is the product of collaborative work between the developer of the Great Park Neighborhoods and environmental coalitions.

Figure 8-1 displays NCCP areas protected within the City of Irvine, including areas containing significant biological resources. A full list of sensitive, threatened, and endangered species protected can be found in the NCCP and in the technical report for the General Plan EIR.

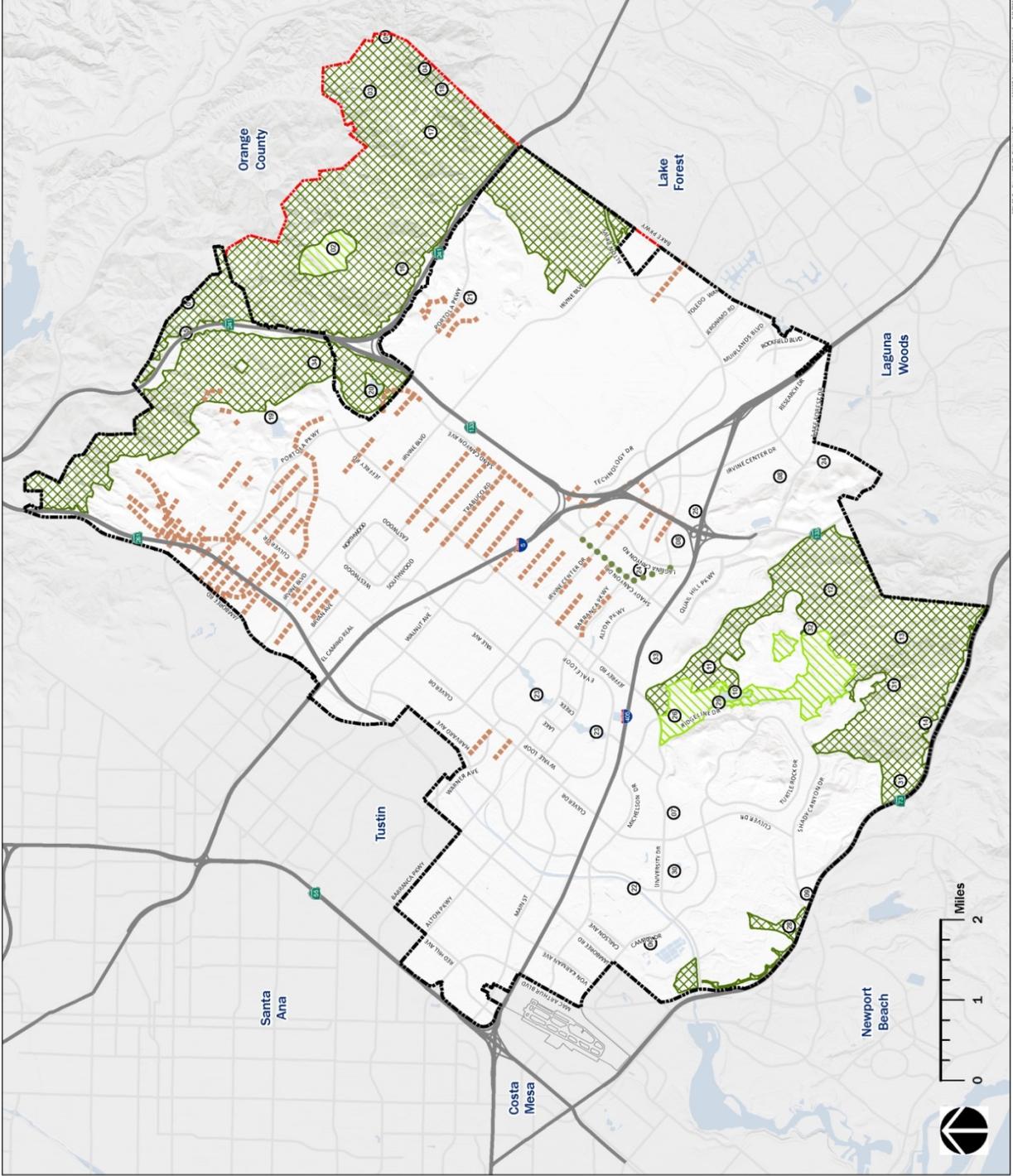
Figure 8-1

# BIOLOGICAL RESOURCES AND NCCP AREAS

## LEGEND

- Eucalyptus Windrow
- Sand Canyon Oak Trees
- NCCP Habitat Reserve
- NCCP Special Linkage
- Code Area Name:
- 01 Limestone Canyon
- 02 Bee Canyon
- 03 The Sinks
- 04 Borrego Canyon
- 05 Santiago Canyon
- 06 San Joaquin Freshwater Marsh
- 07 Sand Canyon Wash
- 08 San Diego Creek
- 09 Bonita Reservoir
- 10 Sand Canyon Reservoir
- 11 Sand Canyon Reservoir Rare Plant Habitat
- 12 Shady Canyon Rare Plant Habitat
- 13 Shady Canyon
- 14 Bommer Canyon
- 15 Limestone Canyon Buffer
- 16 Round Canyon
- 17 Agua Chicon Wash
- 18 Borrego Canyon Buffer
- 19 Rattlesnake Reservoir
- 20 Siphon Reservoir
- 21 Lambert Reservoir
- 22 San Diego Creek - Downstream Reach
- 23 Woodbridge Lakes
- 24 San Diego Creek Buffer
- 25 San Diego Creek - Irvine Center Reach
- 26 Sand Canyon Wash
- 27 (Reserved)
- 28 Bonita Reservoir Buffer
- 29 Sand Canyon Reservoir
- 30 William R. Mason Regional Park Lakes
- 31 Shady and Bommer Canyon Buffer
- 32 Shady Canyon Tributary
- 33 Canada Geese Foraging Areas
- 34 Hick's Canyon
- City Boundary
- Sphere of Influence

Source:  
City of Irvine, 2014; PlaceWorks, 2014





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## 8.2.3. Water Resources

The City of Irvine is part of the Newport Bay Watershed, which is bounded to the northeast by the Loma Ridge and the Santa Ana Mountains and to the southeast by the San Joaquin Hills. Between the Santa Ana Mountains and the San Joaquin Hills lies the flat, alluvial Tustin Plain. The lowest area of this plain is the historic location of the Swamp of the Frogs. Runoff originating in the northern hills now flows through flood control channels into the San Diego Creek Channel, through the Tustin Plain, and then into the Upper Newport Bay estuary.

Irvine’s surface water resources, although more limited than many coastal communities, are essential for plant and animal species that are either native or inhabit the community. In addition to the intermittent streams that are part of the watershed, Irvine also has several lakes (natural and manmade), reservoirs, channels, marshes, and other water resources. Many animal species (including sensitive species) depend on these surface waters, the quality of the waters, and the habitats found within them for nesting, feeding, and migratory purposes.

As shown in Table 8-1, Irvine’s CEQA Manual lists the major water features serving as habitats for fish and/or wildlife species. Additional water features are located near the City as well.

**Table 8-1  
Water Features Serving as Habitats for Fish and Bird Species**

Type of Water Feature	Locations of Water Features
Creeks	San Diego Creek, Serrano Creek, Upper Newport Bay, Santiago Creek, Borrego Creek, Bonita Creek
Washes	Agua Chinon, Bee Canyon, Borrego Canyon, Hicks Canyon, Peters Canyon, Sand Canyon washes
Lakes and Reservoirs	Woodbridge Lakes, William R. Mason Regional Park, and six open reservoirs that store recycled water
Marshes	San Joaquin Wildlife Sanctuary that drains to the Upper Newport Bay estuary
Retarding Basins	Trabuco, Bee Canyon, Hicks Canyon, Agua Chinon, Round Canyon, and Orchard Hills

Source: Irvine CEQA Manual, 2012

### Water Resource Terms

**Beneficial Uses.** Beneficial uses of water refer to a state-designated value of the waterway—such as public water supply, protection for fish and wildlife, recreation, agriculture, industry, navigation, and aesthetics.

**Water Resources.** A broad planning term meant to include rivers, lakes, oceans, intermittent creeks, underground aquifers, and any other source of water for communities..

**Watershed.** A watershed is an area of land that drains all the streams and rainfall to a common outlet such as a reservoir, mouth of a bay, or any point along a stream channel. The boundaries of larger watersheds often contain many smaller watersheds depending on the outflow point.

**Wetlands.** Areas where water covers the soil, or where water is present at or near the surface of the soil for periods of time during the year. Wetlands include marshes, vernal pools, ponds, estuaries, and other similar areas. Wetlands may support aquatic and terrestrial species.



## **Creeks, Streams, and Other Waterways**

Irvine is primarily situated within the San Diego Creek Watershed, which covers 112 square miles in central Orange County. The San Diego Creek, its main tributary, drains from the Santiago Hills to outlets into the Upper Newport Bay. More than one dozen smaller tributaries span the City of Irvine and flow from the hillsides to lower elevations. These include Serrano Creek, Borrego Canyon Wash, Agua Chinon Wash, Bee Canyon Wash, Peters Canyon Wash, and Sand Canyon Wash.

The Santa Ana Regional Water Quality Control Board has prepared a Basin Plan for the region that: 1) designates beneficial uses for surface waters and ground waters; 2) sets narrative and numeric objectives to protect the beneficial uses and conforms to the state's anti-degradation policy; and 3) describes implementation programs to protect all waters. Since most of the segments are impaired by pollution, the Santa Ana RWQCB has set total maximum daily loads for each segment and requires adherence to various programs to achieve them.



[San Joaquin Wildlife Sanctuary](#)

## **San Joaquin Wildlife Sanctuary**

The 538-acre San Joaquin Wildlife Sanctuary is a remnant of the 5,300-acre wetland ecosystem that existed near the Santa Ana River and San Diego Creek prior to flood control modifications. The sanctuary supports a variety of wetland habitats, including marshlands, shallow ponds, and channels confined by earthen dikes. A remnant coastal sage scrub community thrives on its margins. The San Joaquin Marsh is a key linkage between riparian habitats in the upland areas of the watershed and estuarine habitats in the Upper Newport Bay Ecological Reserve. The marsh is a critical stop for 100 migratory bird species using the Pacific Flyway. Altogether, more than 200 bird species have been sighted in the sanctuary, including two resident endangered bird species: the light-footed clapper rail and the California least tern.

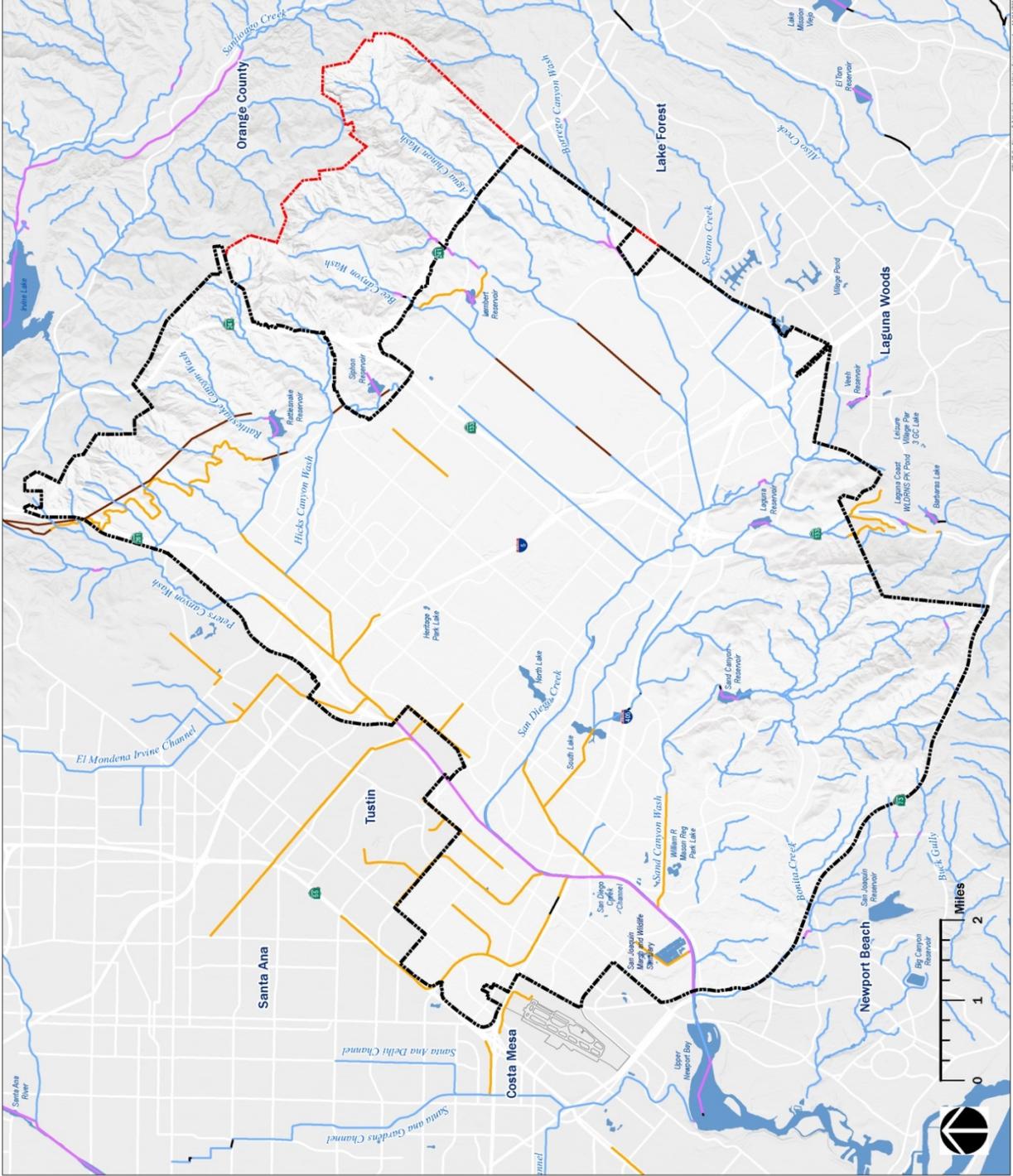
Figure 8-2 on the following page shows the locations of the surrounding watershed areas, major creeks, channels, and water bodies in Irvine.

Figure 8-2

# HYDROLOGY AND WATER FEATURES

## LEGEND

- Drainage
- Artificial Path
- Canal or Ditch
- Connector
- Pipeline
- Water Features
- Lakes and Reservoirs
- Streams and Rivers
- City Boundary
- Sphere of Influence



Source: USGS - National Hydrography Dataset (NHD), 2016; City of Irvine, 2016; PlaceWorks, 2016





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## 8.3 Cultural Resources

This section addresses the cultural resources (e.g., historical, archaeological, and paleontological) in Irvine and the process for their early identification, consideration, and preservation, where appropriate. The City of Irvine has been associated with many cultural resources protected through established policies.

### 8.3.1. Regulatory Setting

#### 8.3.1.1. National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) is the primary federal law governing the preservation of cultural and historic resources in the United States. The law establishes a national preservation program and a system of procedural protections that encourage the identification and protection of cultural and historic resources of national, state, tribal, and local significance. Primary components of the act include: 1) a national policy governing the protection of historic and cultural resources; 2) a comprehensive program for identifying historic and cultural resources for listing in the National Register of Historic Places; 3) a federal-state/tribal-local partnership for implementing programs established by the act; and 4) regulatory guidance for actions that could adversely affect historic properties.

#### 8.3.1.2. National Register of Historic Places

Authorized under the NHPA, the National Register of Historic Places is the nation's official list of buildings, structures, objects, sites, and districts worthy of preservation because of their significance in American history, architecture, archeology, engineering, and culture. To be eligible for listing in the National Register, a resource must meet at least one of the following criteria: 1) is associated with events that have made a significant contribution to the broad patterns of our history; 2) is associated with the lives of persons significant in our past; 3) embodies the distinctive characteristics of a type, period, or method of construction; or represents the work of a master; or possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction; or 4) has yielded, or may be likely to yield, information important in history or prehistory.

#### Cultural Resource Terms

**Cultural Resources.** Refers to the physical remains, objects, historic records, and traditional lifeways of the past. These may include archaeological, historical, or paleontological resources.

**Archaeological Resources.** Artifacts, structural remains, and human remains that originated from an era of prehistory.

**Historical Resources.** Buildings, objects, structures, infrastructure, geographical areas, or other sites that are historically important.

**Paleontological Resources:** Fossilized geological materials that represent a past era and may yield fossil remains of plants and animals.



#### **8.3.1.3. Archaeological Resources Protection Act of 1979 and Native American Graves Protection and Repatriation Act of 1990**

The Archaeological Resources Protection Act of 1979 regulates the protection of archaeological resources and sites that are on federal and Indian lands. The federal Native American Graves Protection and Repatriation Act provides a process for museums and federal agencies to return certain Native American cultural items, such as human remains, funerary objects, sacred objects, or objects of cultural patrimony, to lineal descendants and culturally affiliated Indian tribes.

#### **8.3.1.4. California Environmental Quality Act of 1970**

CEQA declares that it is state policy to “take all action necessary to provide the people of this state with...historic environmental qualities” and that public or private projects financed or approved by the state are subject to environmental review by the state (PRC § 21001). All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered. CEQA includes historic and archaeological resources as integral features of the environment. If paleontological resources are within the proposed project area, the sponsoring agency must take those resources into consideration when evaluating the effects of a project.

#### **8.3.1.5. California Register of Historical Resources**

The State Historical Resources Commission has designed this program for use by state and local agencies, private groups, and citizens to identify, evaluate, register, and protect California’s historical resources. The register is the authoritative guide to California’s significant historical and archeological resources. This program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance; identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under CEQA.

To be eligible for listing in the California Register, a resource must meet at least one of the following “significance” criteria:

# CONSERVATION AND OPEN SPACE

- Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States.
- Associated with the lives of persons important to local, California, or national history.
- Embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values.
- Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Resources must also have “integrity” for the period within which significant events transpired or significant individuals made their contributions. Integrity is the authenticity of a resource’s physical identity, as evidenced by the survival of characteristics or historic fabric that existed during the resource’s period of significance. Although alterations to a resource or changes in its use may occur, the resource is still eligible for listing if: 1) it retains enough of its historic character or appearance; and/or 2) it conveys reasons for its significance or it maintains potential to yield significant scientific or historical data.

