City of Huntington Beach General Plan Update

Program Environmental Impact Report

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Volume I—Technical Background Reports

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Contents

Volume I—Technical Background Reports

Aesthetics and Visual Resources

This section describes the aesthetics and visual resources within the planning area. The information in this section is based on the existing conditions of the planning area's scenic vistas, scenic resources, landmarks, scenic corridors, and visual character.

ENVIRONMENTAL SETTING

Scenic Vistas

In general, scenic vistas can be defined as viewpoints that provide expansive views of a highly valued landscape for the public's benefit. Scenic vistas within the planning area include views of the Pacific Ocean and the Bolsa Chica Ecological Reserve, which covers approximately 1,400 acres. The Pacific Ocean is considered the planning area's most prominent visual asset. Scenic vistas in the planning area include the following:

- The northwest side of the Bolsa Chica Ecological Reserve includes bluffs that rise to an upland area known as the Bolsa Chica Mesa. The site provides a public vista toward the Bolsa Chica Ecological Reserve and Pacific Ocean.
- The southeast side of the Bolsa Chica Ecological Reserve includes another line of bluffs known as the Huntington Beach Mesa that extends between Pacific Coast Highway and Edwards Street. The bluff top area includes the Harriett M. Wieder Regional Park, and provides views of both the ocean and Bolsa Chica Ecological Reserve.
- A line of low, steep bluffs runs along the face of the beach, on the south side of Pacific Coast Highway, between Seapoint Street south to approximately Pier Plaza. Panoramic views of the ocean, coastline, and Catalina Island can be seen from the bluffs and from several locations on Pacific Coast Highway where the road rises above the adjacent bluff line.
- The Huntington Beach Municipal Pier provides panoramic views of the shoreline, ocean, and islands off the coast.

Scenic Resources

Scenic resources are natural or manmade features that are visually pleasing and contribute to the definition of a community or region. Scenic resources can include trees and landscaping, rock outcroppings, historic buildings, and public art. Scenic resources within the planning area include the following:

- The Pacific Ocean and associated beaches are the planning area's most prominent visual assets. The ocean views from Pacific Coast Highway, peripheral streets, and surrounding neighborhoods and districts enhance the visual quality and ambiance of the planning area and help orient visitors and residents.
- The Bolsa Chica Ecological Reserve and Mesa provide quality views of the wetland marshes and natural wildlife.
- The Huntington Beach Municipal Pier is a definable image of the planning area that is visually pleasing and helps orient visitors and residents. The Municipal Pier also affords views of the shoreline, ocean, and islands off the coast.
- The Huntington Beach Wet Lands area on the northeastern side adjacent to Pacific Coast Highway, south of AES Huntington Beach electrical generating plant and north of the Santa Ana River, provides open space and visual relief along Pacific Coast Highway.

- Huntington Harbour is a visual asset to those residences that front the channel. The concentration of recreational boats and related activity on the waterways provides scenic resources not found elsewhere in the planning area's Coastal Zone. Although limited access makes this asset somewhat exclusive to residents, public access is provided to visitors.

- Huntington Beach Central Park is a visual asset, providing lake areas, landscaping, and natural open space areas.

- Community and neighborhood parks are a visual asset to residents, providing landscaping and open space.

Scenic Corridors

A corridor serves as a channel that facilitates movement—usually by automobile, transit, bicycle, or foot—from one location to another. Because people often spend a significant amount of time in movement and observe their surroundings while doing so, corridors often form the predominant image of the community. The City organizes corridors into two categories. Major corridors carry larger volumes of traffic, typically crossing municipal boundaries, and often are lined by commercial and multiple-family residential uses. Minor corridors carry less traffic, often originate and terminate within the city boundaries, and are predominantly lined by perimeter tract walls that line single-family residential neighborhoods. Figure 1 provides a map of the scenic corridors within the planning area.

Major Corridors

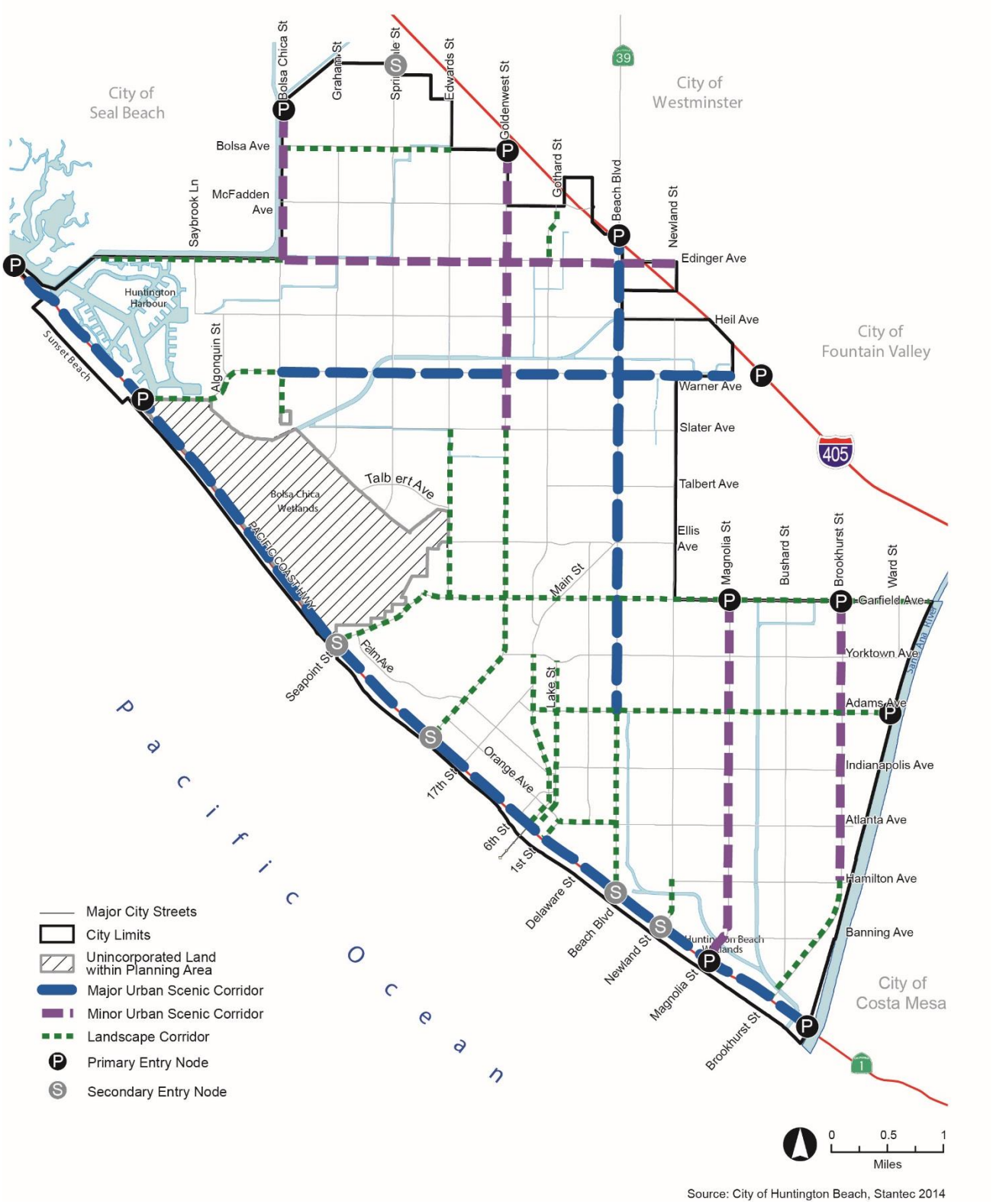
Major corridors generally lack an identifiable sense of place and a well-designed built environment. This can be attributed to inconsistent signage, differing landscapes, and strip commercial centers that lack consistent, quality visual character and are separated from the street by large parking fields. The major corridors include:

- Beach Boulevard
- Warner Avenue
- Pacific Coast Highway

Minor and Landscape Corridors

Minor and Landscape corridors also lack an identifiable sense of place. This can be attributed primarily to the predominance of perimeter tract walls surrounding the adjoining residential neighborhoods and minimal landscaping. The minor and landscape corridors include:

- Bolsa Chica Street (partial)
- Edinger Avenue
- Golden West
- Warner Avenue (partial)
- Magnolia Street
- Brookhurst Street
- Adams Avenue
- Beach Boulevard (partial)
- Lake Street (partial)
- Main Street (partial)
- Seapoint Street/Edwards Street (partial)



Source: City of Huntington Beach, Stantec 2014

FIGURE 1
SCENIC CORRIDORS

Nodes

A node is a significant focal point within a community, such as a plaza or major intersection where significant economic activity occurs. Nodes are located along pathways and often serve as centers of movement and activity at the intersection or convergence of multiple pathways.