### **8.3.1.6. California Public Resources Code**

Archaeological, paleontological, and historical sites are protected by a wide variety of state policies and regulations, enumerated under the California Public Resources Code (PRC). In addition, cultural and paleontological resources are recognized as nonrenewable resources and thus receive protection under the PRC and CEQA. These laws:

- Continue the Historical Resources Commission to oversee the administration of the California Register of Historical Resources and the designation of State Historical Landmarks and Historical Points of Interest (PRC §§5020–5029.5).
- Define the duties of the Office of Historic Preservation. The OHP is responsible for the administration of federally and state-mandated historic preservation programs in California and the California Heritage Fund (PRC §§ 5079–5079.65).
- Protect Native American historical and cultural resources and sacred sites, require notification to descendants of discoveries of Native American human remains, and provide for treatment and disposition of human remains and grave goods.



#### **8.3.1.7. Tribal Consultation: SB 18 and AB 52**

SB 18 places requirements on local governments for developments within or near traditional tribal cultural places (TTCP). It redefined TTCP, requiring a traditional association of the site with Native American traditional beliefs, cultural practices, or ceremonies, or the site must be shown to have been used for activities related to traditional beliefs, cultural practices, or ceremonies. SB 18 also added California Native American tribes to the list of entities that can acquire and hold conservation easements to protect their cultural places. SB 18 requires local jurisdictions to provide opportunities for involvement of tribes in the land planning process for preserving traditional tribal cultural places.

AB 52 (chaptered in 2014) specifies that a project that may cause a substantial adverse change in the significance of a tribal cultural resource requires a lead agency to consult with the California Native American tribe(s) that are traditionally and culturally affiliated with the geographic area of the proposed project, if the tribe requested to the lead agency, in writing, to be informed of proposed projects in that geographic area and the tribe requests consultation, prior to determining the environmental clearance required for a project. The bill also specifies examples of mitigation measures for consideration to avoid or minimize impacts on tribal cultural resources.

#### **8.3.1.8. 2013 California Historic Building Code**

The 2013 California Historic Building Code—CCR, Title 24, Part 8—provides regulations for the preservation, restoration, rehabilitation, relocation, or reconstruction of buildings or properties designated as qualified historical buildings or properties. The CHBC is intended to provide solutions for the preservation of qualified historical buildings or properties, to promote sustainability, to provide access for persons with disabilities, to provide a cost-effective approach to preservation, and to provide for the reasonable safety of the occupants or users.

#### **8.3.1.9. Existing General Plan: Cultural Resources Element**

Irvine has demonstrated a long-term commitment to the preservation of historical, archaeological, and paleontological resources through the adoption of a stand-alone cultural resources element. The primary goal in the element is to ensure the proper disposition of historical, archaeological, and paleontological resources to minimize adverse

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impacts, and to develop an increased understanding and appreciation for the community's and region's historic and prehistoric heritage.

Cultural resource element objectives and policies in the current general plan include, but are not limited to:

- **Objective E-1, Historical, archaeological, and paleontological surveys.** Identify and obtain information on the existence and significance of historical, archaeological, and paleontological sites and encourage land use planning incorporating this information.

Supporting policies require appropriate surveys, site investigations, and written reports to document findings; appropriate removal and deposit; funding of archaeological excavations; maintenance of survey and investigation records; and protection of the integrity of historic sites or resources.

- **Objective E-2, Hazard Occurrence.** 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.

Supporting policies ensure that sites determined to be significant are protected, including sites that are appropriate as part of public facilities; ensure appropriate City staff are available to act in matters relating to the implementation of the element; encourage site preservation through economic incentives; determine the methods and means of preservation; and ensure compliance with CEQA.

These objectives are also related to other parts of the general plan—the land use element (A-6), public facilities and services element (G-1), and the conservation and open space element (L-5 and L-7).

## 8.3.2. Existing Conditions

Cultural resources are the physical remains of the City's past and include historical, archaeological, and paleontological resources. Historic resources include sites established after European contact began in 1542 AD that may be significant to history, architecture, or culture. Archaeological resources generally include any location with physical evidence of human activities that took place before 1750 AD. Paleontological resources include plant and animal remains predating



the geological Holocene (more than 10,000 years ago) and are often in the form of fossil specimens.

The majority of resources in Irvine are prehistoric archaeological resources, and many of these sites have been destroyed by development following investigations. Some sites, like Tomato Springs, have been preserved, and research continues in these areas. The largest remaining concentrations of archaeological sites in Irvine exist in the Upper Newport Bay and the Santiago and San Joaquin Hills. The majority of resources reflect the historical settlements and activities of the Tongva people who began occupying the area 3,000 years ago.

To date, several hundred cultural resources investigations have been completed within the incorporated boundaries of Irvine. Most of the City's developed suburban area has already been surveyed as part of individual environmental impact reports prepared for the City's planning areas. Additional cultural resource surveys are limited unless development occurs. However, areas with significant open space and that are protected may not have received assessments, particularly since grading and development have not disturbed the ground.

Information on cultural resources is obtained by searching recorded site files of resource investigations and findings. Updated files at the South Central Coastal Information Center (SCCIC, California State University, Fullerton) identified a minimum of 506 cultural resources within or immediately adjacent to Irvine. These sites include some of the earliest sites recorded in Orange County and include isolated finds (individual artifacts) and standing structures. Additional records maintained by the OHP in Sacramento identify 14 resources not included in the SCCIC files.

#### **8.3.2.1. Paleontological and Archaeological Resources**

Paleontological investigations have shown that Irvine was once a marine environment. Paleontological investigations of the area have shown that the area (primarily Santiago Hills and San Joaquin Hills) is rich in scientifically important resources that include numerous fossil deposits. Overall, the City of Irvine is sensitive for paleontological resources, and such resources may be found in any area, although some areas have higher levels of sensitivity.

For instance, the IBC area is known for significant fossil deposits from the Pleistocene Epoch. Fossils recovered include herbivores, carnivores,

# CONSERVATION AND OPEN SPACE

rabbits, rodents, birds, reptiles, and amphibians. The herbivores include mammoth, mastodon, giant ground sloth, bison, camel, llama, horse, tapir, peccary, deer, pronghorn, and dwarf pronghorn. The carnivores include bear, sabertoothed cat, whale, jaguar, bobcat, dire wolf, coyote, gray fox, raccoon, weasel, badger, skunk, and sea otter.

The City of Irvine is divided into four zones according to the likely occurrence of important paleontological resources based on local information, rock groups, and past fossil production.

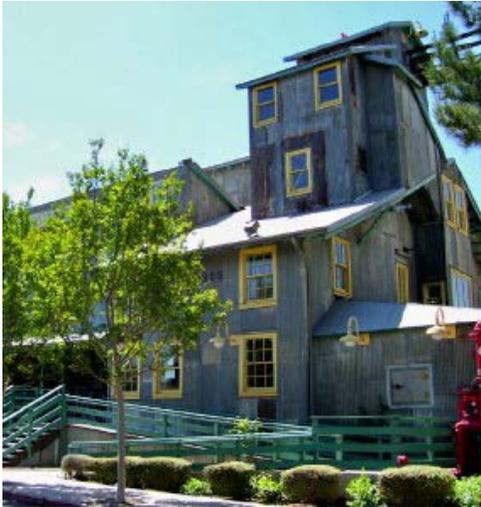
- **No Sensitivity:** Areas in this zone contain exposed volcanic rocks that are not considered likely to harbor intact fossils.
- **Low Sensitivity:** Areas in this zone typically have altered or geologically young rocks exposed at the surface and have a low likelihood of harboring intact fossils.
- **Moderate:** Areas within this zone contain sedimentary rocks with limited histories of significant fossils, which may reflect the lack of fossils or systematic exploration of exposures of these rocks.
- **High Sensitivity:** This zone contains sedimentary rocks with well-established histories of containing significant fossils.

It is important to note that the current paleontological resources map is significantly outdated and should not be used for planning purposes. Scientifically important fossils are being recovered from many areas of Irvine at depths of six feet or more below the surface. Deeper sediments are also known to produce scientifically significant fossils. The maps will be updated as part of the general plan update process.



### 8.3.2.2. Historical Resources

The California Office of Historic Preservation identifies the following five resources in Irvine as being worthy of recognition as significant.



Old Town Irvine Landmark

- Old Town Irvine (30-161894) was assigned an NPS Code of “1CL” (eligible for listing in the National Register of Historic Places and automatically listed in the California Register of Historic Resources). It is referenced as State Historic Landmark No. 1004.
- Christ College (30-161878) was assigned an NPS Code of “1S” and is listed in the National Register of Historic Places and the California Register of Historical Resources under Criterion D (potential for contributions to scientific research).
- Buffalo Ranch/Urbanus Square (30-162164) was assigned an NPS Code of “2S2” (individually eligible for the National Register and already listed in the California Register) and considered eligible under Criterion B (association with significant persons).
- Irvine Bean and Grain Growers Building (30-161889) was assigned NPS Codes of “1S” and “2S3” (listed in the National Register, and automatically listed in the California Register). This resource qualified under Criterion C (architecture).
- Irvine Blacksmith Shop (30-157788) was assigned an NPS Code of “1S” and is considered eligible for the National Register and California Register under Criteria A, B, and C (association with significant events, persons, and architecture, respectively).

Other cultural resources—paleontological, archaeological, or historical—may be present in Irvine but have yet to be discovered. A complete list of cultural resources recorded to date will be provided as part of the technical appendix to the General Plan EIR.

Figure 8-3a displays the paleontological sensitivity areas in Irvine, and Figure 8-3b displays the location of historical resources. These figures will be updated as part of the general plan update.





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Figure 8-3b

# HISTORICAL RESOURCES

## LEGEND

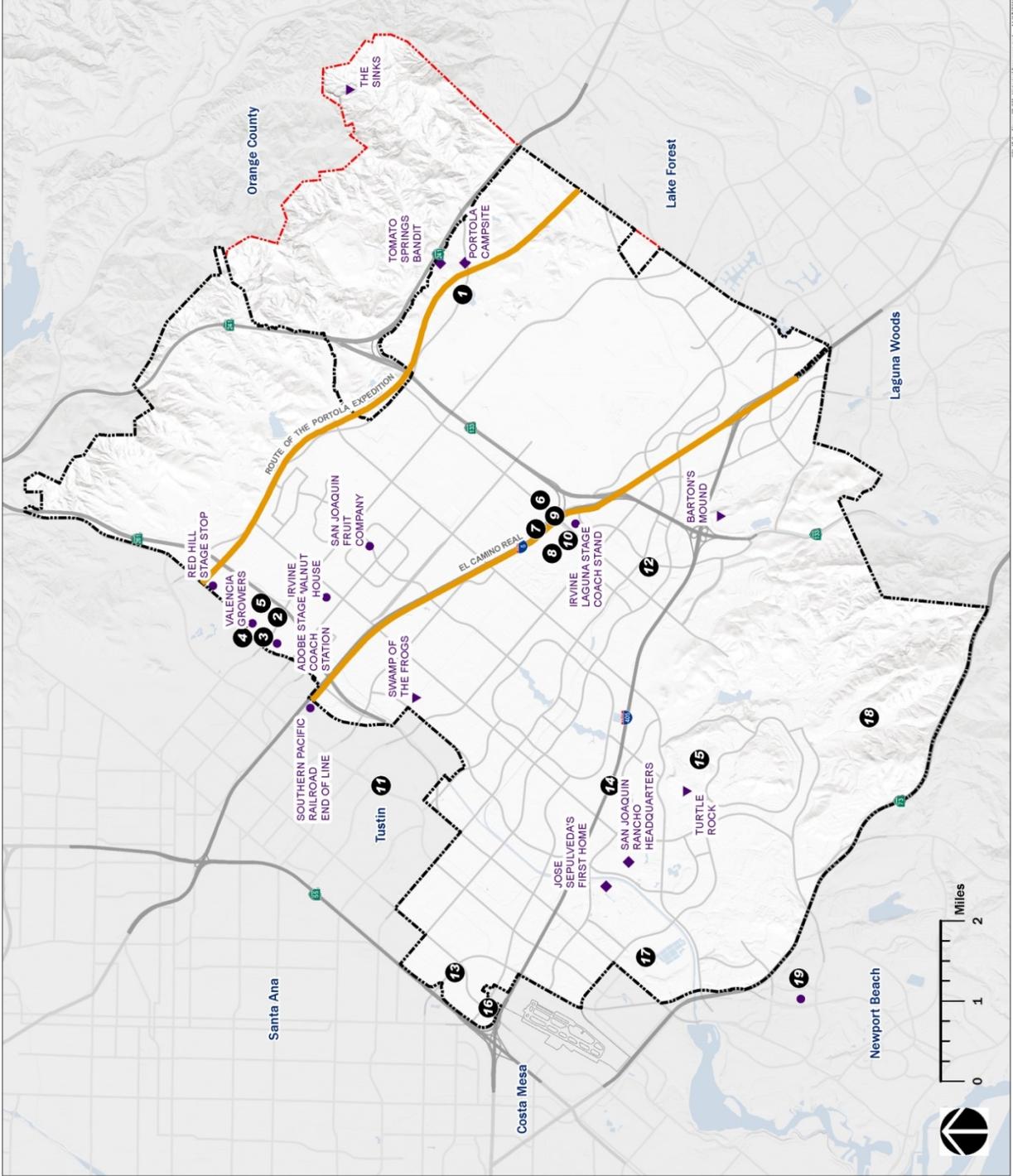
- ◆ Archaeological Site
- Existing Site
- Formerly Existing Site
- ▼ Landform Site

### Historical Site Number

1. Lambert Reservoir
2. First Irvine Office/Ranch Headquarters
3. Irvine Family Home Site and Gardens
4. C.F. Kraus Residence
5. Irvine Employee Housing
6. Irvine Community Center/Public School
7. Irvine Bean Warehouse
8. East Irvine Garage and Service Station
9. A.T.S.F. Station - East Irvine
10. East Irvine Post Office/General Store/Blacksmith Shop
11. Dingible Hangars - "Lugher/Inah-Air" Base
12. Live Oaks - Laguna Canyon Road
13. Site of Michelson Vacuum Tube (Speed of Light Experiments)
14. First Home in University Park
15. French Hill
16. Martin Airport (Original Site of Orange County Airport)
17. San Joaquin Marsh/Peat Bogs
18. Bommer Canyon Cattle Camp
19. Urbanus Square (Old Buffalo Ranch)

- Historical Road or Route
- City Boundary
- Sphere of Influence

Source: City of Irvine, 2016; PlaceWorks, 2016



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## 8.4 Agricultural Resources

Like the greater southern California region, Irvine has a long history of agricultural production, but agricultural resources have significantly declined in recent decades. Similar to communities throughout the region, the increasing costs of land, high demand for housing, competition from larger agricultural operations, and other factors have led to the gradual transition of agricultural land to other purposes.

### 8.4.1. Regulatory Setting

#### 8.4.1.1. Existing General Plan

The existing Irvine General Plan addresses the topic of agricultural resources through both the land use and conservation and open space elements.

**Land Use Element.** The existing land use element includes an “Agriculture” land use designation that identifies land utilized for commercial nurseries and the production of food, including growing crops or grazing animals on natural prime or improved pasture land. However, the land use element does not have any goals or policies related to agriculture uses.

**Conservation and Open Space Element.** The existing conservation and open space element includes a policy that addresses agriculture uses as they relate to preservation areas.

- Objective L-8 Policy (b): Allow agricultural uses and other uses consistent with the preservation category in preservation areas prior to transfer to public ownership. Policy L-8 (c) limits agricultural uses on the frontal slopes of Quail Hill (P-11 and P-12) to cattle grazing.
- Objective L-10 Permanent Agriculture: Encourage the maintenance of agriculture in undeveloped areas until the time of development, and in areas not available for development. Supporting policies include providing opportunities for farming where feasible and appropriate through an Agricultural Legacy Program, which facilitates limited-scale agricultural operations such as edible landscaping, metro-farming, model farming, heritage farming, educational /community service farming, and other programs.



Nursery agriculture uses in Orchard Hills



## 8.4.2. Existing Conditions

Agricultural resources in Irvine have significantly decreased over its history and are now limited to small areas of the City, primarily in the central and eastern portions, as shown in Figure 8-6. Approximately 1,323 acres—according to SCAG’s existing land use classifications—are still used for agricultural purposes. The current Irvine General Plan land use plan sets aside 709 acres with an Agriculture land use designation. However, additional areas in Irvine are used for agricultural purposes other than farmland; these areas are included under a Preservation land use designation in areas not under the jurisdiction of the NCCP/HCP.

Table 8-2 summarizes agricultural uses remaining in Irvine according to the Farmland Mapping Program of the Department of Conservation. As of 2014, the City of Irvine has 5,422 acres for a variety of agricultural uses. The Orange County Board of Supervisors has determined that there will be no Farmland of Local Importance for Orange County. As of 1989, no agricultural land remains under the Williamson Act contract provisions in Section 51230 of the Government Code.

### Agricultural Resource Terms

**Prime Farmland:** Land with the best combination of physical and chemical features able to sustain the long-term production of agricultural crops.

**Farmland of Statewide Importance:** Land similar to prime farmland and suitable for crops, but with minor shortcomings, such as greater slopes or less ability to store soil moisture.

**Unique Farmland:** Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards in some climatic zones in California.

**Farmland of Local Importance:** Land of importance to the local agricultural economy as defined by each county's local advisory committee and adopted by its board of supervisors.

**Grazing Land:** Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with groups interested in the extent of grazing activities.

**Table 8-2  
Existing Farmland Summary**

Type of Farmland	Acres of Land	Percentage of Farmland
Prime Farmland	1,416	26%
Farmland of Statewide Importance	171	3%
Farmland of Local Importance	-0-	0%
Unique Farmland	1,793	33%
Grazing	2,043	38%
<b>Total:</b>	<b>5,422</b>	<b>100%</b>

Source: Department of Conservation, FMMP, 2014.

Note: The table does not include community garden operations or similar small-scale agricultural operations that are not defined as farmland by the California Department of Conservation farmland mapping and monitoring program.

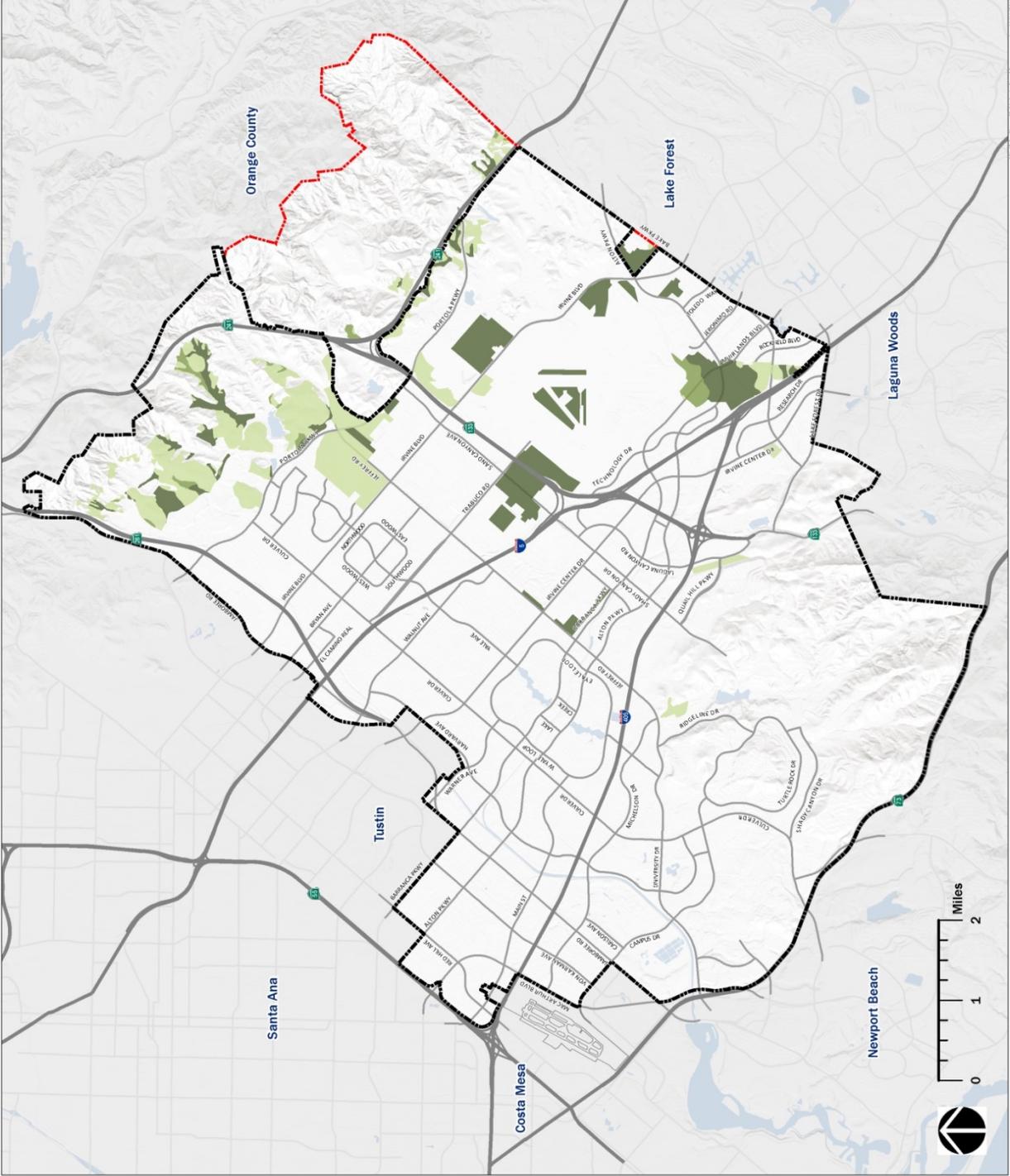
Limited agricultural activities occur in Orchard Hills (Planning Area 1); Portola Springs and the farm leases and programming occur within the Orange County Great Park (Planning Area 51); and limited agricultural row crops are still present as interim viable uses throughout the City. Figure 8-4 shows the location of agricultural uses in Irvine.

Figure 8-4

# AGRICULTURAL RESOURCES

## LEGEND

- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- City Boundary
- Sphere of Influence



Source: California Department of Conservation, 2014; City of Irvine, 2016; PlaceWorks, 2016





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# CONSERVATION AND OPEN SPACE

Because of the diminishing amount of land available for agricultural purposes, Irvine has committed to implementing an Agricultural Legacy Program as part of the current General Plan. The Agricultural Legacy Program is intended to facilitate limited-scale “metro-farming” agricultural operations and programs on public lands. Metro-farming refers to small-scale operations suitable for an urban environment. Examples include small-scale specialty farming, model farming, heritage farming, and community service/educational farming.

Table 8-3 lists examples of small-scale agricultural operations in Irvine.

**Table 8-3  
Agricultural Legacy Program**

Name of Community Garden	Location and Description of Community Garden
Tanaka Farms	Tanaka Farms owns a 30-acre heritage farm. Seasonal food can be purchased onsite or through a Community Supported Agriculture program.
Incredible Edible Community Garden	This 7.5-acre community garden is at 15058 Harvard Avenue, next to the Walnut Trail and Metrolink. It distributes food to thousands of residents across Orange County each year..
UCI Community Gardens	UC Irvine has six community garden projects throughout the campus. Projects are coordinated through the Anthill Village Community Garden Club.
Manassero Farms	Manassero Farms grows and sells seasonal produce. They partner with a local gleaner to transport free produce to food banks and charities.
Farm and Food Lab Great Park	Operated by UCI Master Gardeners, the Farm + Food Lab offers an outdoor educational classroom for gardens, compost bin, and alternative energy projects.
Citywide	The City’s Youth Outreach program has built several community gardens at Creekside High School, Rancho Senior Center, San Joaquin Middle School, etc.



Tanaka Farms

In accordance with the forest land classification of PRC §12220, portions of the City consist of forest land resources, including the Santiago Hills and areas of the northern flatlands, central flatlands, and San Joaquin Hills. Many of these areas occur in areas designated Eucalyptus Windrows, San Canyon Oak Trees, and NCCP Habitat Reserve. City programs include the Eucalyptus Windrow Maintenance and Protection Plan for Lower Peters Canyon and the Urban Forestry Ordinance.



## 8.5 Mineral Resources

Mineral resources refer to aggregate resources that consist of sand, gravel, and crushed rock that provide bulk and strength in construction materials such as portland cement and asphaltic concrete. Other nonfuel mineral resources include metals such as gold, silver, iron, and copper and industrial metals such as boron compounds, rare-earth elements, clays, limestone, gypsum, salt, and dimension stone.

The California Geological Survey classifies the significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975. The act also allows the State Mining and Geology Board to designate lands containing mineral deposits of regional or statewide significance. Table 8-4 indicates the categories of mineral resources in Irvine.

**Table 8-4**  
**Existing Mineral Resource Summary**

Designation	Description	Square miles
MRZ-1	Adequate information indicates that no significant mineral deposits are present or likely to be present, or where it is judged that little likelihood exists for their presence.	38.2
MRZ-2	Adequate information indicates that significant mineral deposits are present, or likely to be present, and development should be controlled. Irvine does not have lands designated MRZ-2.	-0-
MRZ-3	The significance of mineral deposits cannot be determined from the available data. This applies primarily to the San Joaquin Hills area, UCI, and surrounding areas.	21.5
MRZ-4	There is insufficient data to assign any other MRZ designation. This designation applies primarily to the former sphere of influence in the NCCP area.	18.8
<b>Total</b>		<b>78.6</b>

*Source: Department of Mines and Geology, 2014*

*Note: These classifications are designed to indicate the potential for minerals to address state law requirements. The City of Irvine does not allow mining.*

# CONSERVATION AND OPEN SPACE

Lands classified as MRZ-2 are of the greatest importance to California. Such areas are underlain by demonstrated mineral resources or are located where data indicate that significant measured or indicated resources are present. MRZ-2 areas are designated by the state board as being “regionally significant.” Such designations require that a lead agency’s land use decisions involving designated areas be made in accordance with its mineral resource management policies (if any exist) and that it consider the importance of the mineral resource to the region or the state as a whole, not just to the lead agency’s jurisdiction.

The MRZ classification areas in Irvine are shown in the California Geological Survey mineral resources map of Orange County, known as the “Generalized Mineral Land Classification of Orange County, California: Aggregate Resources Only.” The City of Irvine primarily consists of lands designated MRZ-1 and MRZ-3. No areas in Irvine have been designated MRZ-2 or as regionally significant deposits of minerals. The State of California has not given an MRZ designation to the northern sphere of influence area, north of SR-241.

Similar to many communities in southern California, the City of Irvine has also been the subject of limited gas and oil exploration. However, unlike the cities of Brea and coastal communities, which yielded significant oil reserves, the wells in Irvine were not productive. There are no known gas, oil, or geothermal fields in the community today. According to the Department of Conservation, the City of Irvine has an estimated 24 oil and gas wells. As of 2016, all but 3 of the gas and oil wells in Irvine have been plugged and abandoned. The remaining wells are not currently in operation.

Figure 8-5 illustrates locations of mineral resource zones assigned by the Department of Conservation and the oil and gas wells in Irvine.



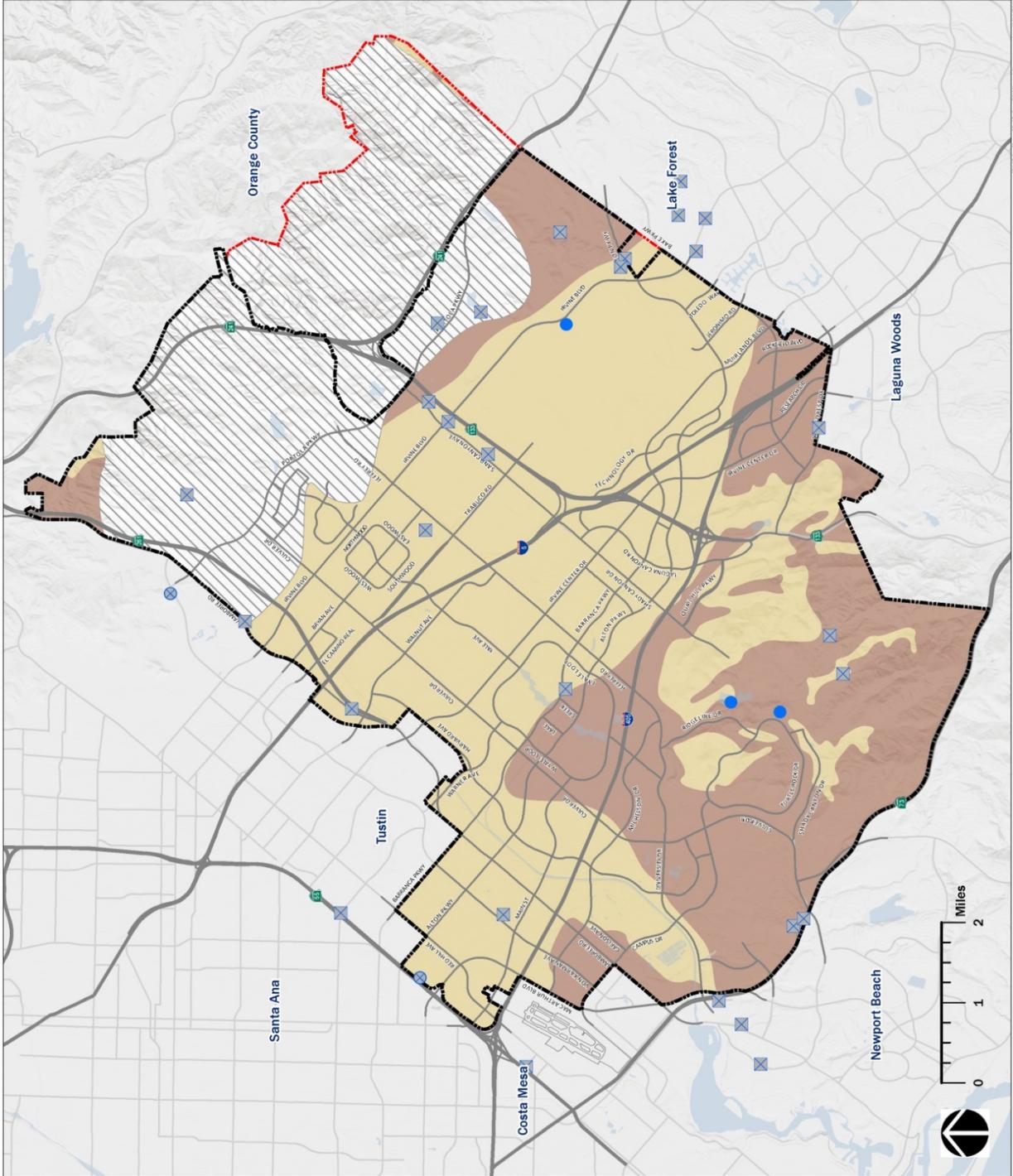
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Figure 8-5

# MINERAL, OIL, AND GAS RESOURCES

## LEGEND

- MINERAL RESOURCE ZONE**
- MRZ-1
  - MRZ-3
  - Not Classified
  - Idle - Oil and Gas Well
  - Plugged and Abandoned - Oil and Gas Well
  - Plugged and Abandoned - Dry Hole
  - City Boundary
  - Sphere of Influence



Source: Generalized Mineral and Land Classification of Orange County, California - Aggregate Resources Only, California Department of Conservation, Division of Mines and Geology, 1994; City of Irvine, 2014; California Department of Conservation, 2016; City of Irvine, 2014; PlaceWorks, 2016



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## 8.6 Visual Resources

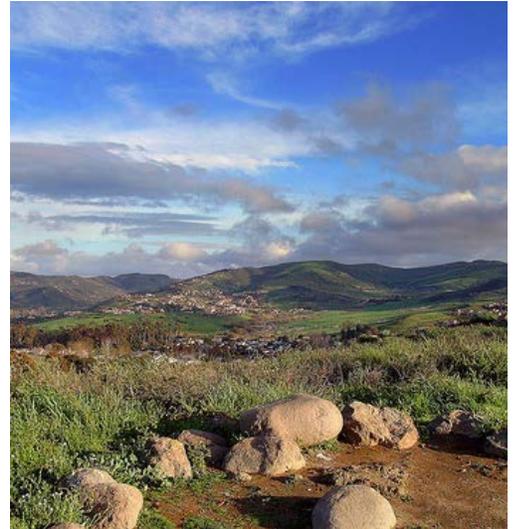
Aesthetics generally refer to visual resources (natural and man-made) and the quality of what can be seen, as well as to the overall judgment (perception) of the visual environment. Aesthetic features occur in a diverse array of environments, ranging in character from urban centers to rural regions and wildlands. Features may include, but are not limited to: open space, vegetation/landscaping, topographic or geologic features, natural water features, structures of architectural or historic significance or visual prominence, and even views from roadways.

### 8.6.1. Regulatory Setting

#### 8.6.1.1. Existing General Plan

The existing Irvine General Plan addresses the topic of visual resources through the open space and conservation element and the land use elements. Visual resource objectives and policies in the current general plan include, but are not limited to:

- Open Spaces Conservation Element Objective L-5, Geophysical Resources. Use and preserve geophysical resources, including, but not limited to, ridgelines, hillsides, and waterways, as part of the City's land use pattern. Supporting policies require roads, highways, and buildings to be designed to be the least damaging, feasible alternative to ecological and aesthetic characteristics of hillsides.
- Land Use Element Objective A-1, Preserve and strengthen Irvine's identity as a diverse and innovative community. Supporting policies require conserving resources along the scenic corridors that characterize Irvine. However, there are no further policies that formally define scenic corridors or programs that provide guidance for implementing this objective.
- Land Use Element Objective A-7, Create a visually attractive and efficiently organized City. With respect to the built environment, the City's architectural guidelines and planning principles strive to distinguish planning areas in character and physical appearance from each other. Numerous criteria are specified in individual projects to achieve this objective.



Overlooking Shady Canyon



### **8.6.1.2. Municipal Code: Hillside Overlay**

For purposes of determining significance under CEQA, a scenic vista is defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Although the Irvine Municipal Code and General Plan do not specifically define or include the term scenic vista, there are a number of regulations and ordinances in the municipal code to protect visual resources in Irvine.

The General Plan, Land Use Element policy A-3(b), requires that proposed development in hillside areas must retain the character and aesthetic value of the natural landform through use of the Hillside Development Ordinance. This overlay regulates development of areas which, due to topography, require special consideration to maintain natural character, environmental values, and aesthetics.

The Hillside Overlay sets forth 10 policies with regard to development in hillside areas. The first four, shown below, set forth broad principles:

- To preserve the most visually significant slope banks and ridgelines in their natural state.
- To minimize the effects of grading and ensure that the natural character of the hillside is retained.
- To preserve visually significant rock outcroppings, native plant materials, natural hydrology, and areas of historical or visual significance.
- To preserve views of significant visual features as viewed both from within the hillside community and outside the hillside community.

Review and approval procedures for applications for new development proposed in hillside areas are articulated in the zoning code. Specific review procedures are established for the San Joaquin Hills and Lomas de Santiago Hills. In these areas, development is permitted in all slope zones, exclusive of preservation areas. Major ridgelines will be preserved as open space. Other ridgelines may be developed in accordance with other applicable hillside development guidelines.