The city organizes nodes into two categories. Entry nodes function as points of identity between the city and adjacent jurisdictions and the Interstate 405 (I-405) freeway. Internal nodes serve as focal points of high activity within the community. The city classifies both categories of nodes into primary and secondary locations.

Entry Nodes

Entry nodes provide defined points where visitors, residents, and passersby enter the city from surrounding communities and the I-405 freeway. Over the years, these locations have been poorly defined and not clearly marked, making the transition in visual character between Huntington Beach and adjoining communities difficult to discern.

Major entry nodes include:

- Santa Ana River and Pacific Coast Highway
- Brookhurst Street and Garfield Avenue
- Bolsa Chica Street and Rancho Avenue
- Edinger Avenue and I-405 Freeway/Beach Boulevard
- Warner Avenue and I-405 Freeway
- Goldenwest Street and Bolsa Avenue
- Adams Avenue and Santa Ana River
- Warner Avenue and Pacific Coast Highway
- Magnolia Street and Garfield Avenue
- Pacific Coast Highway and Magnolia Street
- Pacific Coast Highway and Seal Beach city limits

Secondary entry nodes generally experience less traffic or activity than the major entry nodes. Secondary nodes include:

- Springdale Street at city limits
- Goldenwest Street and Pacific Coast Highway
- Pacific Coast Highway and Seapoint Street
- Pacific Coast Highway and Newland Street
- Pacific Coast Highway and Beach Boulevard

Visual Character

Visual character is descriptive and not evaluative, which means that the development traits described are neither good nor bad in and of themselves. The planning area contains several urban districts. A district is defined as an integral part of a larger urban area, with common distinguishing characteristics that make it identifiable as a place unique from other areas of the community. The primary districts within the planning area include commercial, industrial, open space/recreation, and residential uses. Commercial districts occur along major streets or as centers in which multiple uses are consolidated, such as retail centers and commercial corridors. These commercial districts include Downtown, Beach Boulevard, Brookhurst Street, Edinger Avenue, Bella Terra, Pacific Coast Highway (Sunset Beach/Peter's Landing area), Pacific City, and the Five Points area. Industrial districts contain well-defined areas of manufacturing, industrial, and office uses, such as the Orange County Sanitation District treatment facilities and the Boeing campus. Open space/recreational districts throughout the planning area primarily consist of public parks and recreational areas, such as Central Park and the beach. Residential districts are characterized by well-defined single-family and multi-family tracts, often distinguished from each other by entry signs and architecture styles.

The planning area also is characterized by specific plan areas, as shown in Figure 2. Specific plans have been developed to provide the orderly development and improvement of specific areas within the planning area, characterized by their own unique location, features, land uses, and design guidelines. The visual character of each specific plan is summarized in the following sections.

North Huntington Center Specific Plan

The North Huntington Center Specific Plan was adopted in 1975 to facilitate the development of multiple-family residential, commercial retail, and office uses on a 28-acre site in the north-central portion of the planning area.

Seabridge Specific Plan

The Seabridge Specific Plan was adopted in 1982 to provide a policy framework and conceptual maps to develop low-, medium-, and high-density residential uses on a 51-acre site in the central portion of the planning area near the intersection of Beach Boulevard/Adams Avenue.

Huntington Harbour Bay Club Specific Plan

The Huntington Harbour Bay Club Specific Plan was adopted in 1983 to permit the development of residential, commercial, open space, and recreational uses on the Huntington Harbour Bay Club site. The five-acre site is located in the western portion of the planning area.

Downtown Specific Plan

The Downtown Specific Plan was adopted in 1983, and updated in 2009, to create a unique and identifiable Downtown area for the city, and to provide sufficiently flexible regulations and guidelines to accommodate current and future development opportunities within the specific plan area. Downtown encompasses 336 acres in the southcentral portion of the planning area.

Seacliff Specific Plan

The Seacliff Specific Plan was adopted in 1988 to facilitate low-density single-family residential development on a 30-acre site in the western portion of the planning area.

Ellis-Goldenwest Specific Plan

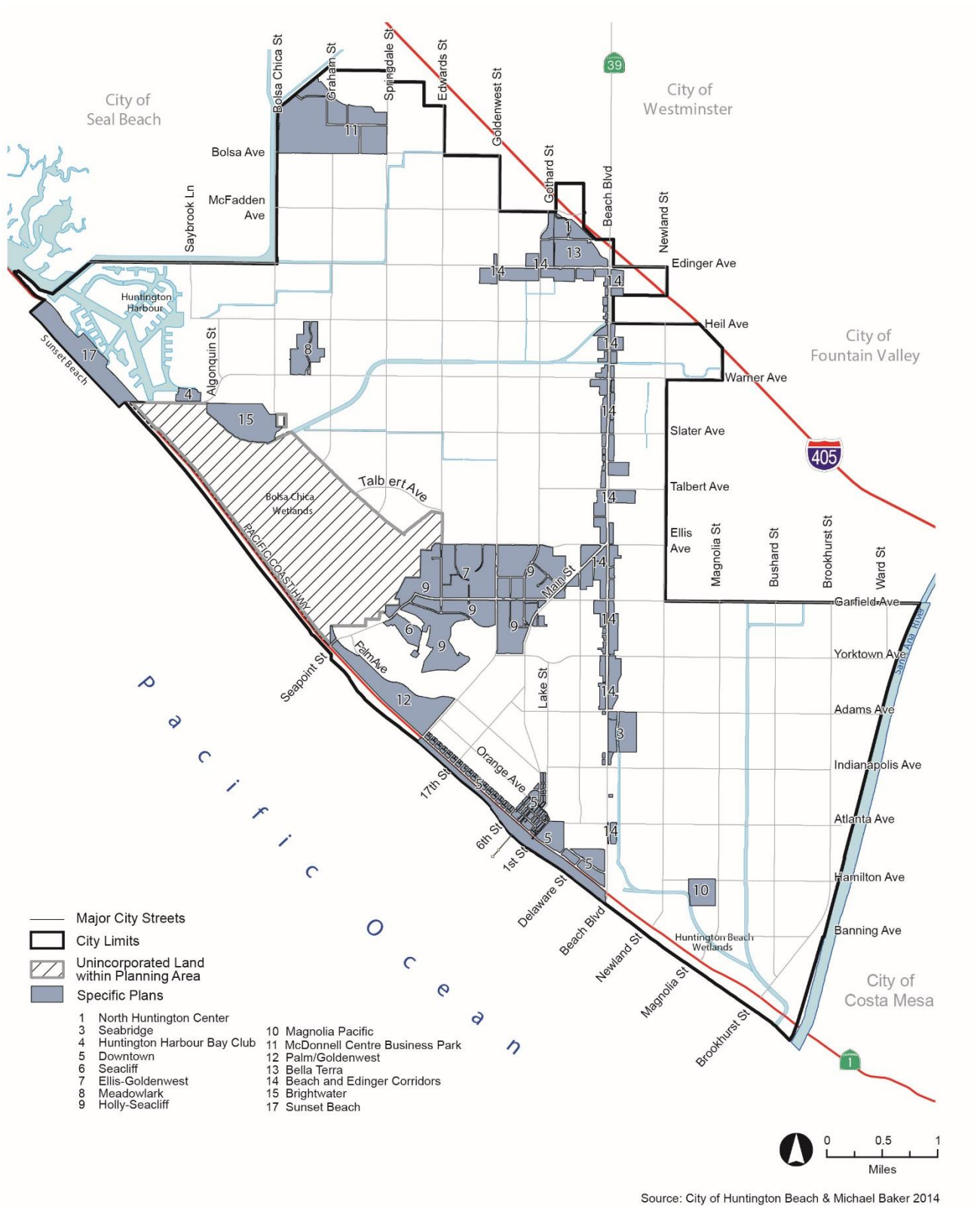
The Ellis-Goldenwest Specific Plan was adopted in 1989 to facilitate the development of an estate residential neighborhood and open space in coordination with existing oil extraction facilities on a 160-acre site located east of the Bolsa Chica Wetlands in the central portion of the planning area.

Meadowlark Specific Plan

The Meadowlark Specific Plan was adopted in 1999 to facilitate the redevelopment of a small craft airport into a residential neighborhood within neighborhood-serving commercial uses on a 65-acre site in the western portion of the planning area.

Holly-Seacliff Specific Plan

The Holly-Seacliff Specific Plan was adopted in 1992 to facilitate the integrated development of low- and medium-density residential, commercial, and industrial uses on a 565-acre site in the central portion of the planning area.