# CONSERVATION AND OPEN SPACE

## 8.6.2. Existing Conditions

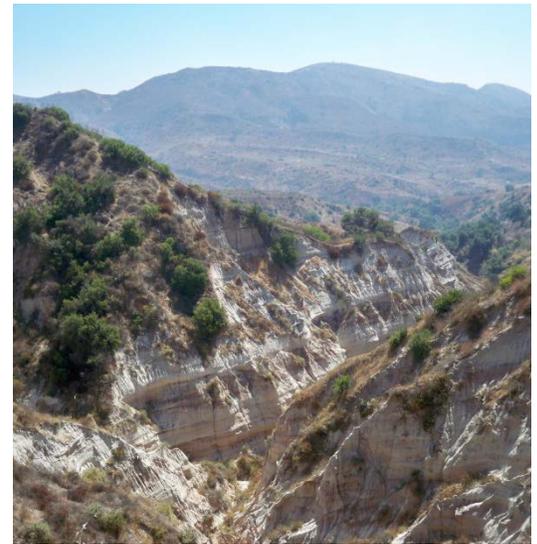
Although an urban community, Irvine’s setting between the foothills and ocean, its topography, and its built environment include an array of natural areas, scenic roadways, and structures that are visual resources.

### 8.6.2.1. Natural Features

Irvine’s topography contains prominent features, such as the Santiago Hills, northern flatlands, central flatlands, and San Joaquin Hills. The ridgelines of these hills are visible from many vantage points throughout the City. From their peaks, these ridgelines also offer unparalleled views of the valley plain and the Pacific Ocean. Within these natural areas are unique rock outcroppings of significant visual quality. Many of these areas are protected under the NCCP/HCP. “The Sinks” is an example of a significant outcropping in Limestone Canyon.

### 8.6.2.2. Water Courses and Trails

The San Diego Creek and various drainage courses that run through the community, particularly the less developed or natural areas, are of scenic value to the community. The City’s open space spine network, which includes two north-south spines (including Jeffrey Spine, shown below) and six east-west spines (Hicks Canyon, Venta Spur Trail, Edison easement, San Diego Creek, and University Drive/Mason Regional Park) offer views that are highly valued by the community.



The Sinks, Limestone Canyon Park



Jeffrey Spine Trail



### 8.6.2.3. Scenic Circulation Routes

State scenic highways are either officially designated as state scenic highways by the California Department of Transportation or are eligible for such designation. Eligible scenic highways are identified in the Streets and Highway Code, Section 260, of the California Scenic Highway Program. Caltrans has not officially designated state scenic highways in Irvine or listed segments that are eligible for designation in Irvine.

Although no City roadways are identified as state scenic highways, the land use element identifies roadways that traverse the community that are designated as either Scenic Highways of Rural or Natural Character or Scenic Highways of Urban Character. The General Plan does not specifically define these designations. Although not specified by the General Plan, additional highways offer panoramic views of the City. SR-241 and SR-261 both offer views of the hillsides and Pacific Ocean.

Table 8-5 summarizes some of the visual resources in Irvine.

**Table 8-5  
Scenic Resources in Irvine**

Type of Resource	Examples in Irvine
Hills and Topography	Santiago Hills and San Joaquin Hills, including canyons, plateaus, narrow ridges, and rock outcroppings
Natural Watercourses	San Diego Creek, Agua Chinon Wash, Bee Canyon Wash, Borrego Canyon Wash, Hicks Canyon Wash, Peters Canyon Wash, and Sand Canyon Wash
Artificial Lakes and Water Bodies	Woodbridge Lakes, William R. Mason Regional Park lakes, and San Joaquin Wildlife Sanctuary
Open Space Trails	Jeffrey Spine
Highways of Rural or Natural Character	Portions of Sand Canyon Avenue, Jeffrey Rd/University Drive, Laguna Canyon Road/Laguna Freeway, and Bonita Canyon Road/Shady Canyon Road
Highways of Urban Character	Portions of Sand Canyon Avenue, Jeffrey Road, Culver Drive, and the I-5/I-405 (south of split)

*Source: 2012 CEQA Manual, City of Irvine; Orange County Central/Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan.*

Figure 8-6 shows the locations of these visual resources.

Figure 8-6

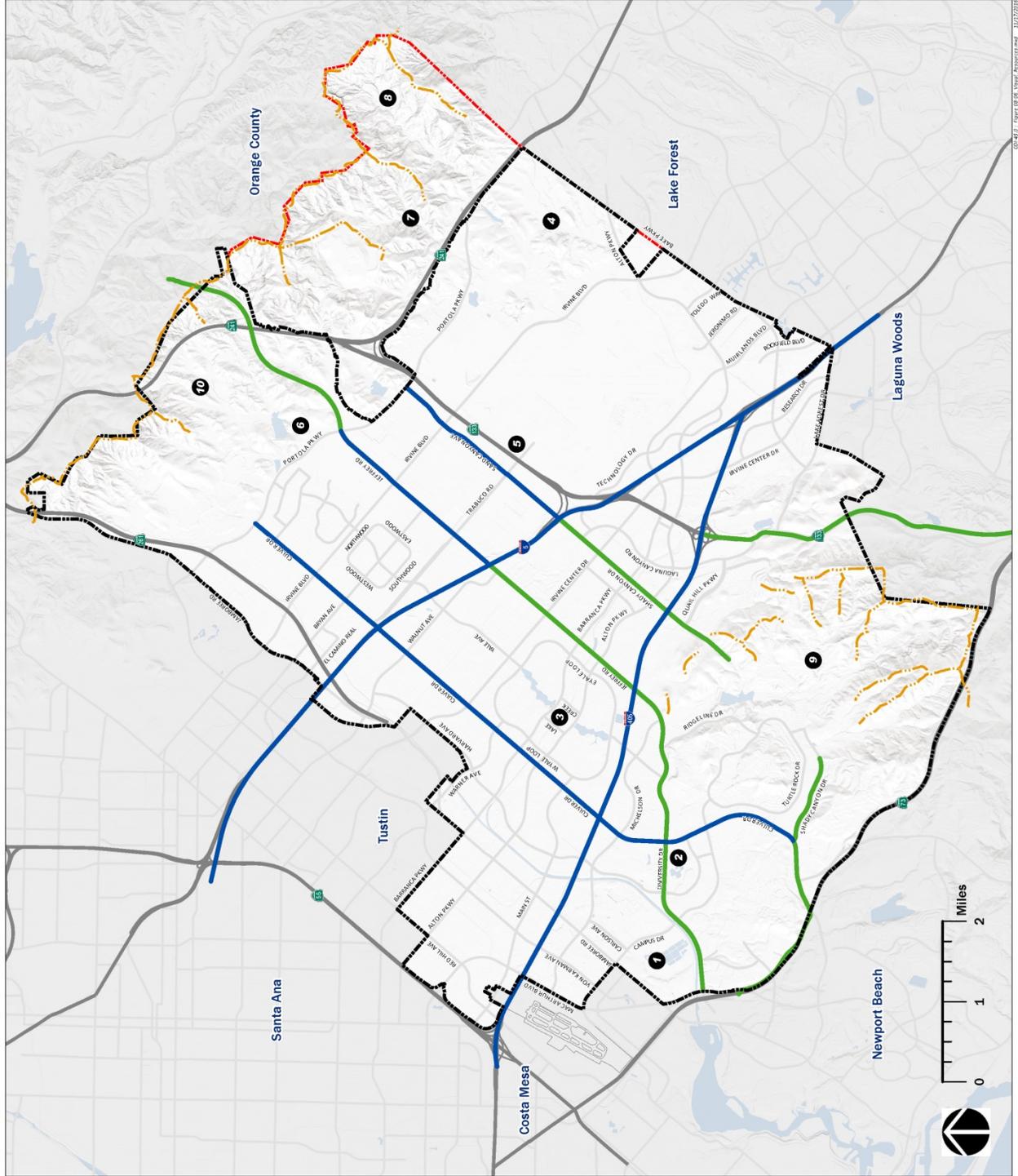
# VISUAL RESOURCES

## LEGEND

Visual Resources #

1. San Joaquin Marsh
2. William R. Mason Regional Park / Sand Canyon Wash
3. Woodbridge Lakes
4. Borrego Canyon Wash
5. Peters Canyon Wash
6. Hick Canyon Wash
7. Bee Canyon Wash
8. Aqua Chino Wash
9. San Joaquin Hills Ridgeline
10. Santiago Hills Ridgeline

- Scenic Highways
- Urban Character
  - Rural or Natural Character
  - Significant Ridgelines
  - City Boundary
  - Sphere of Influence



Source: City of Irvine, 2014; PlaceWorks, 2014



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## 8.7 Opportunities and Constraints

Irvine’s open space resources are one of the most valued amenities in the community, and their continued preservation distinguish the City from urban communities. The following list a few opportunities and constraints to achieving this community-wide goal.

### 8.7.1.1. Biological Resources

While much of Irvine’s open space has been reserved or designated as special linkages, the potential still exists for the identification and acquisition of additional nondesignated open space areas to provide preservation of biological resources—particularly “target and identified species”—and active recreation opportunities such as walking, equestrian, or bike trails. The opportunity exists for the City to ensure that allowances are made through General Plan policies to encourage or require proposed development plans to allocate open space areas.

The large area in the City and sphere of influence as well as nonreserve areas containing “target and identified species” will result in limitations on development, though some impact is anticipated under specific permitting and mitigation requirements already in the NCCP/HCP. However, the disposition and/or suitability of other open space areas remain uncertain. These include the special linkages that are slated for wildlife corridors in the vicinity of the formerly proposed El Toro National Wildlife Sanctuary to the San Joaquin Hills.

### 8.7.1.2. Urban Agriculture

Although agriculture and food production continue to decline in Irvine, urban agriculture is on the rise. Urban agriculture is generally defined as growing fruits, herbs, and vegetables and raising animals in cities as well as accompanying activities, such as processing and distributing food; collecting and reusing food waste and rainwater; and educating, organizing, and employing residents on a small scale. Urban agriculture is a valuable strategy to improve access to healthy, locally grown food. The general plan update offers an opportunity to encourage small-scale urban agriculture throughout Irvine’s communities and neighborhoods.

Although urban agriculture can have positive benefits on public health, it can also have nuisance impacts, such as noise and odor related to animal husbandry. Any policies providing for urban agriculture would



need to be supported with standards regulating its use and operation. In addition, many of the urban agricultural and heritage farming uses are tenuous and subject to renewal of land leases, the increasing price and decreasing availability of water, and competing parties who want the land for other uses. The long-term viability of urban agriculture is therefore a concern.

#### **8.7.1.3. Cultural Resources**

Irvine's undeveloped areas and sphere of influence have the potential to contain paleontological and cultural resources of significance, and the City is required to develop programs for their appropriate disposition. Potential for finds not only exist in Upper Newport Bay and the Santiago and San Joaquin Hills, but in developed areas like the IBC. The Irvine Company has conducted archaeological surveys covering much of the city. While these studies continue, the opportunity exists for the City to ensure that allowances are made in proposed development plans for the proper disposition of any discovered resources.

Prior cultural reports in Irvine have identified important program issues that need to be addressed. Cultural sensitivity maps are outdated and do not adequately reflect the areas in the community where resources have been found or could be found. In addition, cultural studies indicate the need to improve project monitoring—documenting that sensitive areas are being adequately mitigated, that reports are written and submitted as required, and that collections are sent to museums for curation as required in accordance with the cultural resources element. Although future loss of some cultural resources is unavoidable in a built environment, proper reporting and monitoring can minimize this issue.

#### **8.7.1.4. Visual Resources**

Irvine is renowned for its beautiful urban and natural environments. From its carefully curated villages and tailored urban landscapes to its vast natural landscapes, residents are surrounded by visual resources. The NCCP/HCP protects many of the natural resources in the undeveloped areas, and specific EIRs address the built environment, but additional opportunities exist to improve visual resources. Opportunities include the designation of additional scenic highways (e.g., SR-241 and SR-261), the clarification of specific programs to protect scenic highways, and even the development of goals and policies that address community design as a whole, beyond individual villages.

# Chapter 9. Parks/ Recreation and Human Services

## 9.1 Introduction

Irvine prides itself on the range of services available to the community. Over 1,000 acres of parks and sports fields promote passive and active outdoor spaces for all ages and abilities. Parks and recreational amenities in the city include neighborhood and community parks, aquatic centers, athletic complexes, nature center, and fine arts center. Recreational and open space facilities are managed by the City; private entities, such as homeowner associations; and other public agencies, such as school districts and the water districts.

The City of Irvine is also known for its exceptional commitment to quality education and human services. Educational institutions at all levels—primary, secondary, and post-secondary universities and graduate schools—provide residents with some of the finest educational opportunities in the nation. The City’s wide range of human services—from childcare to libraries, and from fine arts to social services—are designed to meet the needs of residents of all ages and abilities.

To that end, this chapter provides a description of existing conditions for parks, recreation, education, and human services.

- Parks, including an assessment of parks and recreational facilities and a high level overview of service needs.
- Education, including an overview of learning opportunities for residents through public schools and libraries.
- Human Services, including childcare, children/youth, family and senior services, and arts and culture.

The chapter concludes with a brief discussion of key issues and opportunities for the general plan update.



University Park



## 9.2 Parks and Recreation

### 9.2.1 Regulatory Setting

The regulatory setting for parks, recreation, and trails can be found in California state law, the existing Irvine General Plan, and various local ordinances, as summarized below.

#### 9.2.1.1 California Codes: Trails and Open Space Lands

The Government Code authorizes general plans to include parks, open space, and recreational planning. In accordance with §§ 65560 to 65568, state law requires the general plan to include an open space plan. Building permits, subdivision approvals, and zoning ordinance approvals must be consistent with the local open space plan. Section 5076 of the Public Resources Code requires that during development of the general plan, cities shall consider trail-oriented recreational use and shall consider such demands in developing specific open-space programs. Cities shall consider the feasibility of integrating their trail routes with appropriate segments of the state system. The City's parks and recreation and its open space and conservation elements provide policy direction to meet this state requirement.



#### 9.2.1.2 Mitigation Fee Act

The California Mitigation Fee Act (Government Code §§ 66000 et seq.), allows cities to establish fees on developers to mitigate the impact of development projects on a jurisdiction's ability to provide specified public facilities. To comply with the Mitigation Fee Act, a jurisdiction must follow four primary requirements: 1) make certain determinations regarding the purpose and use of a fee and establish a nexus or connection between the project and the public improvement being financed with the fee; and 2) segregate fee revenue from the general fund in order to avoid commingling of capital facilities fees and general funds. For fees that have been in the possession of the jurisdiction for five years or more and for which the dollars have not been spent or committed to a project, the jurisdiction must make findings each fiscal year describing the continuing need for the money and refund any fees with interest for which the findings noted above cannot be made.

## 9.2.13 Government Code, Quimby Act

Government Code § 66477 (the Quimby Act) allows cities to require developers to dedicate land and/or the payment of in-lieu fees solely for park and recreation purposes. The required dedication and/or fees are based on the residential density, parkland cost, and other factors. Land dedicated and fees collected pursuant to the Quimby Act may only be used for developing new parks or recreational facilities or rehabilitating existing parks or recreational facilities. The maximum dedication and/or fee allowed under current state law is equivalent to providing three acres of parkland per 1,000 persons, unless the park acreage of a municipality exceeds that standard, in which case the maximum dedication is five acres per 1,000 residents. A city can require a greater amount of park acreage, but the park acreage requirement must be imposed in accordance with City standards rather than the Quimby Act. The Irvine General Plan Parks and Recreation Element sets a standard of five park acres per 1,000 residents citywide, with an exception of three acres of parkland per 1,000 residents in the Irvine Business Complex.

## 9.2.14 General Plan Parks and Recreation Element

The parks and recreation element of the existing general plan includes goals and policies that support the primary objective to provide park and recreation opportunities at a level that maximizes available funds and enables residents of all ages to utilize leisure time in a rewarding, relaxing, and creative manner. The element includes policies that:

- Provide for a broad spectrum of recreational opportunities and park facilities, in public or private ownership, to accommodate a variety of types and sizes of functions (Objective K-1).
- Require developers of residential land to dedicate land or fees for parks, consistent with the Quimby Act, Irvine Subdivision and Zoning Ordinances, and General Plan (Objective K-2).
- Locate park and recreation facilities in a manner that allows safe and easy access to such facilities by their intended users (Objective K-3).
- Ensure that Irvine's park system is developed, maintained, and rehabilitated in a manner that is cost-effective and consistent with the community's needs and ability to pay (Objective K-4).



Portola Springs Park



### **9.2.15 Subdivision Ordinance/Parks Standards Manual**

The amount of parkland required for dedication is established at the time of subdivision approval through the Irvine Subdivision Ordinance. The ordinance also establishes park credit standards and provides for any exceptions for dedication (i.e., housing incentives) for park/public facilities. In Irvine, developers of residential subdivisions are required to dedicate park land or pay fees in lieu of dedication, at the rate of five acres per 1,000 population. Of this total, two acres of community parks and three acres of neighborhood parks per 1,000 residents are required.

The Parks/Public Facility Standards Manual is designed to consolidate policies, procedures, guidelines, and standards for public and private parks, public facilities, and related recreation amenities into a single document to provide guidance regarding park and public facilities dedication, design, and development. The manual outlines requirements for parks and amenities based on population, equipment specifications by type of public facility, and land appraisal procedures. The Standards Manual also establishes physical design standards for all types of amenities to allow access and use by people with disabilities.



### **9.2.16 Irvine Parks Master Plan**

In 2015, the City kicked off an update to the Irvine Community Parks Master Plan (1988). The Parks Master Plan provides a framework for recreational facility planning and development in the City of Irvine. It provides guidelines for siting community parks as well as design standards for specific facilities, such as golf courses, riding and hiking trails, and picnic facilities. As a part of the update, the City conducted a Parks and Parks Facility Needs Assessment that reviewed the City's existing parks, recreation programs, and recreational facility inventory and projected future demand for facilities through 2025.

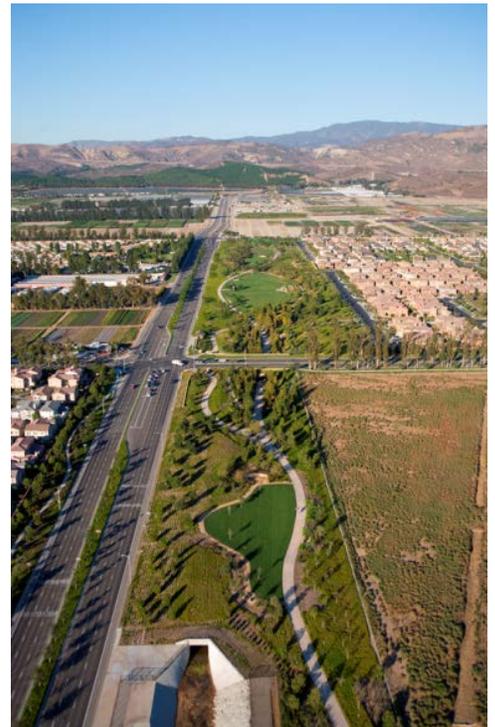
The following Existing Conditions section provides a high-level overview of the needs assessment in the level of detail needed for the General Plan. Detailed inventories and documented facility conditions are not included in this report, but can be found in the 2015 Parks Needs Assessment. Adoption of the updated Irvine Community Parks Master Plan Design Standards is anticipated in 2017.

## 9.2.2 Existing Conditions

### 9.2.2.1 Park Facilities

Irvine has a hierarchy of park facilities, each designed with a specific group of users and purposes in mind.

- **Regional Parks.** Regional parks are owned and managed by the County of Orange. There is no mandated dedication standard or park size required. Regional parks typically have both active or passive elements, and may have special use amenities that are regional in nature. Mason Regional Park offers biking paths, a wilderness hiking area, toddler areas, and fields for softball, volleyball, and other uses. The park also offers a 123-acre wilderness area and golf course.
- **Community Parks.** Community parks are intended to serve more than one residential village. Amenities typically include facilities such as multi-use buildings, restrooms, play areas, athletic fields and courts, trail access, and picnic areas. These parks are generally, but not always, at least 20 acres in size and able to serve a population of 10,000. Community parks are owned and maintained by the City, and developed with facilities to serve more than one village.
- **Public Neighborhood Parks.** Neighborhood parks are designed to serve the immediate neighborhood. These parks are typically a minimum of 4 acres in size and able to serve a minimum population of 2,500 people. Public parks are owned and maintained by the City, but may be adjacent to or joint use with schools. Amenities can include playgrounds, picnic areas, athletic courts, and other outdoor gathering spaces that serve a neighborhood's recreation needs.
- **Private Neighborhood Parks.** These parks are a minimum of one-third of an acre and serve an immediate development or specific planned community. Private parks are owned and maintained by homeowner associations or maintenance districts. The size of each private neighborhood park is determined by the surrounding density, except for developments in the IBC, which must comply with the "IBC Residential Mixed Use Overlay Zone."



Woodbury Village Parks



**Orange County Great Park**

Irvine is also home to the 1,300-acre Orange County Great Park, which is being developed on the decommissioned El Toro Marine Corps Air Station. Through a public-private partnership, the City and the adjacent private land owner will develop an additional 688-acre section—230 acres have been completed. The park will include amenities such as a sports park, ice rink, visitor center, cultural center, and urban agriculture component, with programs and events to activate this unique regional outdoor space. Preserved areas will include a 178-acre wildlife corridor and 40-acre Bosque area.

**Facility Needs**

Irvine’s parkland requirement is five acres of parkland and/or in-lieu fees for every 1,000 residents, further defined as two acres of community parkland and three acres of neighborhood parkland. The City applies the park service goal when reviewing new development proposals. At that time, the City calculates the need for parkland based on anticipated residents. The requirement can be met through a combination of dedicated public land, privately owned and developed park sites, other eligible improvements such as recreational facilities, and in-lieu fees.

As shown in Table 9-1, the City has more than 55 parks comprising 1,059 acres, which is 84 percent of its 1,250-acre requirement. This does not include the many private parks, greenways, and other open spaces maintained by homeowner associations. Only with the addition of the 688-acre Great Park and regional facilities (and reduced park dedication requirements for the IBC and specific development projects) does the City appear to satisfy its parkland requirements.

**Table 9-1  
Park Requirements for Residential Development**

Calculations	Parkland Classification		
	Community	Neighborhood	Private
Existing Parks	19	36	N/A
Existing Park Acres	350	172	537
Current Population	250,000	250,000	250,000
Required Acres	500	750	N/A
Current Ratio	1.4 acres	0.69 acres	2.15 acres

*Source: City of Irvine, 2016*

*Figures do not include the 688-acre Great Park or 228-acre regional park facilities.*

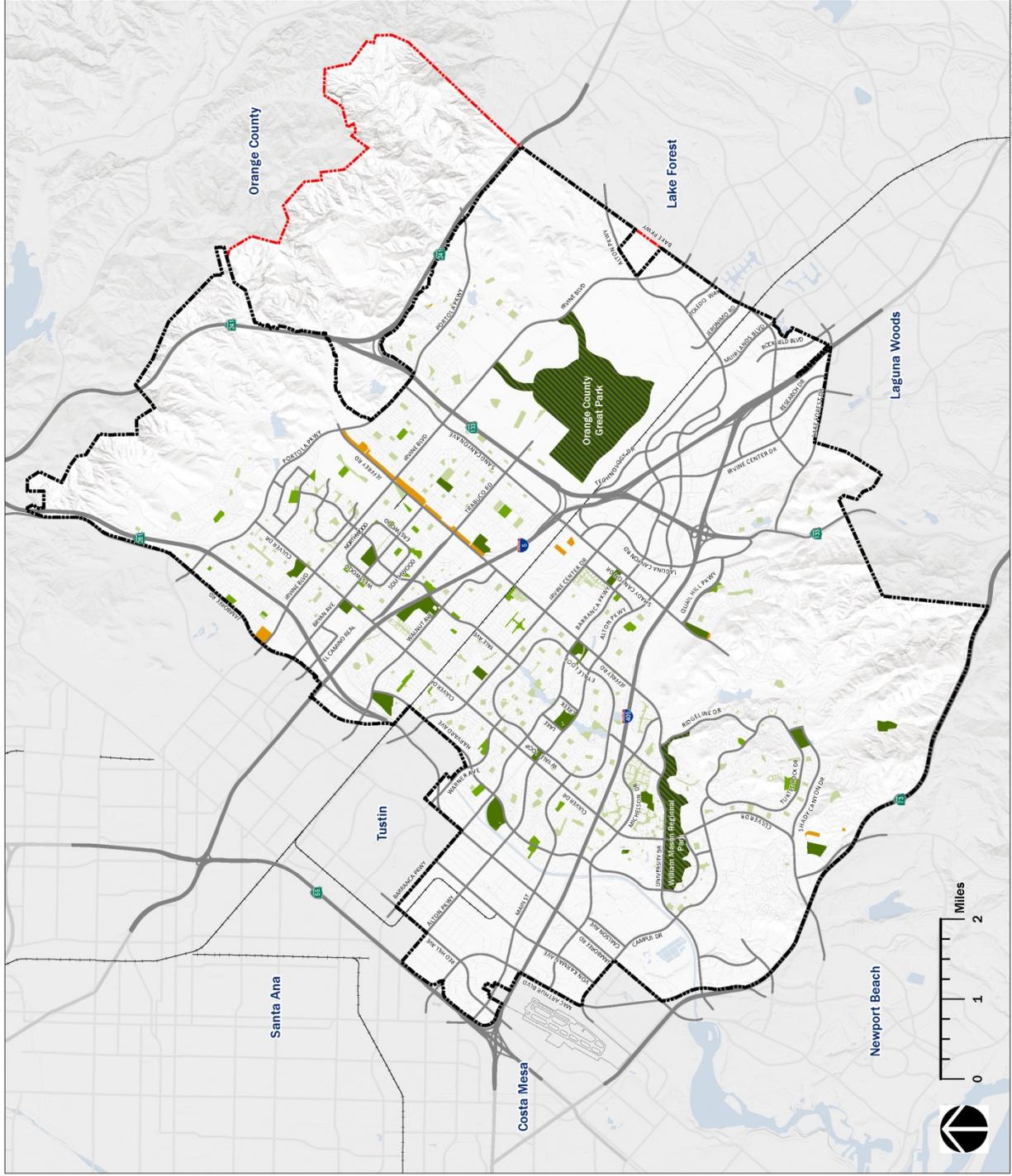
The majority of residents live within a quarter-mile walking distance of a public or private park and within a half-mile walking distance of a community park. However, outlying portions of the City and new growth areas—including the IBC, Spectrum, and northeast and southwest Irvine—do not have convenient access to community parks. As the City moves closer toward buildout, the Parks and Parks Facility Master Plan will guide future park and recreation priorities for the City. Figure 9-1 displays the location of park facilities in Irvine.

Figure 9-1

# Parks & Recreational Areas

## LEGEND

- Private Parks
- Neighborhood Park
- Community Park
- Regional Park
- Special Use Facilities
- City Boundary
- Sphere of Influence



Source: City of Irvine, 2016; PlaceWorks, 2016



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### 9.2.2.2 Recreational Facilities and Programs

The City of Irvine offers an extensive variety of recreational facilities and services in parks or other locations within residential neighborhoods. These include approximately 89 athletic fields, 126 sports courts, pools, gymnasiums, and many other recreational facilities. Additionally, the City is home to three public golf courses—Oak Creek, Strawberry Farms, and Rancho San Joaquin. The City of Irvine is also home to many community centers that offer programs for families and seniors.

The City provides additional recreational facilities jointly with other public agencies, as well as facilities and services within parks, including child care centers and senior centers. Residents and visitors have access to nearby public beaches, local mountains, natural parks, and deserts that are within a short traveling distance from Irvine—including Aliso and Wood Canyon Regional Park, Limestone Canyon Regional Park, Crystal Cove State Park, and the Laguna Coast Wilderness Park.

**Healthy City Healthy Planet**

The Healthy City Healthy Planet initiative is an affirmation of Irvine’s commitment to health, fitness, well-being, and the sustainability of the community. Through the integration of multiple practices into all aspects of City planning and the delivery of municipal services, Irvine actively supports the health of its residents. The City’s website provides a comprehensive list of programs and efforts that support the Healthy City Healthy Planet initiative.



Woollett Jr. Aquatics Facility

As part of the planning process, recreational facilities were analyzed to determine the types of facilities needed based on current use, trends in recreation, and future program demands as the City grows. Although Irvine generally meets its park requirements, significant challenges in meeting the service demands for facilities may still exist. Fields, courts, and multipurpose facilities are in high demand for soccer, football, and baseball as well as gymnasium activities, such as badminton, volleyball, table tennis, and basketball, among other sports.



## Facility Needs

Irvine is fortunate to have indoor community facilities that offer venues for a range of classes, programs, and activities. Irvine has 10 community centers, 3 senior centers, and a fine arts center. At a distance of two miles from residences, the City is well served by existing community centers. Few neighborhoods have access to community centers within walking or biking distances, but most users are willing to drive to these sites. The City has another 100,000 square feet of planned community centers, but a deficit remains even if all were built today. Planned community centers will be important for serving new residential areas.

The Parks Master Plan included a recreational facility accessibility study. The study found that most residential neighborhoods have access to recreational facilities within a reasonable and short driving distance. However, neighborhoods in newly growing areas of Irvine (northeast), areas south of UCI and Concordia, and the IBC and Spectrum lack adequate access to soccer fields, ball diamonds, etc. While schools can address some of this deficit, further attention is needed. More information on recreation amenities can be found in the Master Plan.

The Parks Facility Master Plan included an analysis of the amount of square footage needed today versus 2025 for indoor facilities. The analysis was based on existing facilities compared with updated facility standards (which are generally higher than previous standards). Table 9-2 summarizes the findings of the demand and supply analysis.

**Table 9-2  
Irvine Existing Recreational Facility Needs, 2015**

Current Facilities	Select Facility Statistics			
	Number of Facilities	Existing Square Footage	Square Footage Needed	Deficit/Surplus
Community Centers	10	78,720	258,094	179,374
Senior Centers	3	41,610	25,809	- 15,801
Fine Arts Center	1	18,600	25,809	7,209
Gymnasium	None	None	25,809	25,809

*Source: Irvine Parks and Park Facilities Master Plan, 2016*

*Note: The Plan also produced estimates of the number and type of specific park amenities, such as ballfields, pools, playgrounds, and other facilities. Please consult the Parks and Parks Facility Master Plan for a description of needed facilities.*

## 9.2.2.3 Park Programs and Services

The Irvine Community Services Department offers classes, activities, and special events to residents and non-residents of all ages and abilities. Parks and facilities throughout the City provide the necessary resources (e.g., field, classroom) to accommodate these activities. Table 9-3 provides an abbreviated list of the types of programs and services offered in Irvine. The City regularly publishes a recreational brochure that provides more detailed information on programs to residents. Program needs can be found in the Parks Master Plan.

**Table 9-3  
Park and Recreational Programs in Irvine**

Category	Description of Activity, Class, or Service
Events and Family Activities	Seasonal activities and events for all ages, including tours of Old Town Irvine, arts and crafts, excursions, and educational programs.
Early Childhood	Classes and activities geared toward kids age 5 and under, includes “parent and me” classes, dance, cooking, music, art, sports, and preschool programs.
Youth	Activities for children include camps, cooking, dance, gymnastics, art, music, martial arts, education, and fitness. Teen activities include sports, music, art, and leadership.
Adults	Classes and activities geared toward adults, including sports, yoga, dance, language, hikes, martial arts, writing, cooking, tax and business help, and organized excursions.
Seniors and Active Plus	Classes and activities include computers, dance, music, drama, fitness, yoga, cooking, and nutrition, as well as medical review and tax assistance.
Aquatics	Classes and activities offered for all ages at the Woollett and Northwood Aquatics Centers include water aerobics, lifeguard training, and swim lessons.
Arts	Classes and activities offered include creative workshops, ceramics, printmaking, drawing, painting, sculpture, culinary arts, jewelry, and photography.
Disability Services	Classes and support to individuals with disabilities and their families include dance, art, social nights, and culinary workshops as well as fitness and wellness activities.
Outdoors/ Nature	Special programs at Turtle Rock Nature Center, Bommer Canyon, Quail Hill trail heads, and staging areas include creative crafts and play, campfires, kite flying, and opportunities in land stewardship.
Tennis	Thirteen parks offer tennis facilities. Lessons are offered to a variety of ages and levels from beginner to advanced; league play is also available through the City and USTA.

*Note: Before- and after-school programming is also offered for children and teens through a third-party provider in conjunction with IUSD and TUSD.*



### 9.2.2.4 Off-Street Trails

Trail connectivity is another important recreation feature in Irvine. Many trails run through Irvine and provide connectivity for cyclists and pedestrians. Trails enhance active recreation by providing not only non-motorized transportation connections but access to Irvine’s open space, parks, and recreational facilities. Trailheads throughout the City offer parking, restrooms, and locations for residents and visitors to meet up prior to heading out on a trail.



**Class 1 Trails** are a highly valued amenity for residents biking and walking in Irvine.

Table 9-4 provides a list of off-street paved public trails and associated linear miles. As shown in Figure 9-2, these Class 1 trails provide direct connection to or within one-half mile to most community and regional parks, UC Irvine, and open space areas in the community.

**Table 9-4  
Paved Off-Street Trails**

Map Legend	Trail Name	Linear Miles
BT	Barranca Trail	1.0
BC	Bonita Canyon Trail	2.2
CV	Cypress Village Trail	1.0
FT	Freeway Trail	3.7
HV	Harvard Trail	1.5
HC	Hicks Canyon Trail	2.2
JT	Jeffrey Open Space Trail	3.8
JM	Juanita Moe Trail	1.0
MT	Mojeska Trail	0.3
PC	Peters Canyon Trail	4.2
PT	Portola Trail	4.6
SD	San Diego Creek Trail	10.5
SC	Sand Canyon Trail	4.3
SH	Shady Canyon Trail	4.0
TR	Turtle Rock Trail	2.7
UT	University Trail	3.8
VS	Venta Spur Trail	3.5
WT	Walnut Trail	3.3
WI	West Irvine Trail	1.7
WT	Woodbridge Trail	2.3