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 2
ADOPTED SPECIFIC PLANS

Magnolia Pacific Specific Plan

The Magnolia Pacific Specific Plan was adopted in 1992 to facilitate the advancement of planned residential development on a 40-acre former landfill site in the southern portion of the planning area. Since that time, the site has undergone significant environmental analysis and study to determine the appropriate cleanup procedures to remediate the site based on the presence of toxic chemicals and substances associated with the ASCON Landfill. As a result of action by the Department of Toxic Substances Control (DTSC), development of residential uses per the specific plan is no longer allowed on the site. A future land use has not yet been determined.

McDonnell Centre Business Park Specific Plan

The McDonnell Centre Business Park Specific Plan was adopted in 1998 to support the development of a planned industrial/business park complex on a 307-acre site in the northwestern portion of the planning area. This area currently includes the Boeing campus and other industrial and office uses.

Palm/Goldenwest Specific Plan

The Palm/Goldenwest Specific Plan was adopted in 2000 to enable the redevelopment of a 150-acre site in the southern portion of the planning area from oil-producing uses to low- and medium-density residential and visitor-serving commercial and recreational uses.

Bella Terra Specific Plan

The Bella Terra Specific Plan was adopted in 2000 to facilitate the redevelopment of a regional commercial retail center to a lifestyle center and mixed-use development with residential and commercial uses. The 63-acre site is located in the northern portion of the planning area.

Beach and Edinger Corridors Specific Plan

The Beach and Edinger Corridors Specific Plan was adopted in 2010 to promote mixed-use development and to orchestrate improvements and aesthetic enhancements to the city's two primary commercial corridors. The specific plan area occupies 458 acres in the central portion of the planning area.

Brightwater Specific Plan

The Brightwater Specific Plan was adopted in 2007 to facilitate the annexation and development of a 106-acre site on the western edge of the Bolsa Chica Wetlands. The plan allows for the development of low- and medium-density residential neighborhoods. The area has been annexed into the city but the Specific Plan has not been certified by the California Coastal Commission (CCC).

Sunset Beach Specific Plan

The Sunset Beach Specific Plan was adopted in 2010, and amended in 2015, to establish development regulations and administrative procedures for the previously unincorporated community of Sunset Beach. The site is a 134-acre residential community located in the western portion of the planning area. Annexation of Sunset Beach into the city occurred on August 22, 2011. However, the city is still working with the California Coastal Commission to update the Local Coastal Program (LCP) for this portion of the planning area.

Light and Glare

Glare results from sharply reflected light caused by sunlight or artificial light reflecting from highly finished surfaces, such as window glass or brightly colored surfaces. The types of land uses that are typically sensitive to excess light and glare include residential, hospitals, senior housing, and other types of uses where excessive light and glare may disrupt sleep. In addition, light and glare may interfere with the vision of drivers. A variety of sources within the planning area produce artificial light, including streetlights, illuminated signs, automobile headlights, security lights associated with buildings and parking lots, and interior and exterior lighting from developments.

Shade or Shadow

Prolonged periods of shade and shadowing can negatively affect the character of certain land uses. Shadow-sensitive uses generally include routinely used outdoor spaces associated with residential, recreational, or institutional land uses; commercial uses, such as pedestrian-oriented outdoor spaces or restaurants with outdoor seating areas; nurseries; and existing solar collectors/panels.

Shadows are cast in a clockwise direction from west-northwest to east-northeast from approximately 7:00 a.m. to 4:00 p.m. depending on the time of the year. The spring equinox is March 19 or 20, summer solstice is June 20 or 21, autumn equinox is September 22 or 23, and winter solstice is December 20 or 21. The shortest shadows are cast during the summer solstice and grow increasingly longer until the winter solstice when they reach their maximum lengths. One- to three-story mid-rise buildings are the primary source of prolonged shadows within the planning area.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws related to visual resources apply to the planning area.

State Plans, Policies, Regulations, and Laws

Caltrans Scenic Highway Program

The California Department of Transportation (Caltrans) Scenic Highway Program protects and enhances the natural scenic beauty of California's highways and corridors through special conservation treatment. Caltrans defines a scenic highway as any freeway, highway, road, or other public right-of-way that traverses an area of exceptional scenic quality. Caltrans designates a scenic highway by evaluating how much of the natural landscape a traveler sees and the extent to which visual intrusions degrade the scenic corridor. No officially designated scenic highways are located within the planning area; however, the Pacific Coast Highway is eligible for designation.

Regional and Local Ordinances

Huntington Beach Urban Design Guidelines

On September 5, 2000, the Huntington Beach City Council approved the Urban Design Guidelines for the planning area. The Urban Design Guidelines promote high-quality development that will implement goals, objectives, and policies of the General Plan for orderly development; enhance the planning area's unique identity and character and contribute to a positive city image; contribute to a positive physical image and identity of the planning area; maintain and protect the value of property; and maintain a high quality of life without causing unnecessary high public or private costs for development or unduly restrict private enterprise, initiative, or innovation in design.

Huntington Beach Zoning and Subdivision Ordinance

The 1997 Zoning and Subdivision Ordinance established development standards for all land to be developed in the planning area. These standards address permitted uses, minimum parcel sizes, building heights, densities, setbacks, parking, landscape, and other requirements, which ultimately shape the form of the planning area.

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Agriculture and Forestry Resources

This section describes the agricultural and forestry resources within the planning area. The information in this section is based on the Existing Land Use Technical Report prepared by Michael Baker International[1].

Environmental Setting

The planning area is approximately 29.6 square miles in area and is located with the northwestern portion of Orange County along the Pacific Ocean. The city is bounded by the Pacific Ocean to the west, the city of Seal Beach to the north, the cities of Westminster and Fountain Valley to the east, and the cities of Newport Beach and Costa Mesa to the south. The planning area boundaries are irregularly shaped with a base that extends along the coast for approximately 9.5 miles. The planning area is urbanized and mostly built-out with the exception of open space scattered throughout the planning area intended to provide residents and visitors with parks, beaches, commercial recreational uses, habitat conservation areas, cemeteries, water recreation uses, and agriculture.

Agricultural land uses are still present in the planning area; however, agricultural lands have been replaced largely by residential, commercial, and industrial development, and related infrastructure. There are approximately 81 acres of agricultural land (or less than 1 percent of land in the planning area) existing in the planning area. These lands are primarily nurseries, located in the southeastern portion of the city (Figure 1)[2] within Southern California Edison owned right of way areas designated as Public by the General Plan land use map. No portion of the planning area is designated or zoned as forest land or timberland. The Huntington Beach Zoning and Subdivision Ordinance allows a residential agricultural district to serve as a transition or holding zone for property with existing agricultural activities, and as a zone where restricted residential development is permitted. Although this zone is no longer codified in the Huntington Beach Zoning and Subdivision Ordinance, there are several locations throughout the planning area that still have a residential agricultural designation on the zoning map, with the largest concentration of residential agricultural-zoned parcels occurring in the southeastern portion of the planning area[3].

Regulatory Framework

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws related to agricultural resources apply to the planning area.

State Plans, Policies, Regulations, and Laws

Farmland Mapping and Monitoring Program

The California Department of Conservation, Division of Land Resources Protection, administers the Farmland Mapping and Monitoring Program (FMMP). The FMMP produces agricultural resource inventories and maps that rate agricultural lands based on soil quality, irrigation status, and land use within California. These ratings are used to help prioritize farmland conservation efforts. The inventories and maps are updated every two years, and were last updated in 2012. The FMMP uses the term "Farmland of Statewide Importance" and "Prime Farmland" to describe parcels that meet certain criteria. There is no Farmland of Statewide Importance or Prime Farmland located within the planning area[4].

1 Michael Baker International. 2014. Existing Land Use Technical Report for the City of Huntington Beach General Plan Update. August.
2 Ibid
3 Huntington Beach, City of. 2014. City of Huntington Beach Zoning Map. August.
4 California Department of Conservation. 2014. Farmland Mapping and Monitoring Program California Important Farmland Finder. Accessible at http://maps.conservation.ca.gov/ciff/

Williamson Act

The Williamson Act is an agricultural conservation tool. Under the Williamson Act, local governments can enter into contracts with private property owners to protect land for agricultural and open space purposes. There are no Williamson Act contracts within the planning area[5].