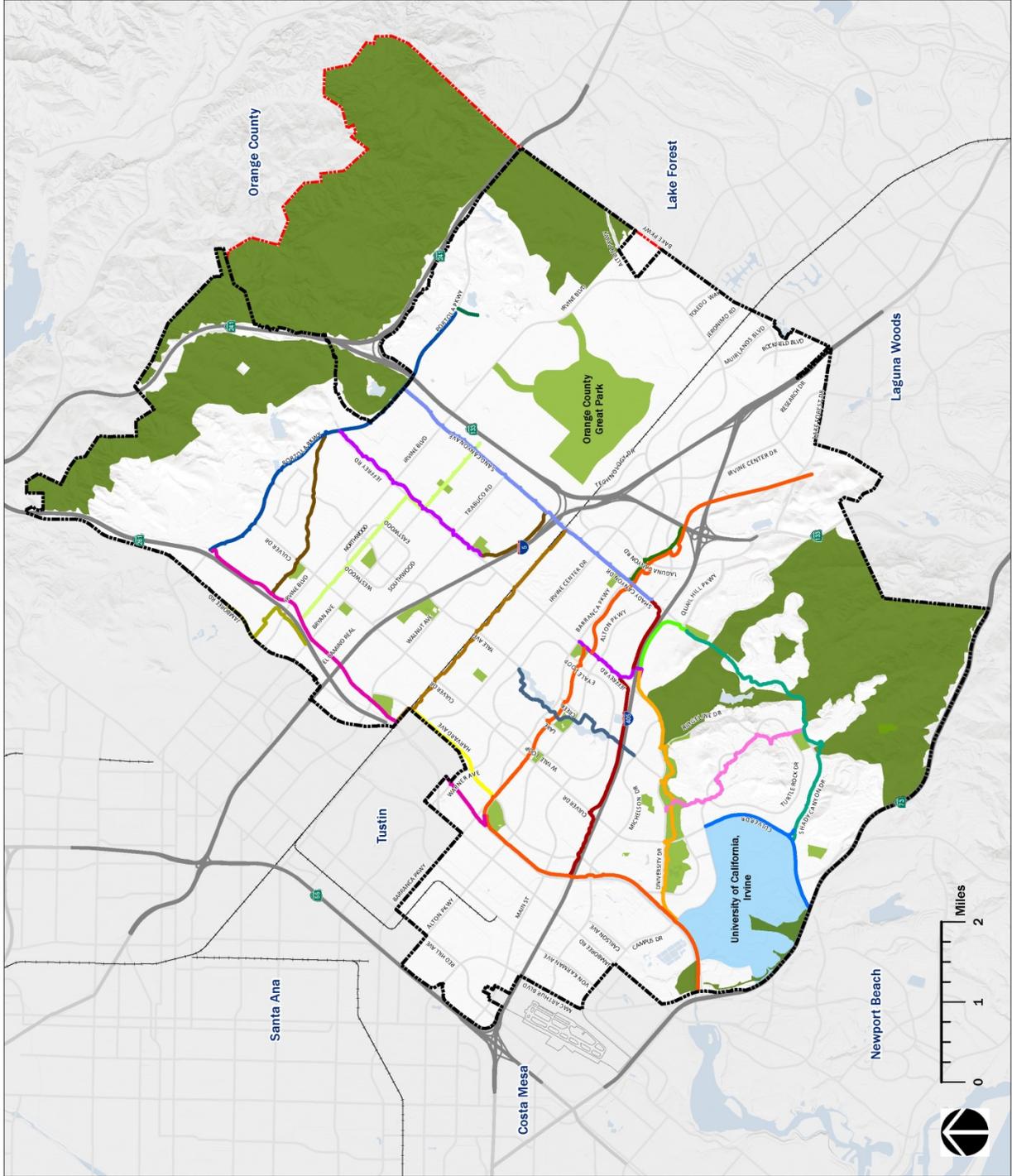
*Source: City of Irvine, 2016*

Figure 9-2

# Named Public Paved Off-Street Trails

## LEGEND

- Existing Trails
- Barranca Trail (BT)
- Bonita Canyon Trail (BC)
- Cypress Village Trail (CV)
- Freeway Trail (FT)
- Harvard Trail (HT)
- Hicks Canyon Trail (HC)
- Jeffrey Open Space Trail (JT)
- Juanita Moe Trail (JM)
- Mojeska Trail (MT)
- Peters Canyon Trail (PC)
- Portola Trail (PT)
- San Diego Creek Trail (SD)
- Sand Canyon Trail (SC)
- Shady Canyon Trail (SH)
- Turtle Rock Trail (TR)
- University Trail (UT)
- Venta Spur Trail (VS)
- Walnut Trail (WT)
- West Irvine Trail (WI)
- Woodbridge Trail (WT)
- Community & Regional Parks
- NCCP Areas
- University of California, Irvine
- City Boundary
- Sphere of Influence



Source: City of Irvine, 2016; PlaceWorks, 2016



GP-4.0 - Figure 9-2: Named Off-Street Trails.mxd 1/20/2025



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## 9.3 Education

Irvine is known throughout the region and state for supporting a high-quality learning environment and academic achievement. This section includes a discussion of educational resources available in Irvine.

### 9.3.1 Regulatory Setting

In California, the operation of public schools is funded by state taxes, which are allocated for either general purposes or for specific programs. Construction and renovation of school buildings are the responsibility of local school districts. The state regulations below are related to the ability of districts to acquire and spend funds for capital improvements.

#### 9.3.1.1 School Facilities Act of 1986

Enacted in 1986, Assembly Bill 2926 (School Facilities Act) authorizes a levy of impact fees on new residential and commercial/industrial development. In 1987, the bill was amended by AB 1600, which added Sections 66000 et seq. to the Government Code. Under this statute, payment of impact fees by developers serves as CEQA mitigation to satisfy the impact of development on school facilities.

#### 9.3.1.2 California Senate Bill 50 of 1998

Senate Bill (SB) 50 authorizes school districts to collect fees to offset the costs associated with increasing school capacity as a result of development and related population increases. The funding goes to acquiring school sites, building new schools, and modernizing schools. SB 50 establishes a process for determining fees to mitigate the impact of development on school districts from increased enrollment. According to § 65996 of the Government Code, SB 50 development fees are deemed “full and complete school facilities mitigation.”

#### 9.3.1.3 School Impact Fees

Education Code § 17620 provides the basic authority for school districts to levy fees on construction for (re)construction of school facilities, subject to Government Code §§ 65995 and 66001. Fees are based on the square footage within the perimeter of a structure, as assessed by the City. As required under state law, school impact fees are based on a nexus study and range from \$3.36 to \$3.48 per square foot. Additional variations depend on the occupancy of the project.



Northwood High School is one of the highest-rated public high schools in the country.



### 9.3.2 Existing Conditions

The full range of educational services is available in the City of Irvine. These include quality K–12 schools, professional colleges, private schools and institutions, and four-year public post-secondary institutions—many of which are renowned statewide and nationally for quality education.

#### Irvine’s Commitment to Education

In 2006, the Irvine City Council established the Irvine Educational Partnership Fund, a City program that provides annual City funding to support Irvine public schools. Measure R, approved by the Irvine citizenry in November 2010, confirmed the City’s continued provision of financial support to educational and enrichment programs in Irvine’s public K–12 schools.

In 2016, voters passed a \$319 million bond, Measure E. Funds from Measure E will enable IUSD to provide critical upgrades for aging schools to meet the same academic, technology, and safety standards as new IUSD schools. Upgrades will include additional classrooms, science labs, dedicated spaces for art and music, and technology infrastructure upgrades.

#### 9.3.2.1 Primary and Secondary Schools

Irvine is served by the Irvine Unified School District (IUSD), Saddleback Valley Unified School District, Santa Ana Unified, and Tustin Unified. Most of the City is within IUSD boundaries. In addition to public schools, Irvine is home to many private schools—Montessori schools, alternative education, and schools affiliated with religious denominations. Table 9-5 summarizes the schools that are part of IUSD and their enrollment.

**Table 9-5  
Public Schools in the Irvine Unified School District**

Public Schools	Fiscal Year				
	2011-12	2012-13	2013-14	2014-15	2015-16
Elementary	22	22	22	24	24
High School	4	4	4	4	4
Middle	5	5	6	6	6
All Others	3	3	3	3	3
Total Schools	34	34	35	37	37
Students	28,185	29,072	30,123	31,392	32,319

*Source: California Department of Education*

#### 9.3.2.2 Universities and Colleges

The University of California, Irvine (UC Irvine) is a public research university founded in 1965 that provides undergraduate and graduate education with 16 fully accredited schools and programs. As of fall 2016, university enrollment consisted of 27,331 undergraduate students and 6,126 graduate and post-baccalaureate students. The university’s 1,478-acre main campus is in southwestern Irvine. The university also includes the UC Irvine Medical Center, a research and teaching hospital in the City of Orange. As the largest employer in the City, UC Irvine has a significant positive impact on the local and regional economy.

# PARKS, RECREATION, AND HUMAN SERVICES

Additional higher education institutions in Irvine include Concordia University, a small private university affiliated with the Lutheran church. Concordia's enrollment is estimated at 4,300 students. Irvine Valley College offers classes and programs for more than 15,000 students. California State University, Fullerton, maintains an Irvine branch to meet the higher educational needs of central and south Orange County. The campus presently has an enrollment estimated at 4,300 students.

The City of Irvine is home to numerous satellite campuses for four-year colleges, including, but not limited to:

- Pepperdine Graduate School (18111 Von Karman Avenue)
- Fuller Theological Seminary (17744 Sky Park Circle)
- Fashion Institute of Design (17590 Gillette Avenue)
- Chicago School of Professional Psychology (at UCI)
- University of La Verne (2855 Michelle Drive)
- Chapman University Health Campus (9401 Jeronimo Rd)
- University of Southern California (2300 Michelson Drive)

### 9.3.2.3 Library Service

Irvine understands the importance of lifelong learning and the role that libraries can play in achieving that goal by providing library resources that meet the educational, cultural, civic, business, and lifelong learning needs of all residents. To that end, the City desires to provide library services that are community-oriented; provide knowledgeable, service-oriented staff; and offer access to information, books, and other materials in a variety of formats with contemporary technology.

Library services in Irvine are provided by the Orange County Public Library (OCPL). OCPL operates three public library branches in Irvine that provide an array of programs and services, including children's activities, programs for teenagers, and resources related to careers. The IUSD also provides school libraries; data on IUSD libraries are online at the California Department of Education Library Survey website: <http://www.cde.ca.gov/ci/cr/lb/schlsurvwelcomp.aspx>. Libraries are also supported by several private foundations in Irvine.

Table 9-6 lists OCPL facilities in Irvine and selected characteristics.



Katie Wheeler Library, Irvine



**Table 9-6  
Irvine Public Libraries**

Current Facilities	Select Facility Statistics			
	Square Footage	No. of Volumes	Total Circulation	Days/wk open
<b>Public Libraries</b>				
Heritage Park	~ 21,000	153,000	965,000	7
University Park	~ 11,500	110,000	567,000	7
Katie Wheeler	~ 11,250	47,500	308,000	7
Total	~ 43,750	310,500	1,840,000	7
<b>Library Needs</b>				
Standard/capita	0.5 sq ft.	2.5 volumes	N/A	N/A
Current Needs	125,000	625,000	N/A	N/A
Future Needs	50,000	250,000	N/A	N/A
Total Needs	175,000	875,000	N/A	N/A

*Source: California State Library, Public Library Statistics Portal, 2014/15*

*Note: All figures are approximate totals as of FY 2014/2015.*

*Current needs = facility standard multiplied by a population of 250,000*

*Future Needs = facility standard multiplied by additional population of 100,000*

Determining the appropriate service levels for libraries has long been an issue in Orange County and Irvine. OCPL has a standard of 0.2 square foot of library space and 1.5 volumes per capita applied countywide. Based on these metrics, Irvine’s libraries offer 87 percent of the square footage needed and 83 percent of the total collections needed. In 2005/2006, the City established a Library Services Advisory Committee to evaluate options for enhanced library services. According to a commissioned Library Needs Assessment, the City adopted a standard of 0.5 square foot of library space and 2.5 volumes per capita (Arroyo Associates 2006). Based on this standard and updated for population growth since then, the City would require an additional 81,250 square feet of library space and 314,500 in holdings—double the amount it has today. Moreover, the City could consider locational criteria to ensure that each library is centrally located to serve an approximate population base.

Figure 9-3 shows the locations of schools, colleges, and libraries in Irvine.





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## 9.4 Human Services

The City of Irvine strives to be a caring, family-oriented community where each resident is respected and valued. As such, Irvine collaborates with an active coalition of community organizations, agencies, and non-profit entities to meet the human services needs of each segment of the community. This section describes and evaluates the diverse supportive programs and activities that are provided to improve the health and well-being of families, children, and adults.

### 9.4.1 Regulatory Setting

Human services are addressed in the existing general plan and various strategic plans prepared by the City.

#### 9.4.1.1 General Plan

The existing general plan does not directly address human services. In the 1990 update, service providers identified the perceived lack of affordable space and land designated for institutional use as the primary reason for not locating to and operating such services in the City. If more sites were available, more services could be provided, reducing the barriers of providing affordable services to Irvine residents. To that end, the general plan sets forth local public facility standards that are used to determine the types of facilities built and where such services co-locate. However, the general plan does not directly address the role of providing public services. In lieu of this guidance, the City has department-level strategic plans that set forth City goals, policies, and programs to achieve desired goals. Since that time, local service providers for profit and nonprofit have located within the community.

#### 9.4.1.2 Strategic Plan for Children, Youth and Families

Recognized as a model for the quality of life it provides to children, youth and families, the City takes a proactive approach to planning for the well-being of residents. In 2007, the City Council directed staff to develop a Strategic Plan for Children, Youth and Families to address priority programmatic areas identified.

- **Reduce poverty and the harmful effects of poverty and near-poverty status among Irvine families (Support Families in Need).**



- Expand and enhance early care and educational opportunities, and support continued developmental well-being of children (Child Care and School Readiness).
- Reduce and prevent alcohol and substance use and other harmful behavior among Irvine youth (Youth Alcohol, Substance Use and Other Risky Behavior Reduction).
- Enhance and expand community service by youth and families in Irvine through youth-oriented and intergenerational programs (Youth Volunteerism).
- Improve health; fitness; and social, emotional, and developmental well-being among children and youth (Health, Fitness and Well-Being).

#### **9.4.1.3 Senior Services Strategic Plan**

In 2010, the City of Irvine adopted a Senior Services Strategic Plan to identify and support policies and practices that strengthen the emotional, cognitive, physical, and social health of the City's older adults. The plan provides a vision, strategies, and programs to address five priority focus areas.

- **Education.** Information and assistance to older adults on topics such as financial, legal, insurance, employment, advocacy, and policy issues.
- **Housing.** Support accessible, affordable, and safe housing for older adults.
- **Mental and Physical Health.** Support programs and services designed to enhance cognitive, emotional, and physical health of older adults.
- **Recreation and Leisure Programs.** Promote physical and social health in older adults through recreation and leisure opportunities.
- **Transportation.** Support effective local and regional transportation services among public and private sources that provide transportation for older adults.

## 9.4.2 Child Care and Childhood Development

The City of Irvine recognizes that high-quality, accessible, and safe child care positively impacts a family's quality of life. Demand for these services continues to increase due to demographic, economic, and social factors, including the high cost of living, increase in the number of single-parent households, the prevalence of families with two working parents, and parents returning to work with children at younger ages. The need for quality and affordable child care continues to increase faster than the development of facilities to meet current demand.

Irvine is recognized as a leader in child care and preschool development and services since the 1980s, including providing land and City facilities, funding, direct services, and planning and coordination. Irvine is one of the few cities in California with a Child Care Services Coordinator office and a Child Care Committee supported by the City Council. Innovative programs include the Irvine Child Care Project (see sidebar), which was recognized by the League of California Cities with the 2011 Helen Putnam Award for innovative local government programs.

Child care facilities and services are as varied as the families who use them. Some prefer licensed child care providers operating out of homes, while others find that larger facilities better suit their needs. In any given year, approximately 50 preschool-age child care centers, 25 infant/toddler centers, 40 school-age child care centers, and 65 large family child care homes operate in Irvine. Additional licensed facilities serving up to 8 children operate in Irvine. In any facility, infants, toddlers, preschool-aged and school-aged children all have different needs, and staffing and the facilities housing them need to be tailored accordingly.

To determine the need for child care in Irvine, the City commissioned a comprehensive study to compare the number of existing child care spaces, existing demand for child care, and future needs based on population and employment growth (Child Care Needs Assessment, Briones, 2016). The study considered demand primarily from residents of Irvine and a small percentage of employees working in Irvine, but living in other communities. The child care study also examined existing and future needs in different areas of the community.

As summarized in Table 9-7, the study found that Irvine has a documented shortfall of approximately 2,433 child care spaces in 2016 and that the shortfall will increase to nearly 7,000 spaces by 2035. This

### **Irvine Child Care Project**

Established in 1984, Irvine Child Care Project is a joint powers agreement between Irvine Unified School District and the City of Irvine to accommodate more affordable and quality child care in the city. The mission of the Irvine Child Care Project is to provide quality, affordable school-age child care—through community-based, non-profit organizations on elementary school sites—to children of families who live and/or work in Irvine.

The Irvine Child Care Project currently leases facilities on all 25 elementary school campuses in the IUSD school district to non-profit agencies operating licensed before- and after-school child care (grades K-6). This provides childcare spaces for approximately 2,300 children each year.



underscores the ongoing importance of considering child care in planning and development situations in Irvine.

**Table 9-7  
Irvine Licensed Child Care Assessment**

Items	Type of Child Care by Age Group			
	Infant Care	Preschool Care	School Age Care	Total Spaces
Children Requiring Licensed Care	2,484	4,787	5,678	12,949
Total Existing Child Care Spaces	1,053	6,074	3,389	10,516
Existing Shortage Surplus of Spaces	(1,431)	1,287	(2,289)	(2,433)
New Demand for Spaces (2014-35)	877	1,698	1,976	4,551
Total Existing and New Deficit	(2,308)	(411)	(4,264)	(6,984)

*Source: City of Irvine, Child Care Needs Assessment, 2016*

The City continues to work with the development community to provide child care services. When large projects are proposed, the City may negotiate for child care services as part of the development agreement for that project. This approach continues to assist in meeting future facility demands. However, as the City approaches buildout, there will be fewer developments large enough to make the provision of child care facilities financially feasible. Options to provide additional child care facilities will diminish and be available on infill sites.

## 9.4.3 Senior Services

Our society as a whole is not only aging but also questioning how communities should plan for and serve their senior residents. In Irvine, seniors and older adults (broadly defined as 55 years or older) make up a large segment of the population—one in five residents are seniors. Demographers clearly indicate that the “senior” population will continue to grow as the “baby boomer” generation ages and as our population’s life expectancy continues to rise. This is particularly true in Irvine, where the average life expectancy of adults is 85 years of age.

The needs of Irvine’s senior residents will vary depending on their age. Like most communities, the City of Irvine is experiencing a segmentation of the senior population into two groups: younger and older seniors. The younger segment of the population (those closer to 50 years of age) can have significantly different interests (e.g., recreational, raising children, work) and needs than their older counterparts. Seniors in the older category tend to have greater healthcare needs, and Irvine is recognized as a leader in providing quality senior services and programs.

Irvine is one of the few cities with a Senior Council, established in 1978, which advises the City Council on matters pertaining to older adults. The City also employs staff assigned specifically to address the wide range of program needs of seniors. A wide range of senior activities and programs are operated through the City’s three senior centers and the Keen Center for Senior Resources. Services are designed to specifically meet needs in the five priority areas of education, housing, mental and physical health, recreation and leisure, and transportation.