California Department of Forestry and Fire Protection's Fire and Resource Assessment Program

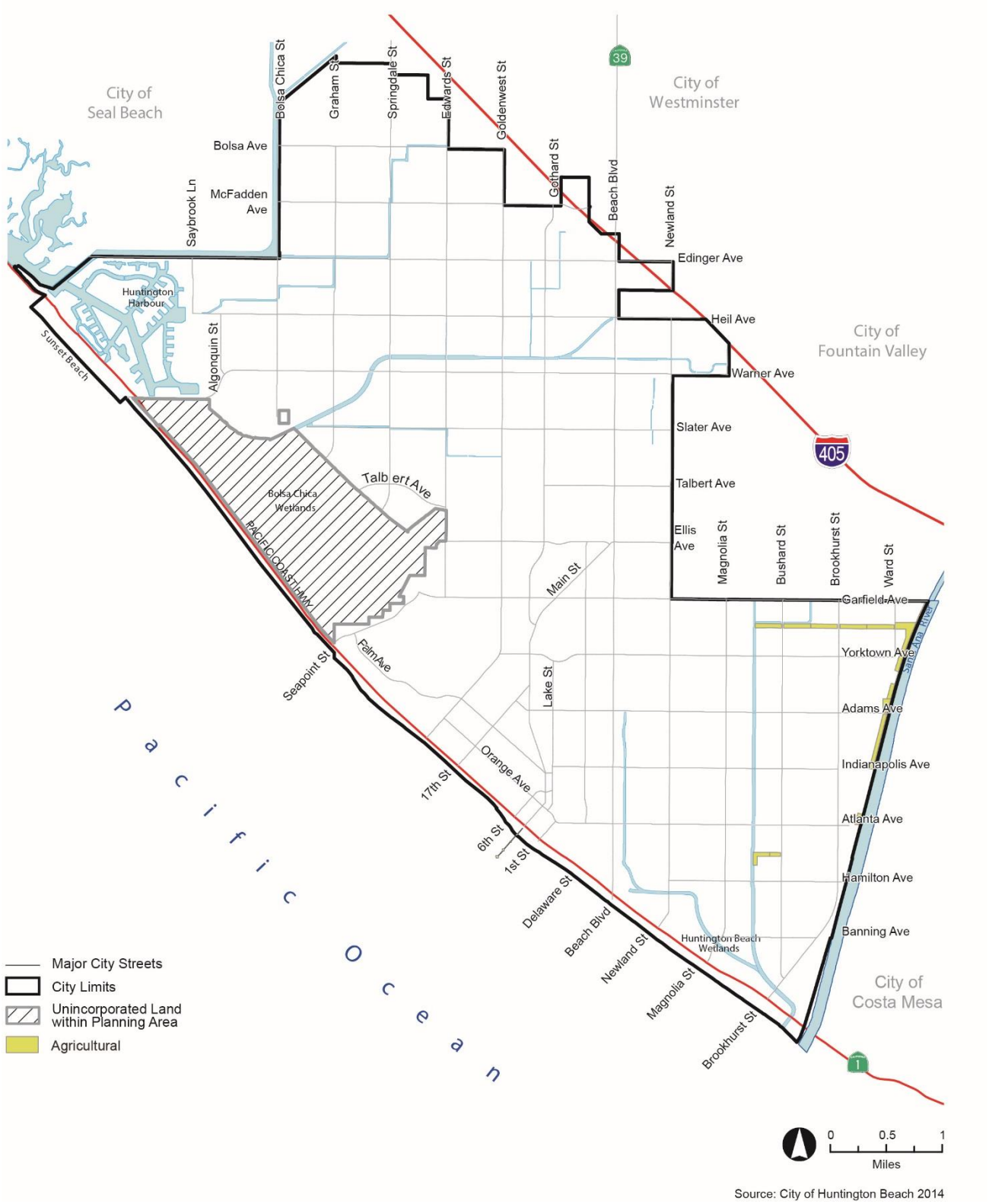
The California Department of Forestry and Fire Protection (Cal Fire) is dedicated to the stewardship of more than 31 million acres of California's privately owned wildland[6]. In addition to providing wildfire emergency services, Cal Fire enforces laws that regulate logging on privately owned lands in California. Cal Fire's government-appointed body, the Board of Forestry and Fire Protection, is charged with protecting the forest resources of all the wildland areas of California that are not under federal jurisdiction. These resources include major commercial and non-commercial stands of timber, areas reserved for parks and recreation, the woodland, brush-range watersheds, and all such lands in private and state ownership that contribute to California's forest resource wealth. According to Cal Fire's Fire Resource Assessment Program, the planning area is not within the boundaries of a State Forest, and does not include any lands designated or zoned as forest land or timberland that would be considered a forestry resource[7].

Regional and Local Ordinances

Huntington Beach Municipal Code Title 20 – Title 25

The City of Huntington Beach Zoning Code (Huntington Beach Municipal Code Title 20 – Title 25) is the primary implementation tool for the General Plan Land Use Element. The Zoning Code consists of two parts: the official Zoning Map dividing the city into zones consistent with General Plan land use designations, and text establishing development standards for each zone, including permitted uses, density and intensity of uses, building height, performance standards, and other regulations.

5 California Department of Conservation, Division of Land Resource Protection. 2013. State of California Williamson Act Contract Land.
6 California Department of Forestry and Fire (Cal Fire). 2012. Cal Fire Protection Programs. Accessible at http://calfire.ca.gov/index.php
7 Cal Fire. 2006. Fire and Resource Assessment Program State of California Land Cover Map.



Source: City of Huntington Beach 2014

FIGURE 1
AGRICULTURAL LAND USE

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Air Quality

This section describes the existing air quality conditions within the South Coast Air Basin—the air basin within which the city of Huntington Beach is located. The air quality information in this section is based on the Existing Circulation Conditions Technical Report prepared by Stantec[1] and the Greenhouse Gas (GHG) Emissions Inventory Technical Report prepared by Michael Baker International[2]. Additionally, the air quality information in this section is based on various sources, including the South Coast Air Quality Management District (SCAQMD), the California Air Resources Board (ARB), and the U.S. Environmental Protection Agency (EPA).

ENVIRONMENTAL SETTING

The planning area is approximately 29.6 square miles in area and is located within the northwestern portion of Orange County along the Pacific Ocean. The planning area is bound by the Pacific Ocean to the southwest, Seal Beach to the northwest, Westminster to the north, Fountain Valley to the northeast, and Costa Mesa to the east. The planning area boundaries are irregularly shaped with a base that extends along the coast for approximately 9.5 miles. The planning area is located within the southern portion of the South Coast Air Basin (Basin), which is a subregion of the SCAQMD's jurisdiction, and is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties[3].

The extent and severity of the air pollution problem within the Basin are a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of air pollutants throughout the Basin. The Basin contains California's largest metropolitan region. Pollutant concentrations in parts of the Basin are among the highest in the nation. The area includes the southern two-thirds of Los Angeles County, all of Orange County, and the western urbanized portions of Riverside and San Bernardino Counties. The Basin covers a total of 6,480 square miles, is home to more than 42 percent of California's population, and generates about 24 percent of the state's total nitrogen oxides emissions and approximately 16 percent of the state's total Fine Particulate Matter ($PM_{2.5}$) emissions[4].

The SCAQMD is the air pollution control agency principally responsible for comprehensive air pollution control within a 10,743-square mile area consisting of the South Coast Air Basin, and the Riverside County portions of the Salton Sea Air Basin and Mojave Desert Air Basin. The SCAQMD is a regional agency that works directly with county transportation commissions and local governments, and cooperates actively with all federal and state government agencies. The SCAQMD develops rules and regulations, establishes permitting requirements, inspects emissions sources, and enforces such measures through educational programs or fines, when necessary.

Ambient concentrations of air pollutants are determined by the types and quantities of emissions released and the atmosphere's ability to transport, transform, and dilute those emissions. Natural factors that affect transport, transformation, and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in a given area are determined by such natural factors as topography,

1 Stantec. 2014. Existing Circulation Conditions Technical Report Traffic Study for the City of Huntington Beach General Plan Update. August.
2 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory Technical Report for the City of Huntington Beach General Plan Update. August.
3 South Coast Air Quality Management District (SCAQMD). 2016. Draft Final Air Quality Management Plan. December 2016. Accessed February 9, 2017 at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draft-final-aqmp/strikeout/2016finaldraftaqmpdec2016(strikeout).pdf?sfvrsn=24
4 California Air Resources Board (ARB). 2013. Area Designation Maps/ State and National. June 2013. Accessed July 31, 2014 at http://www.arb.ca.gov/desig/adm/adm.htm

meteorology, and climate, in addition to the types and quantities of the emissions that are released by a variety of sources.

Topography, Climate, and Meteorology

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific Ocean. As a result, the climate consists of a semi-arid environment with mild winters, warm summers, moderate temperatures, and comfortable humidity. Precipitation is limited to a few winter storms. The usually mild climate pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The average annual temperature varies little throughout the Basin, averaging 75 degrees Fahrenheit (°F). However, with a less pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures greater than 100 °F in recent years.