While the majority of seniors drive to and from events and services, other seniors may be less mobile. Recognizing the importance of getting around Irvine for shopping, medical care, and social activities, the City of Irvine TRIPS program provides a low-cost, door-to-door, wheelchair-accessible transportation service to qualified Irvine residents age 18 and older who are unable to drive due to a permanent physical or cognitive disability. The City also provides a range of low cost transportation options for seniors who are not disabled to meet their mobility needs. Services are provided by the City and community volunteers.

For a complete inventory, please refer to the Senior Services Strategic Plan, Senior Resources Directory, and City website.



Irvine offers over 1,000 affordable senior and additional market rate senior housing. Shown here is the 221-unit Solaria project.



### 9.4.4 Children, Youth, and Family Services

Irvine has always had a large population of families with children, and has responded by providing a range of programs and services. Recognized as a model for the quality of life offered to families, Irvine has been named one of the nation’s 100 Best Communities for Young People by America’s Promise Alliance and consistently ranks among the top communities on indicators for conditions of children and families.

Table 9-8 provides a brief summary of some of the services the City of Irvine provides for children, youth, and families. Numerous other services are provided to residents by the many for-profit and non-profit organizations in the community.

**Table 9-8  
Children, Youth, and Family Services**

Sample of Services by Age Group		
Children	Youth	Families
Recreation Programs	Recreation Programs	Recreation Programs
Library programs	Library programs	Library programs
Afterschool programs	After school programs	Financial Assistance
Child Care Services	Volunteer & Leadership	Child Resource Center
School readiness programs	Drug and Alcohol Use Prevention	FOR Families Counseling Service
Special Education	Youth Action Teams	Housing Support

*Source: Strategic Plan for Children, Youth, and Families*

Some households in Irvine face greater challenges, with incomes insufficient to cover food, housing, transportation, medical, education, and child care costs. City programs respond to some of these needs but cannot meet all of them. However, the City of Irvine partners with local nonprofits, congregations and faith-based groups, and Orange County agencies to provide a wide array of services and programs for residents.

Probably one of the most widely available and effective programs for individuals and families in need in Irvine is affordable rental housing. According to the 2013-2021 Housing Element, the City and its partners provide almost 4,000 units of housing affordable to lower income households. This provides seniors, families, and children a secure environment and allows them to afford other basic necessities of life.

## 9.4.5 Community Arts and Culture

Cultural arts and activities enhance and enrich the Irvine community. Cultural appreciation, visual arts, music, dance, performance, and the many other arts—all provide an opportunity for expression for residents of all ages and backgrounds. Cultural arts also extend to beautifying the community and may include murals, fountains, park design, and other features of the physical environment.

### Performing Arts

The Irvine Barclay Theatre provides programming in contemporary dance, music, and theater arts. Irvine Barclay Theatre was established as a public-private partnership to create a unique arts venue and to support the UCI Claire Trevor School of the Arts. In addition, the Irvine Valley College Performing Arts Center also provides programs and events at its state-of-the-art, \$32 million performing arts venue. Finally, as described in the sidebar, the IUSD also provides a comprehensive arts education in the four arts disciplines supported by the community.

### History and Culture

Irvine continues to embrace its multicultural diversity in various ways. These include museums such as the San Joaquin Ranch House, considered the oldest standing structure within the original boundaries of Irvine Ranch. A research library and extensive photo collection of local historic information are available. The old town area also includes buildings of historical significance to Irvine's early history. As Irvine's population has diversified, multicultural organizations offer a diverse complement of programs and events. The City also coordinates cultural events, including the Irvine Global Village Festival and Korean Festival.

### Visual Arts

The Irvine Fine Arts Center provides art classes, open studio programs, events, and exhibitions for all ages in fully equipped art studios. The Fine Arts Exhibition Program presents contemporary and cultural art exhibitions that showcase artists and expand community awareness, understanding, and sensitivity to art. The City is also home to the Irvine Museum (now at UCI), which is the only museum in California dedicated to the preservation and display of California impressionism.

#### Irvine Unified School District

The IUSD provides a comprehensive arts education in the four arts disciplines—visual arts, dance, theater, and music—for students from grades K-12. The IUSD strives to adhere to the standards of the Visual and Performing Arts Framework produced by the California Department of Education. These programs are supported by the Irvine Public School Foundation, Claire Trevor School of the Arts, and generous funders such as the Irvine Company.

In 2016, the Irvine Company granted a \$20 million gift to the IUSD that will allow for the continuation of the popular Education Enrichment program. This program provides art, music, and science teachers to every 4th through 6th grade class in IUSD. The grant helps to fund more than 30 teachers at 24 elementary schools for the next decade and also matches the original gift provided by the Irvine Company nearly a decade ago in 2006.



## 9.5 Opportunities and Constraints

Irvine is known for its robust programs and services in parks, recreation, and human services. As the city approaches buildout, there remain opportunities and challenges to continue and expand these programs.

### 9.5.1 Opportunities

**Park Facilities and Programs.** Historically, developers have satisfied park dedication requirements with providing a combination of facilities, fees, and land. However, as many facilities are aging, the need is rapidly increasing for facility maintenance, rehabilitation, and adaptation. Moreover, recreational needs are changing, requiring the continual adaptation of programs and services to meet emerging needs. These and other recreational service priorities in the recently adopted Parks Master Plan should be reflected in the General Plan Update.

**Educational Opportunities.** Children and youth living in Irvine are fortunate to grow up in a community that offers great public schools and a variety of opportunities to continue their education after high school. Not only do great schools attract new residents to the City, but Irvine's colleges and universities are an important component of the vibrant local economy. Opportunities exist to continue and improve the educational process, particularly through the expansion of library services to meet the facility standards set forth in prior planning efforts.

**Cultural Art Programs.** Few cities have embraced the role of arts and culture in the community. Through festivals, a fine arts center, and performance arts venues, Irvine continues to support arts and culture. As Irvine looks toward its future, additional opportunities may exist to improve arts and culture. These could include a robust program for art in public places, a cultural arts master plan, or a similar endeavor that integrates the various forms of art and cultural expression in Irvine.

**Human Services.** The City provides a broad range of human services. These include recreation, education, arts and culture, classes and programs for all ages, and many other human services. While the City's human services are addressed in City master plans, this policy direction is not reflected in the current general plan. As the City updates the general plan, there is an opportunity to reflect and strengthen existing policy and programs that emphasize human services.

## 9.5.2 Constraints

**Changing Resident Needs.** As its demographics change, the City is recognizing a shift in recreational demands and a need to provide facilities and programs for a broader spectrum of the population, particularly seniors, young adults, children, and youth. The City's updated Strategic Plan for Children, Youth and Families and Parks Master Plan are intended to keep pace with emerging service needs.

**Libraries and Education.** Irvine is known for its commitment to education. However, there continues to be a deficit in library space to meet the needs of residents who do not attend college. At some point, the City will need to prioritize the development of new libraries, potentially through local fees. Unless impact fees are adopted locally to fund a library or other locally approved funding source, it will eventually not be possible to catch up to the deficit in library space.

**Child Care Needs.** Irvine continues to have a shortage of child care spaces, and this deficit will increase through buildout of the community. It is important to note that the unmet need is a conservative estimate because the analysis assumed only a fraction of employees who work in the City but live elsewhere desire child care in Irvine. The General Plan could provide more formal policy guidance that would increase the opportunities for including childcare in certain areas or projects.

**New Facility Standards.** The City is revisiting its park and recreational standards based on current resident needs—an expected trend as communities and residents age over time. The needs standards suggest a strong demand for indoor facilities (community centers, pools, libraries, etc.) and a greater number and diversity of athletic fields. This trend places a greater demand on the City to use available space, reprogram existing facilities, and work with non-profit organizations.

**Open Space Demand.** The City barely meets its goal of 5 acres of parks per 1,000 residents, but not with community and neighborhood parks. The deficit is being addressed with private parks and regional facilities. However, little information is known about private parks and the adequacy of their amenities. The burden to provide active open space is becoming increasingly difficult, particularly in areas such as the IBC, and the deficit impacts use of public/private recreational facilities and parks. The City could better define the role of private parks in the general plan.



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# Chapter 10. Noise

## 10.1 Introduction

When considering noise impacts, we often think of dogs barking or loud music. These certainly constitute unwanted sources of noise. However, our daily life is often more affected by mobile sources such as freeway traffic, trains, and overflight of commercial airplanes. Unwanted noise from these and other sources is known to have adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance.

The existing general plan defines noise as unwanted sound that is considered unpleasant and bothersome.

## 10.2 Defining and Measuring Sound

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dB are detectable under quiet, controlled conditions. A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernable to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

### 10.2.1 Sound Measurement

Sound intensity is measured through the A-weighted measure (dBA) to correct for the relative frequency response of the human ear. That is, an A-weighted noise level deemphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dB is 10 times more intense than 1 dB, 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater

**Sound:** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

**Noise:** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.



than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as “spreading loss.”

Several rating scales have been developed to analyze the adverse effect of noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people largely depends on the total acoustical energy content of the noise, and the time of day when the noise occurs. The most common scales are:

- **L<sub>eq</sub>**: This value represents the equivalent energy noise level, an average acoustic energy content of noise for a stated period of time; thus, the L<sub>eq</sub> of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. This rating scale does not vary, regardless of whether the noise occurs during the day or night.
- **L<sub>dn</sub>**: The Day-Night Average Level is a 24-hour average L<sub>eq</sub> with a 10 dBA “weighting” added to noise during the hours of 10 pm to 7 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L<sub>eq</sub> would result in a measurement of 66.4 dBA L<sub>dn</sub>.
- **CNEL**: This is the Community Noise Equivalent Level, a 24-hour average L<sub>eq</sub> with a 10 dBA weighting added to noise during the hours of 10:00 pm to 7:00 am, and an additional 5 dBA weighting during the hours of 7:00 pm to 10:00 pm to account for noise sensitivity in the evening and nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L<sub>eq</sub> would result in a measurement of 66.7 dBA CNEL.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 55 dBA, moderate in the 55 to 70 dBA range, and high above 70 dBA.

**10.2.1.1 Typical Noise Levels from Specific Sources**

Table 10-1 lists typical noise levels generated by specific activities or sources. While not an exhaustive list of noise sources, it depicts a noise levels that are useful for comparison purposes. Sounds such as gunshots or explosions are louder than the scale shown in Table 10-1.

**Table 10-1  
Typical Noise Levels from Noise Sources**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawn mower at 3 feet		
	90	
Diesel truck at 50 feet/mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area in daytime		
	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater; large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night; concert hall (background)
	20	
		Broadcast/recording studio
	10	
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013.



Freeway traffic at I-5 and 405 interchange.

Transportation corridors, including freeways and arterial roadways, are a major source of noise in many communities. Although there is a large amount of variation between communities and between roadways, outdoor noise levels are typically 55 to 60 dBA CNEL within 50 feet of a collector or secondary arterial roadway and 65 to 70 dBA CNEL within the same distance from a major primary/major arterial roadway. Noise generated by transportation corridors can cause a range of effects, including annoyance and interference with sleep, speech, and performance of activities (i.e., work or school).

### 10.2.2 Effects of Excessive Noise

Excessive noise can have health and social effects on humans. These are summarized below:

- **Physical Damage.** While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event, such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.
- **Sleep and Speech Interference.** Noise can interfere with everyday activities such as talking, working, studying, and sleeping. Chronic exposure to unwanted noise can have substantial negative effects on employee productivity, and sleep interference may contribute to negative health outcomes that include stress, high blood pressure, heart disease, and mental health disorders.
- **Annoyance.** Noise can sometimes be merely bothersome or distracting. However, sound annoyance can also have effects on a person's health. Chronic exposure to unwanted noise can lead to increased stress, heart rate, and blood pressure. The annoyance of noise is affected by overall volume, interval, and other characteristics of the sound. For instance, the content of a loud conversation or the repetitive nature of a dog's barking may contribute to its annoyance.

### 10.2.3 Vibration

Vibration is described as a trembling, quivering, or oscillating motion of the earth. Like noise, vibration is transmitted in waves, but through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Vibration can be either natural as in the form of earthquakes, volcanic eruptions, sea waves, landslides, or man-made as from explosions, the action of heavy machinery or heavy vehicles such as trains. Both natural and man-made vibration may be continuous such as from operating machinery, or transient as from an explosion. Like noise, vibration can be annoying and can affect human health.

The three main types of waves associated with groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation.
- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.
- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the RMS velocity. PPV is the maximum instantaneous peak of the vibration signal and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response.

The units for PPV and RMS velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order



Central Park West under construction



to compress the range of numbers required to describe the vibration. In this study, all PPV and RMS velocity levels are in in/sec, and all vibration levels are in dB relative to one microinch per second (abbreviated as VdB). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Man-made vibration problems are, therefore, usually confined to relatively short distances (500 to 600 feet or less) from the source (FTA 2006).

Construction operations generally include a wide range of activities that can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at up to 200 feet. Heavy trucks can also generate groundborne vibrations, which can vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, etc., all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration from normal traffic flows on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, heavy loads, and wheel-rail interactions.

#### **10.2.3.1 Effects of Vibration**

Vibration, especially repeated or chronic vibration, can generate impacts to structures, safety, and human health.

- **Annoyance and Interference with Activities.** As with noise, vibration can be distracting or annoying. Especially when experienced over longer intervals, it can adversely affect a person's ability to work, study, sleep, or communicate. Interference with these activities can lead to secondary health effects, including stress, high blood pressure, and sleeplessness.
- **Noise.** Groundborne vibration can rattle windows, shake items on shelves or hanging on walls, and in general, produce low rumbling noises. These unwanted noises can lead to health effects as described earlier in this chapter. Vibration-related noise is generally felt strongest inside buildings.

- Structural Damage.** Structures amplify groundborne vibration, and wood-frame buildings, such as typical residential structures, are more affected by ground vibration than heavier buildings. The level at which groundborne vibration is strong enough to cause architectural damage has not been determined conclusively. The most conservative estimates are reflected in Federal Transit Administration standards, shown in Table 10-2.

**Table 10-2**  
**Groundborne Vibration Impact Criteria for Architectural Damage**

Building Category	PPV (inches per second)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

*Source: FTA 2006.*

### 10.2.4 Noise Sensitive Land Uses

Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment, public health, and/or safety. These include homes, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes. Commercial and industrial uses are generally not considered sensitive uses unless noise and vibration would interfere with their normal operations and business activities.

## 10.3 Regulatory Background

Noise is regulated at the state and local levels and at the federal level for certain uses. Below are the relevant noise guidelines, policies, and standards established by federal and state agencies and the City of Irvine.



### 10.3.1 Federal Regulations

#### 10.3.1.1 Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) has established a noise exposure standard, which is set at the noise threshold where hearing loss may occur from long-term exposures. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure, functions of the heart, and the nervous system. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter. Extended periods of noise exposure above 90 dBA can result in permanent hearing damage.

#### 10.3.1.2 Federal Transit Administration Vibration Impact Criteria

The Federal Transit Administration (FTA) maintains a guidance manual entitled Transit Noise and Vibration Impact Assessment. The manual establishes procedures for predicting and assessing noise and vibration impacts of proposed federally funded mass transit projects, including bus and rail projects. In addition to identifying criteria for measuring potentially adverse impacts, the manual describes mitigation measures and design features that have been effectively used to mitigate impacts.

Although Irvine's public transit system consists primarily of locally funded OCTA buses, future mass transit projects constructed with federal funding would be subject to federal review. In that scenario, the FTA's noise and vibration guidelines would be used to comply with requirements of the National Environmental Policy Act.

#### 10.3.1.3 Department of Housing and Urban Development

HUD's environmental criteria and standards for noise abatement and control are in Title 24, Part 51, of the Code of Federal Regulations. Similar to FTA's guidelines, HUD's noise standards are relevant for a specific set of projects that are initiated or funded by HUD. Special attention is devoted to "high noise areas" where mitigation is required for projects in environments that have 24-hour noise level averages exceeding 65 dB.

#### **10.3.1.4 Federal Highway Administration**

FHWA's procedures for abatement of highway-related traffic and construction noise are in Title 23, Part 772, of the Code of Federal Regulations. These procedures require federal highway projects or highway projects built with federal funding sources to comply with the FHWA's traffic noise model when analyzing traffic noise impacts of such projects. They also outline guidelines for funding, constructing, and monitoring adequate noise abatement measures.

In January 2006, FHWA published a national database of construction-equipment-reference noise emission levels. This database is part of FHWA's Roadway Construction Noise Model and provides a comprehensive list of the noise-generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. Noise levels generated by heavy construction equipment can range from approximately 70 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site.

### **10.3.2 State Regulations**

#### **10.3.2.1 California Building Code**

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, of the California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.



#### **10.3.2.2 California Penal Code**

The Irvine Police Department enforces California Penal Code, Section 415, which establishes that noise is illegal when any person “maliciously and willfully disturbs another person by loud and unreasonable noise.” This measure, which typically involves complaints from neighbors, does not differentiate between different times of day. Instead, the unwanted noise must be demonstrably “unreasonable” to be a noise violation.

#### **10.3.2.3 Airport Noise Regulations**

The California Public Resources Code, Section 21096, requires that when preparing an environmental impact report for a project in an airport influence area, as defined by an airport land use compatibility plan, the lead agency must use the *California Airport Land Use Planning Handbook* as a technical resource for airport noise and safety compatibility issues. The basis for compatibility zone delineation for airports is the CNEL contours created with the Federal Aviation Administration Integrated Noise Model for private and public airports.

#### **10.3.2.4 Caltrans Construction Vibration Guidance**

Caltrans provides state and local agencies with a manual that addresses vibration issues associated with the construction, operation, and maintenance of Caltrans projects. The guidance and procedures in the manual consist of screening tools for assessing the potential for adverse effects related to human perception and structural damage.

#### **10.3.2.5 General Plan Guidelines**

Section 65302 of the California Government Code outlines requirements for the preparation of general plans by local jurisdictions. Consistent with the code, a city or county’s general plan must have a noise element that does the following:

- Identifies and evaluates noise problems in the community, including those related to highways, freeways, surface streets, rail operations, aviation, and industrial plans.
- Establishes noise contours for all of the above sources in terms of CNEL or Ldn.
- Identifies implementation measures and possible solutions to address existing and foreseeable noise problems.

### 10.3.3 Existing General Plan

Table 10-3 shows noise standards for interior and exterior noise for a variety of land uses.

**Table 10-3  
Existing General Plan Noise Standards**

Land Use	Energy Average (CNEL)	
	Interior	Exterior
<b>Residential Uses</b>		
Single Family and Multifamily (with closed windows/with open windows)	45/55	65
Mobile Homes	—	65
<b>Commercial/Industrial Uses</b>		
Hotel, motel, transient lodging	45	65
Commercial, retail, bank, restaurant	55	—
Office building, professional office, research/development	50	—
Amphitheater, concert hall, auditorium, meeting hall	45	—
Gymnasium	50	—
Health clubs	55	—
Manufacturing, warehousing, wholesale, utilities	65	—
Movie theater	45	—
<b>Other</b>		
Hospital, school classroom	45	65
Church, library	45	—
Parks	—	65

*Note: See Table F-1 of the existing general plan for a detailed interpretation of information in this table.*

As shown in Table 10-3, average noise is required to be lowest for sensitive land uses such as schools, hospitals, and homes. The existing general plan also contains a land use compatibility matrix related to noise (Table 10-4). The matrix uses four “zones” to describe whether various land uses are compatible or not based on overall noise levels.



- Zone A: Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
- Zone B: New construction or development should be undertaken only after detailed analysis of the noise reduction requirements and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
- Zone C: New construction or development should normally be discouraged. New construction or development may only proceed if a detailed analysis or noise reduction requirements are made, and needed noise insulation features must be included in the design.
- Zone D: New construction or development should generally not be undertaken.

**Table 10-4  
Land Use/Noise Compatibility Matrix**

Land Use	Energy Average (CNEL)						
	≤	55	60	65	70	75	≥80
Single-family residential	A	A	B	B	C	D	D
Mobile home	A	A	B	C	C	D	D
Hotel, motel, transient lodging	A	A	B	B	C	C	D
Commercial retail, Bank, restaurant, movie theater	A	A	A	A	B	B	C
Office building, research & development, professional office, city office building	A	A	A	B	B	C	D
Amphitheater, concert hall, auditorium, meeting hall	B	B	C	C	D	D	D
Children's amusement park, miniature golf, go-cart track, health club, equestrian center	A	A	A	B	B	D	D
Automobile service station, auto dealer, manufacturing, warehousing, wholesale, utilities	A	A	A	A	B	B	B
Hospital, church, library,	A	A	B	C	C	D	D

**Table 10-4  
Land Use/Noise Compatibility Matrix**

Land Use	Energy Average (CNEL)						
	≤	55	60	65	70	75	≥80
school classrooms							
Parks	A	A	A	B	C	D	D
Golf courses, nature centers, cemeteries, wildlife reserves, wildlife habitat	A	A	A	A	B	C	C
Agriculture	A	A	A	A	A	A	A

On the surface, this table appears to convey similar information as Table 10-3, since it shows lists of land uses and acceptable CNEL levels. However, where the noise standards matrix shows the maximum noise that sensitive uses should be exposed to, the land use compatibility matrix indicates that new land uses, in general, should be contemplated in part on a site’s existing noise environment. For example, Table 10-3 shows that there is no maximum exterior noise standard for health clubs. However, Table 10-4 shows that extra scrutiny should be used when siting health clubs in areas with an average CNEL of 65 or louder.

**City of Irvine Single-Event Noise Standard:**

The maximum interior noise levels of the loudest 10% of single noise events [L<sub>max</sub>(10)] for noise sensitive land uses within the 60 CNEL of aircraft and railroad noise sources shall not exceed 65 dBA between 7 a.m. and 7 p.m. nor 55 dBA between 7 p.m. and 7 a.m. for typical occupancy. (Note: The samples for single event noise measurement must include representative aircraft operation.)

**10.3.3.1 Aircraft Noise Compatibility Standards**

As part of the General Plan Noise Element, the City requires that any sensitive land uses in the 60 dBA CNEL contour for aircraft noise also comply with the City’s single-event noise standard (see box at right). The single-event noise standard is a supplemental noise criteria in addition to the Title 21 and Title 24 interior noise standards of 45 dBA CNEL.

**10.3.4 City Noise Ordinance**

The City’s noise ordinance was adopted in 1975 and revised in 2005. Similar to the existing general plan, Title 6, Division 8, Chapter 2, of the municipal code includes noise standards for stationary sources based on land use type. However, these standards also take into account time of day and the duration of noise disturbances. Land uses range from the most (Zone 1) to least (Zone 4) noise sensitive (see Table 10-5).

- Zone 1: All hospitals, libraries, churches, schools, and residential properties



- Zone 2: All professional office and public institutional properties
- Zone 3: All commercial properties excluding professional office properties
- Zone 4: All industrial properties

**Table 10-5  
Municipal Code Noise Standards**

Zone	Time of Day	Location	Noise Level in dBA Not to Be Exceeded for:				
			30 Min.	15 Min.	5 Min.	1 Min.	Any Time
1	7am to 10pm	Exterior	55	60	65	70	75
		Interior	—	—	55	60	65
	10pm to 7am	Exterior	50	55	60	65	70
		Interior	—	—	45	50	55
2	7am to 10pm	Exterior	55	60	65	70	75
		Interior	—	—	55	60	65
3	Anytime	Exterior	60	65	70	75	80
		Interior	—	—	55	60	65
4	Anytime	Exterior	70	75	80	85	90
		Interior	—	—	55	60	65

*Note: See Municipal Code § 6-8-204 for exceptions.*

Table 10-5 establishes the maximum permissible noise level from a stationary source that may intrude onto adjoining property. For residential properties, noise generated offsite is prohibited from exceeding 55 dBA during daytime hours (7:00 am to 10:00 pm) and shall not exceed 50 dBA during the nighttime hours (10:00 pm to 7:00 am) for more than 30 minutes in any hour at the property line. For events of shorter duration, these noise levels are adjusted upward incrementally. As Table 10-5 shows, maximum noise levels are lower

- At night than during the day.
- inside buildings than outside buildings.
- for longer durations than for shorter durations.

In addition to these standards, the Irvine Municipal Code has specific noise regulations for construction and agricultural activities and property maintenance (e.g., leaf blowers).

## 10.4 Existing Conditions

Irvine has large open space areas and is adjacent to wildland, but it is in a highly urbanized part of southern California. Irvine residents experience a complex acoustic environment that includes noise generated by traffic, airplanes, and trains. There are also numerous stationary sources of noise associated with existing development. It should be noted that existing conditions described here are qualitative only and are intended to broadly describe the City's noise setting. Noise measurements were not collected as part of this report, but will be collected as part of the EIR for the general plan update.

### 10.4.1 Ground Transportation Noise

Traffic noise is typically the primary source of noise that affects noise-sensitive land uses. Irvine's circulation system is described in detail in Chapter 5. Existing roadways are shown in Figure 5-1, and existing transit service is shown in Figure 5-4.

#### 10.4.1.1 Freeways

Freeways passing through Irvine generate a substantial amount of unwanted traffic noise, especially during peak commute times. The Santa Ana (I-5) and San Diego (I-405) freeways partially mitigate this noise with extensive use of masonry sound walls. The Eastern Transportation Corridor toll roads (SR-133 and SR-261) are below grade, also mitigating some traffic noise for surrounding land uses. However, the heavy daily traffic on Irvine's freeways means that some level of traffic noise is unavoidable. Furthermore, some residential neighborhoods have been constructed close to the roadways, meaning some homes are particularly impacted by unwanted freeway noise.

Notable problem areas for freeway noise are residential neighborhoods along I-405. Although residential uses are adjacent to almost all freeway segments in the City, I-405 travels through densely populated areas that feature high density housing close to the freeway. These include portions of the Irvine Business Complex (IBC) south of the freeway (such as the Central Park and Park Place communities) and areas near the Irvine Spectrum (such as The Park neighborhood).

Nonresidential sensitive receptors are also near its noisiest freeways:



Sound wall along the I-405.



- Irvine High School adjacent to I-5
- Rancho San Joaquin Middle School adjacent to I-405
- Kaiser Permanente Hospital—opened in 2008—adjacent to I-405 at Sand Canyon Avenue

#### **10.4.1.2 Arterial Roadways**

As described in Chapter 5, the master-planned growth of Irvine has resulted in a distinct street hierarchy that is dependent on large arterial roadways to move large volumes of traffic through the City. These roadways, which are often between four and eight lanes wide, accommodate fast-moving traffic and generate substantial traffic noise. Noise contours for Irvine’s roadway system are shown in Figure 10-1. Arterials in Irvine known for their large traffic volumes and noise levels include:

- Alton Parkway
- Barranca Parkway
- Culver Drive
- Irvine Boulevard
- Irvine Center Drive
- Jamboree Road
- Jeffrey Road
- Sand Canyon Avenue
- University Drive

Recent EIRs for the Irvine Business Complex Vision Plan (2009) in the western part of the City and the Heritage Fields project in the eastern part of the City (2012) show that many of the City’s loudest roadway segments are along Culver Drive, Jamboree Road, and Jeffrey Road. Some of these segments currently experience CNEL values at or near 80 dBA. All three of these roadways are northeast/southwest arterials that traverse large expanses of residential neighborhoods. Although sound walls and lush landscaping buffer homes from roadway noise to some extent, they do not fully mitigate the adverse effects of living next to a noisy corridor.

#### **10.4.1.3 Railroads**

Railroad operations are a potential source of noise and ground vibration. As described in Chapter 5, Irvine is served by regular Amtrak and Metrolink passenger rail services with a station stop, Irvine Station,

near the Spectrum Center in the southeastern portion of the City. Irvine Station is the busiest station in Orange County, serving over one million commuters annually. The railroad that accommodates these rail operations traverses through the central portion of the City. It is also used by BNSF for freight. Noise generated by train engines, wheels, and whistles is an ongoing issue for Irvine residents, especially those in residential neighborhoods adjacent to the railroad (Planning Areas 10, 11, 12, 33, and 40).

The most-notable problem area for sensitive receptors and railroad noise is the segment of railroad between Jamboree Road and Jeffrey Road. This 2.3-mile corridor through the middle of Irvine has a continuous sequence of residential neighborhoods on both sides, as well as Greentree Elementary School and several parks. These are all considered noise-sensitive receptors. Overhead electrical power line easements adjacent to the corridor on the south create somewhat of a buffer for nearby homes. However, residents still experience high levels of railroad noise on both sides of the tracks.

### 10.4.2 Aircraft Noise

Noise from aircraft at the John Wayne Airport (SNA) is produced from takeoffs, flyovers, approaches, and landings. Each of these events results in noise exposure to sensitive receptors near the airport. Figure 10-1 shows the noise contours of SNA in relation to the City's boundary.

Portions of the IBC beneath the flight path of SNA experience the highest exposure to noise from the airport. However, this area is free of sensitive receptors, largely due to compliance with the airport land use compatibility plan. Land uses in the area consist primarily of low-scale light industrial and office buildings. Areas of Irvine in the 60 dBA CNEL boundary for SNA do not contain homes, schools, cultural institutions, or major medical facilities.

### 10.4.3 Stationary Sources

Stationary sources generate noise at all types of land uses. They include landscaping and maintenance activities, air conditioning and ventilation systems, loading and delivery, public address systems, and miscellaneous mechanical and electric equipment. Because Irvine is a large, urbanized city with numerous intensive land uses—such as universities, shopping centers, and industrial parks—it has a complex



and varied acoustic environment. Since most large new developments in the City are subject to discretionary review, their potential role as generators of stationary noise are usually analyzed during the CEQA process.

Notable stationary sources of noise in Irvine include:

- UC Irvine (particularly during special events) – PA 50
- Frank R. Bowerman Landfill (including hauling and earthmoving activities) – PA 3
- Concerts at Irvine Meadows Amphitheater – PA 39
- Industrial and manufacturing facilities (deliveries, mechanical equipment, etc.) – citywide

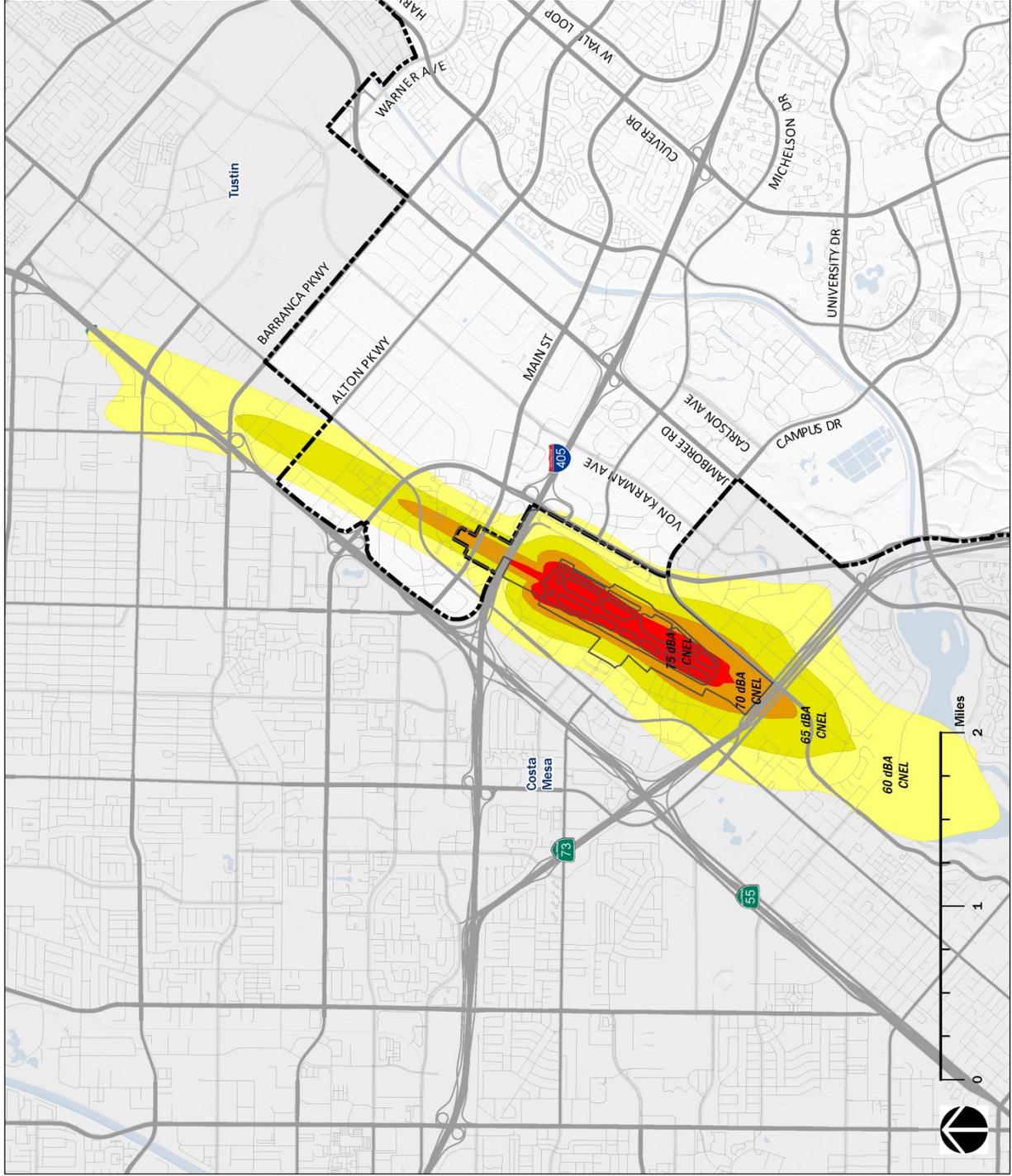
Construction activities on development sites throughout the City also generate noise heard by surrounding land uses.

Figure 10-1

# AIRPORT NOISE CONTOURS

## LEGEND

- JOHN WAYNE AIRPORT 2012 ANNUAL NOISE CONTOURS
- 60 dBA CNEL
  - 65 dBA CNEL
  - 70 dBA CNEL
  - 75 dBA CNEL
  - City Boundary



Source: City of Irvine, 2014;  
Orange County Airport Land Use Commission, N.D.



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## 10.5 Opportunities and Constraints

### 10.5.1 Opportunities

**End of Military Operations in Orange County.** MCAS El Toro and MCAS Tustin were both decommissioned in 1999. The gradual replacement of those installations with civilian uses has eliminated a major source of unwanted noise in Irvine. Although new urban uses on the sites will themselves generate noise, the redevelopment of the MCAS El Toro and MCAS Tustin sites presents an opportunity to separate noise-sensitive land uses from noise-generating land uses.

**New Sound Mitigation Technologies.** The last few years have produced a number of new technologies and strategies for reducing traffic noise—freeway noise in particular. Innovations in window design, building insulation, barrier design, automobile exhaust systems, and jet engines will allow Irvine to mitigate its existing sources of unwanted noise and will offer opportunities to minimize exposure of new land uses to unwanted noise.

### 10.5.2 Constraints

**Increase in Automobile Traffic.** Irvine and southern Orange County will continue to grow. Many cities in the region, including Irvine, aim to increase their jobs-housing balance with the hope that this will reduce commute distances and increase efficiency in the local transportation network. However, even with such gains, traffic and traffic noise is expected to grow on area freeways. Furthermore, planned growth in eastern Irvine—including new land uses and roadways—will introduce new sources of traffic noise in that part of the City.

**Proximity of Growth Areas to Major Sources of Noise.** Planning Area 51, which will be home to the Orange County Great Park and Great Park Neighborhoods, is adjacent to the one of the busiest freeway interchanges in the world (El Toro Y) and to the OCTA-owned railroad that is heavily used by freight and commuter trains. Additional demand for housing in the IBC near John Wayne Airport and the I-405 freeway will create additional noise proximity concerns. Special attention will need to be devoted to minimizing noise for new land uses in the City.