Although the Basin has a semi-arid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as “high fog,” are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically 9 to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

The topography and climate of southern California combine to make the Basin a high air pollution potential area. The high-pressure zone restricts the movement of cooler air, resulting in the formation of temperature inversions that hamper the vertical dispersion of air pollutants in the Basin. High-pressure systems, such as the semi-permanent high-pressure zone in which the Basin is located, are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler, marine-influenced air near the ground surface, and resulting in the formation of subsidence inversions. Such inversions restrict the vertical dispersion of air pollutants released into the marine layer and, together with strong sunlight, can produce worst-case conditions for the formation of photochemical smog.

The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to be transported away from coastal areas in the Basin. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement of pollutants in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal areas of the Basin. Usually, inversions are lower before sunrise than during the day. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone observed during summer months in the Basin. Smog in southern California generally results from temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods, allowing them to form secondary pollutants by reacting with sunlight. These pollutants have a limited ability to disperse from the Basin due to typically low wind speeds. While there are clear skies and sunshine over the project area, it is still susceptible to air inversions.

Criteria Air Pollutants

Air pollution comes from many different sources: (1) stationary sources such as factories, power plants, and dry cleaners; (2) mobile sources such as cars, planes, and trains; and (3) naturally occurring sources such as windblown dust and volcanoes. The potential for atmospheric pollution in an area depends largely on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and low inversions produces the greatest concentration of air pollutants. The warm sunny weather in the Basin associated with a persistent high-pressure system is conducive to the formation of ozone and other oxidative pollutants, commonly referred to as “smog.” The problem is further aggravated by the surrounding mountains, frequent low inversion heights, and stagnant air conditions. All of these factors act together to trap pollutants in the Basin. On days without inversions, or on days of winds averaging more than 15 miles per hour, smog potential is greatly reduced.

An ambient (outside) air quality standard is the definition of "clean air." A standard establishes the concentration above which a pollutant is known to cause adverse health effects to sensitive groups, such as children and the elderly. The ARB and EPA currently focus on the following air pollutants as indicators of ambient air quality: ozone (O_3), particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). Because these are the most prevalent air pollutants known to be deleterious to human health and extensive documents describing their health effects are available, they are commonly referred to as "criteria air pollutants." Both the California and federal governments have adopted health-based standards for criteria air pollutants. Air quality standards are expressed as a measure of the amount of pollutant per unit of air. For example, the PM standards are expressed as micrograms per cubic meter ($\mu g/m^3$), and the ozone standards are expressed in parts per million (ppm)[5].

Determining whether a region's air quality is healthy or unhealthy relies on comparing contaminant levels in ambient air samples to the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS). Both the ARB and EPA use monitoring data to determine the Basin's attainment status with respect to the CAAQS and NAAQS to identify areas with air quality problems and initiate improvement efforts. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used for an area that cannot be classified based on available information. The current CAAQS and NAAQS (as of June 2013) are shown in Table 1. In addition, Table 1 shows the area's current attainment designations.

Per-capita emissions have been reduced substantially in the Basin through 40 years of air quality controls. However, increases in the population over that time have made substantial overall emission reductions more difficult. Many pollution sources, including automobiles, have been significantly controlled. However, increases in the number of sources, particularly those growing proportionately to population, reduce the potential air quality benefits of new controls. Currently, millions of people live in nonattainment areas for one or more of the six criteria air pollutants[6]. Sources and health effects associated with each of the criteria air pollutants are summarized in Table 2. Table 3 presents the standards and local monitoring data for ambient air quality from the Anaheim-Pampas Lane weather station, which is approximately 20 miles northeast of the planning area.

5 ARB. 2009a. The California Almanac of Emissions and Air Quality 2008 Edition. Sacramento, CA. Accessed July 31, 2014, at http://www.arb.ca.gov/aqd/almanac/almanac09/ almanac09.htm

6 U.S. Environmental Protection Agency (EPA). 2012. Criteria Air Pollutant Information. March 20, 2012. Accessed July 31, 2014 at http://www.epa.gov/air/urbanair/

TABLE 1
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California[1] Standard[3]	California[1] Attainment Status	National[2] Standards[3,4]	National[2] Attainment Status
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Nonattainment	N/A	N/A[5]
	8 Hours	0.070 ppm (137 µg/m^3)	N/A	0.075 ppm (147 µg/m^3)	Extreme Nonattainment
Particulate Matter (PM_{10})	24 Hours	50 µg/m^3	Nonattainment	150µg/m3	Serious Nonattainment
	Annual Arithmetic Mean	20 µg/m^3	Nonattainment	N/A	Serious Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	24 Hours	No Separate State Standard		35 µg/m^3	Nonattainment
	Annual Arithmetic Mean	12 µg/m^3	Nonattainment	15.0 µg/m^3	Nonattainment
Carbon Monoxide (CO)	8 Hours	9.0 ppm (10 µg/m^3)	Attainment	9 ppm (10 µg/m^3)	Unclassified/ Attainment/ Maintenance
	1 Hour	20 ppm (23 µg/m^3)	Attainment	35 ppm (40 µg/m^3	Unclassified/ Attainment/ Maintenance
Nitrogen Dioxide (NO_2)[5]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Nonattainment	0.053 ppm (100 µg/m^3)	Attainment/ Maintenance
	1 Hour	0.18 ppm (339 µg/m^3)	Nonattainment	100 ppb (188 µg/m^3)	Attainment/ Maintenance
Lead (Pb)[7,8]	30 days Average	1.5 µg/m^3	Attainment	N/A	N/A
	Calendar Quarter	N/A	N/A	1.5 µg/m^3	Attainment
	Rolling 3-Month Average	N/A	N/A	0.15 µg/m^3	Attainment
Sulfur Dioxide (SO_2)[6]	24 Hours	0.04 ppm (105 µg/m^3)	Attainment	0.14 ppm (certain areas)	Attainment
	3 Hours	N/A	N/A	N/A	Attainment
	1 Hour	0.25 ppm (655 µg/m^3)	Attainment	75 ppb (196 µg/m^3)	N/A
	Annual Arithmetic Mean	N/A	N/A	0.30 ppm (certain areas)	Attainment
Visibility Reducing Particles[9]	8 Hours (10 a.m. to 6 p.m., PST)	Extinction coefficient = 0.23 km@<70% RH	Unclassified	No National Standards	
Sulfates	24 Hour	25 µg/m^3	Attainment		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Unclassified		
Vinyl Chloride[7]	24 Hour	0.01 ppm (26 µg/m^3)	N/A		

µg/m^3 = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; km = kilometer(s); RH = relative humidity; PST = Pacific Standard Time; N/A = Not Applicable

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas; torr in this table refers to method of measuring pressure where 1 torr= 133.322368 pascals.

[4] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[5] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion. California standards are in units of parts per million. To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.

[6] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until

Pollutant	Averaging Time	California[1] Standard[3]	California[1] Attainment Status	National[2] Standards[3,4]	National[2] Attainment Status

one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of parts per billion. California standards are in units of parts per million. To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[7] ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[8] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[9] In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: ARB 2013

TABLE 2
COMMON SOURCES OF HEALTH EFFECTS FOR CRITERIA AIR POLLUTANTS

Pollutants	Sources	Health Effects
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in sunlight	Aggravation of respiratory and cardiovascular diseases; reduced lung function; increased cough and chest discomfort
Fine Particulate Matter (PM_{10} and $PM_{2.5}$)	Stationary combustion of solid fuels; construction activities; industrial processes; atmospheric chemical reactions	Reduced lung function; aggravation of respiratory and cardiovascular diseases; increases in mortality rate; reduced lung function growth in children
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust; natural events, such as decomposition of organic matter	Aggravation of some heart diseases; reduced tolerance for exercise; impairment of mental function; birth defects; death at high levels of exposure
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust; high temperature stationary combustion; atmospheric reactions	Aggravation of respiratory illness
Sulfur Dioxide (SO_2)	Combination of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ore; industrial processes	Aggravation of respiratory diseases; reduced lung function
Lead (Pb)	Contaminated soil, paint	Behavioral and hearing disabilities in children; nervous system impairment

Source: SCAQMD 2005 and EPA 2012

TABLE 3
SUMMARY OF ANNUAL AMBIENT AIR QUALITY DATA (2009–2013): ANAHEIM-PAMPAS LANE WEATHER STATION

Pollutant	Averaging Time	Federal Primary Standards	California Air Quality Standards	Maximum Concentrations[1]					Number of Days Exceeding National Standard[2]					Number of Days Exceeding State Standard[2]				
				2009	2010	2011	2012	2013	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Ozone (O_3)	1 hour	Revoked[3]	0.09 ppm	**0.093**	**0.104**	0.088	0.079	0.084	Revoked					0	1	0	0	0
	8 hour	0.075 ppm	0.07 ppm	**0.077**	**0.088**	**0.073**	0.067	0.070	1	1	0	0	0	2	1	1	0	0
Fine Particulate Matter (PM_{10})[6]	24 hours	150 µg/m^3	50 µg/m^3	**62**	43	**53**	48	**77**	0	0	0	0	0	*	*	12.2	0	5.7
	Annual	Revoked[4]	20 µg/m^3	-	-	-	-	-	-	-	-	Revoked		-	-	-	-	-
Fine Particulate Matter ($PM_{2.5}$)	24 hours	35 µg/m^3	None	**64.5**	31.7	**39.2**	**50.1**	**37.8**	4	0	2	4	1	-	-	-	-	-
	Annual	12 µg/m^3	12 µg/m^3	11.7	10.1	10.9	10.8	10.0	-	-	-	-	-	-	-	-	-	-
Nitrogen Dioxide (NO_2)	1 hour[5]	0.180 ppm	0.100 ppm	0.068	0.073	0.074	0.067	0.082	0	0	0	0	1	0	0	0	0	0
	Annual	0.053 ppm	0.030 ppm	0.018	*	*	0.014	*	0	0	0	0	0	0	0	0	0	0

Highlighted in Blue = above California Standards
Highlighted in Green = above National Standards
Highlighted in Red= above both standards
"-" = data not available or applicable.
"" = insufficient data to determine the value.*

(1) *Concentration units for O_3, CO, SO_2, and NO_2 are in ppm. Concentration units for PM_{10} and $PM_{2.5}$ are in micrograms per cubic meter (µg/m^3). State maximum values are reported.*

(2) *A value of 1 indicates that the standard has been exceeded.*

(3) *The national 1-hour O_3 standard was revoked in June 2005.*

(4) *The national annual PM_{10} standard was revoked in December 2006.*

(5) *The national 1-hour NO_X standard is exceeded if the 3-year average of the 98th percentile of the daily maximum 1-hour average exceeds 0.100 ppm (effective January 22, 2010).*

(6) *Information for PM_{10} was not available at the Orange County level so the PM_{10} information was taken from the Anaheim-Pampas Lane weather station (approximately 13 miles northeast)*

Source: ARB 2010c

Ozone

The Basin is located in both a national and state non-attainment area for ozone, as shown in Table 1. The closest weather station to the city is the Anaheim-Pampas Lane weather station located approximately 20 miles northeast in the city of Anaheim, and is used as a proxy for the planning area. As shown in Table 3, ambient air monitored by the Anaheim-Pampas Lane weather station exceeded the national standards for 8-hour ozone in 2009 and 2010, exceeded the state standards for 8-hour ozone in 2009, 2010, and 2011, and exceeded the state standards for 1-hour ozone in 2009 and 2010. The ambient air monitored at the station was at a level less than the state standard for 1-hour ozone in 2010 and less than the national and state attainment status for ozone in 2012 and 2013. However, the 2013 ozone data are close to the national and state thresholds established for the 1-hour and 8-hour ozone pollutant levels.

Overview

Ozone is a photochemical oxidant and the primary component of smog. Ozone is formed through complex chemical reactions between precursor emissions of volatile organic compounds (VOC), reactive organic gases (ROG), and oxides of nitrogen (NO_X) in the presence of sunlight. VOC emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. ROGs are classes of organic compounds that react to form photochemical smog or ozone. VOCs and ROGs are closely related and both contribute to the formation of ozone. However, air districts choose to monitor either VOCs or ROGs, and the SCAQMD monitors VOCs. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high VOC and NO_X levels are present to sustain the ozone formation process. After the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is considered a regional pollutant.

Ozone located in the upper atmosphere (stratosphere) shields the Earth from harmful ultraviolet radiation emitted by the sun. Ozone located in the lower atmosphere (troposphere) is a health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for ozone formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry[7].

The adverse health effects associated with exposure to ozone relate primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect both sensitive receptors, such as asthmatics and children, and healthy adults. Exposure to ambient levels of ozone ranging from 0.10 ppm to 0.40 ppm for one to two hours has been found to substantially alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes (the amount of air inhaled and exhaled), and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to these adverse health effects, evidence exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increased response of the respiratory system to challenges and a decrease in the immune system's ability to defend against infection[8].

Trends

The number of days the state 8-hour ozone standard has been exceeded within the Basin has been fairly constant in the past decade, ranging from 124 to 154 days per year from 2000 to 2010. The number of days above the national 8-hour standard initially decreased over the same time period, ranging from 126 days in 2000 to 108 days in 2007, but increased again to 119 days in 2008. This is partially explained because the national 8-hour standard was lowered to 0.075 ppm in 2008, and as a result, exceedance days are higher than in previous years. The days above the national 8-hour standard during the last decade ranged from

7 Godish, T. 2004. Air Quality. Lewis Publishers. Boca Raton, FL.
8 Ibid

102 to 133 days per year. It should be noted that the lowest number of exceedance days per year (102 days) within that period occurred in 2010. The number of days above the state 1-hour standard has decreased slightly in the past decade, and ranged from 79 to 125 days per year over the same time period. Again, the lowest number of days above the state 1-hour standard (79 days) occurred in 2010[9]. Continued implementation of aggressive emission control measures is expected to reduce ozone formation throughout the Basin.

Particulate Matter

Respirable PM with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. Fine particulate matter ($PM_{2.5}$) is a subgroup of PM_{10}, consisting of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less[10]. The planning area is located in a state non-attainment area but is within a national attainment area for PM_{10}, as identified in Tables 1 and 3. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations; fires and natural windblown dust; and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and VOC[11]. In addition, the planning area is located in both a national and state non-attainment area for $PM_{2.5}$, as identified in Tables 1 and 3. Sources of $PM_{2.5}$ include all types of combustion activities, such as motor vehicles, power plants, and wood burning; crushing and grinding operations; and dust from paved or unpaved roads. $PM_{2.5}$ is also created from gases resulting from burning fuels for industrial processes, which react with sunlight and water vapor in the atmosphere[12].

Overview

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulate matter (referred to as the "piggybacking effect") or with fine dust particles of silica or asbestos. Generally, effects may result from both short-term and long-term exposure to elevated concentrations of PM_{10} and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death[13]. $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Trends

Direct emissions of PM_{10} have been increasing in the Basin since 1975. This is a result of increases in emissions from area-wide sources in the Basin, including fugitive dust from paved and unpaved roads, dust from construction and demolition operations, and other sources. The increase in activity of these area-wide sources reflects the increased population and employment growth as well as vehicle miles traveled (VMT) in the Basin[14].

Although PM_{10} concentrations in the Basin have somewhat stabilized in the last decade, ambient concentrations still exceed the state annual and 24-hour PM_{10} standards (137 estimated days above the 24-hour state standard in 2010 versus 248 days in 2000). For $PM_{2.5}$, it was estimated that the national 24-hour standard was exceeded eight days in 2010 versus 96 days in 2000[15]. While emission controls

9 ARB. 2014. Ozone Trends Summary: South Coast Air Basin. Accessed July 31, 2014 at http://www.arb.ca.gov/adam/trends/trends1.php
10 SCAQMD. 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan
11 U.S. EPA. 2012. Criteria Air Pollutant Information. March 20, 2012. Accessed July 31, 2014 at http://www.epa.gov/air/urbanair/
12 U.S. EPA. 2014a. Fine Particle (PM2.5) Designations: Frequent Questions. Accessed August 21, 2014 at http://www.epa.gov/airquality/particlepollution/designations/faq.htm
13 U.S. EPA. 2014b. Fine Particle (PM2.5) Designations: Frequent Questions. Accessed August 21, 2014 at http://www.epa.gov/airquality/particlepollution/health.html
14 SCAQMD. 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan
15 ARB. 2012. Highest 4 Daily PM10 Averages. Accessed July 31, 2014 at http://www.arb.ca.gov/adam/topfour/topfour1.php

implemented for ozone are also expected to reduce PM_{10} concentrations, additional controls will be needed to reach attainment[16].

Concentrations of $PM_{2.5}$ have decreased in the Basin in the past decade. Measures adopted as part of the upcoming $PM_{2.5}$ State Implementation Plan and programs to reduce ozone and PM from diesel-fueled engines will help reduce public exposure to $PM_{2.5}$ in this region[17].

Carbon Monoxide

The planning area is located in an area that meets both national and state CO standards, as identified in Table 1.

Overview

CO is a colorless, odorless, and poisonous gas produced by incomplete combustion of carbon in fuels, primarily from mobile (transportation) sources. In 2011, no areas of the Basin exceeded the CO air quality standards. The highest concentrations of CO continued to be recorded in Los Angeles County, where vehicular traffic is most dense[18].

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO include dizziness, headaches, fatigue, and at higher concentrations, death. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases[19].

The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, which is a regional pollutant, CO tends to cause localized problems. Achieving the CAAQS and NAAQS standards for CO are rarely a problem at the regional level, but can be exceeded when ideal conditions exist (e.g., large numbers of idling vehicles and poor air dispersion).

Trends

CO concentrations in the Basin have decreased by more than 72 percent in the peak 8-hour indicator since 1988. Since 2003, there have been no exceedance days for either the state or national standard, and the entire Basin is now designated as attainment for both CO standards. Ongoing reductions from motor vehicle control programs should continue this downward trend in ambient CO concentrations[20].

Nitrogen Dioxide

The planning area is located in both a national and state attainment area for NO_2, as identified in Tables 1 and 3.

Overview

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices such as boilers, gas turbines, and mobile and stationary reciprocating internal-combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2[21]. Because NO_2 is formed and depleted by photochemical reactions associated with smog, NO_X, which represents both NO and NO_2, often is used as

16 SCAQMD. 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan
17 Ibid
18 Ibid
19 U.S. EPA. 2010. Risk and Exposure Assessment to Support the Review of the Carbon Monoxide Primary National Ambient Air Quality Standards: Second External Review Draft:171. February. Accessed July 31, 2014 at http://www.epa.gov/ttn/naaqs/standards/co/data/COREA2ndDraft Feb2010.pdf
20 SCAQMD. 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan
21 U.S. EPA. 2012. Criteria Air Pollutant Information. March 20, 2012. Accessed July 31, 2014 at http://www.epa.gov/air/urbanair/

a surrogate for NO_2. Measuring only NO_2 concentrations in a particular area may not adequately describe local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms including coughing, difficulty breathing, vomiting, headache, and eye irritation during or shortly after exposure. After approximately four to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment, with such symptoms as chronic bronchitis and decreased lung functions[22].

Trends

Over the last 20 years, NO_2 emissions have decreased in the Basin. The peak 1-hour indicator for 2007 was more than 67 percent lower than what it was during 1988. In 2000, the maximum 1-hour concentration registered in the Basin was 0.214 µg/m^3, with three days above the state standard. Ten years later in 2010, the maximum 1-hour concentration registered in the Basin was 0.118 µg/m^3, with zero days above the state 1-hour standard[23]. The Basin attained the state 1-hour NO_2 standard in 1994, bringing the entire state into attainment. The national annual average standard has not been exceeded since 1991.

NO_2 is formed from NO_X emissions, which also contributes to ozone. As a result, the majority of future NOx emission control measures will be implemented as part of the overall ozone control strategy. Many of these control measures will target transportation sources, which account for more than 80 percent of regional NO_X emissions. These control measures, set and implemented by the SCAQMD, would need to reduce regional NOx emissions by 65 percent by 2023 and 75 percent by 2032 from 2008 levels to attain the national 8-hour ozone standard[24].

Sulfur Dioxide

The planning area is located in an area that meets both national and state SO_2 standards, as identified in Table 1.

Overview

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring from inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects[25]. Asthmatics are more sensitive to the irritant effects of SO_2 than non-asthmatics, especially when exercising or when in cold, dry air. Some allergic or atopic individuals and people with Reactive Airway Disease Syndrome (i.e., acute, irritant-induced asthma) also may be more sensitive to SO_2 irritation[26].

Trends

The Basin is in attainment for SO_2. SO_2 emissions can be created through the burning of high sulfur-containing fuels by locomotives, large ships, and non-road equipment. Emission levels of SO_2 have decreased since 1975, due mainly to the switch from fuel oil to natural gas for electric generation and to reduced fuel-sulfur content. Increased SO_2 emissions in the Basin are projected to result from increased

22 Office of Environmental Health Hazard Assessment (OEHHA). 2010. Acute, 8-hour and Chronic Reference Exposure Level Summary. Accessed July 31, 2014 at http://oehha.ca.gov/air/allrels.html
23 ARB. 2012. Highest 4 Daily PM10 Averages. Accessed July 31, 2014 at http://www.arb.ca.gov/adam/topfour/topfour1.php
24 SCAQMD. 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan
25 U.S. EPA. 2012. Criteria Air Pollutant Information. March 20, 2012. Accessed July 31, 2014 at http://www.epa.gov/air/urbanair/
26 OEHHA. 2010. Acute, 8-hour and Chronic Reference Exposure Level Summary. Accessed July 31, 2014 at http://oehha.ca.gov/air/allrels.html

shipping activities at both the Port of Los Angeles and the Port of Long Beach, both major shipping hubs in the region[27].

Sensitive Land Uses

Sensitive land uses (or sensitive receptors) are areas where people most susceptible to respiratory distress are located. This includes sensitivities such as asthmatics, the elderly, children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise who are more susceptible to the effects of air pollution than the general population. Sensitive land uses that are in proximity to localized sources of toxic air contaminants or CO are of particular concern.

Some land uses are considered more sensitive to changes in air quality than others depending on the population groups and the activities involved. Land uses that may contain a high concentration of sensitive receptors include residential areas, hospitals, day-care facilities, elder-care facilities, elementary schools and parks. Existing and planned sensitive receptor land uses located throughout the planning area include single and multi-family residential homes, schools, parks, medical facilities and day care facilities.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

U.S. Environmental Protection Agency

The EPA is responsible for setting and enforcing the NAAQS for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government. NAAQS standards identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. The criteria pollutants are ozone, CO, NO_2 (which is a form of NO_X), SO_2 (which is a form of sulfur oxides), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively) and lead. The EPA has classified air basins (or portions thereof) as being in "attainment," "non-attainment," or "unclassified" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because there is insufficient data to designate an area, or designations have yet to be made.

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan that demonstrates the means to attain the federal standards. The plan must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the plan.

Federal Clean Air Act

The federal Clean Air Act (CAA), as amended, establishes air quality standards for several pollutants. These standards are divided into primary standards and secondary standards. Primary standards are designed to protect public health, and secondary standards are intended to protect public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. The CAA requires that regional plans be prepared for non-attainment areas illustrating how the federal air quality standards could be met. In 1994, the California ARB approved the most recent revision of the State Implementation Plan, and submitted the plan to the EPA for approval. In 1996, the plan was approved by the EPA, and contained a list of ROG and NOx control measures for demonstrating future attainment of ozone standards. The steps to achieve attainment will continue to require significant emissions reductions in both stationary and mobile sources.

The EPA is responsible for implementing the CAA, which was first enacted in 1955 and amended numerous times after. The CAA established federal air quality standards known as the NAAQS. These standards

27 ARB. 2009a. The California Almanac of Emissions and Air Quality 2008 Edition. Sacramento, CA. Accessed July 31, 2014 at http://www.arb.ca.gov/aqd/almanac/almanac09/almanac09.htm

identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. The criteria pollutants are ozone, CO, NO_2 (which is a form of NO_X), SO_2 (which is a form of sulfur oxides), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively) and lead.

The EPA has classified air basins (or portions thereof) as being in "attainment," "non-attainment," or "unclassified" for each criteria air pollutant, based on whether or not the NAAQS have been achieved. If an area is designated unclassified, it is because there is insufficient data to designate an area, or designations have yet to be made. For the Basin's attainment status, refer to Table 1, National and California Ambient Air Quality Standards. The CAA (and its subsequent amendments) requires each state to prepare an air quality control plan, which is referred to as the State Implementation Plan (SIP). The CAA amendments dictate that states containing areas violating the NAAQS revise their SIPs to include extra control measures to reduce air pollution. The SIP includes strategies and control measures to attain the NAAQS by deadlines established by the CAA. The SIP is periodically modified to reflect the latest emissions inventories, plans, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The EPA has the responsibility to review all SIPs to determine if they conform to the requirements of the CAA.

State Plans, Policies, Regulations, and Laws

California Air Resources Board

The ARB is responsible for the coordination and administration of both federal and state air pollution control programs in California. The ARB also has the primary responsibility for the development of California's SIP. The CAA allows states to adopt ambient air quality standards and other regulations provided that they are at least as stringent as federal standards. The CAAQS were established in 1969 pursuant to the Mulford-Carrell Act. These standards generally are more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility reducing particulates, hydrogen sulfide and sulfates. The Resources Board also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved.

California Clean Air Act

The California Clean Air Act (CCAA), which was approved in 1988, requires that each local air district prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. The CCAA also requires that by the end of 1994 and once every three years thereafter, the air districts are to assess their progress toward attaining the air quality standards. The triennial assessment is to report the extent of air quality improvement and the amounts of emission reductions achieved from control measures for the preceding three-year period. The AQMPs also serve as the basis for preparation of the State Implementation Plan for the state of California. Like the EPA, the Resources Board also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved.

Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data show that a state standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events are not considered violations of a state standard, and are not used as a basis for designating areas as nonattainment. Under the CCAA, the Basin is designated as a nonattainment area for ozone, PM_{10}, and $PM_{2.5}$. The Basin is designated as an attainment area for CO, NO_2, SO_2, and lead.

Regional and Local Ordinances

South Coast Air Quality Management District

The SCAQMD is one of 35 air districts in California and is the agency principally responsible for comprehensive air pollution control in the Basin. To that end, the SCAQMD, a regional agency, works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, and cooperates actively with all federal and state government agencies.

The SCAQMD develops rules and regulations, establishes permitting requirements, inspects emissions sources, and enforces such measures through educational programs or fines, when necessary.

The SCAQMD and SCAG prepared the 2012 AQMP, which addresses federal and state CAA requirements. The 2012 AQMP was approved on January 25, 2013, by the SCAQMD and the ARB. The purpose of the 2012 AQMP for the Basin is to set forth a comprehensive and integrated program that will lead the Basin into compliance with the national 24-hour $PM_{2.5}$ air quality standard, to provide an update to the Basin's commitments toward meeting the national 8-hour ozone standards, and to establish programs and integrate planning efforts of all levels of government to reduce levels of common air pollutants. The 2012 AQMP also serves to satisfy the EPA as the State Implementation Plan and serves as the SCAQMD portion of the official SIP submittal for the national 2006 24-hour $PM_{2.5}$ standard. Finally, the AQMP updated specific new control measures and commitments for emissions reductions to implement that attainment strategy for the 8-hour ozone State Implementation Plan and helped to reduce reliance on long-term measures. The 2012 AQMP established programs which require integrated planning efforts and the cooperation of all levels of government: local, regional, state, and federal in order to reduce levels of common air pollutants.

The 2012 AQMP includes new information on key elements such as current air quality; improved emission inventories, especially significant increases in mobile source emissions; an overall control strategy comprised of stationary and mobile source control measures, SCAQMD, federal and state stationary and mobile source control measures, and the SCAG Regional Transportation Strategy and Control Measures; new attainment demonstration for $PM_{2.5}$ and ozone; milestones to the Federal Reasonable Further Progress Plan; and preliminary motor vehicle emission budgets for transportation conformity purposes.

In addition to the 2012 AQMP, and rules and regulations set by the SCAQMD, the SCAQMD published the California Environmental Quality Act (CEQA) *Air Quality Handbook*, which provides guidance to assist local government agencies and consultants in developing the environmental documents required by CEQA. With the help of the CEQA *Air Quality Handbook*, local land use planners and other consultants are able to analyze and document how proposed and existing projects affect air quality, and should be able to fulfill the requirements of the CEQA review process. SCAQMD is in the process of developing an *Air Quality Analysis Guidance Handbook* to replace the current CEQA *Air Quality Handbook* approved by the SCAQMD Governing Board in 1993.

Southern California Association of Governments

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties, and serves as a forum for regional issues relating to transportation, the economy, community development and the environment. SCAG serves as the federally designated metropolitan planning organization for the southern California region, and is the largest metropolitan planning organization in the United States. With respect to air quality planning, SCAG has prepared the Regional Comprehensive Plan and Guide for the region, which includes Growth Management and Regional Mobility chapters that form the basis for the land use and transportation control portions of the 2012 AQMP. SCAG is responsible under the CAA for determining transportation conformity of projects, plans and programs with the SCAQMD.

Lead State Implementation Plan

The 2012 Lead State Implementation Plan for Los Angeles County outlines the control strategies for lead emission sources, describes lead air quality and inventory in southern Los Angeles County, and describes planning and pollution control activities to demonstrate attainment of the Lead NAAQS no later than December 31, 2015. Rule 1420, "Emissions Standards for Lead," was adopted September 11, 1992, and its goal is to reduce emissions of lead from non-vehicular sources. Rule 1420.1 was adopted to establish additional requirements for large facilities that process more than 50,000 tons of lead annually, including an ambient lead concentration limit of 0.15 $\mu g/m^3$.

SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules that may be applicable in the planning area include the following:

- ***Rule 401—Visible Emissions.*** A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the U.S. Bureau of Mines, or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subparagraph (b)(1)(A) of this rule.

- ***Rule 402—Nuisance.*** A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

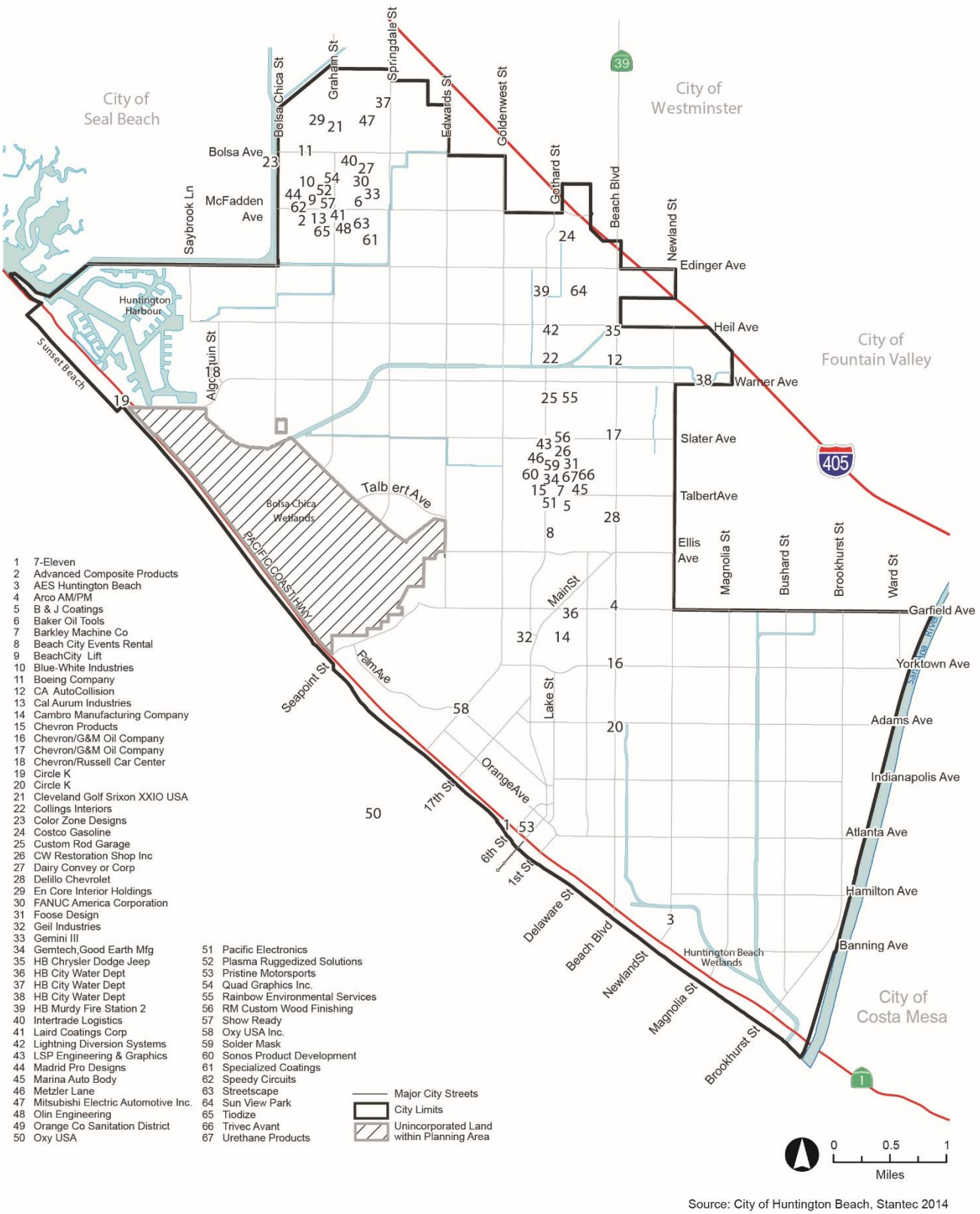
- ***Rule 403—Fugitive Dust.*** This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust.

- ***Rule 445—Wood-Burning Devices.*** This rule prohibits permanently installed wood burning devices in any new development. A wood burning device means any fireplace, wood burning heater, or pellet-fueled wood heater, or any similarly enclosed, permanently installed, indoor or outdoor device burning any solid fuel for aesthetic or space-heating purposes, which has a heat input of less than one million British thermal units per hour.

- ***Rule 1113—Architectural Coatings.*** No person shall apply or solicit the application of any architectural coating within SCAQMD, with VOC content in excess of the values specified in a table incorporated in the Rule.

- ***Rule 1120—Asphalt Pavement Heaters***. A person shall not operate an asphalt pavement surface heater or an asphalt heater-remixer for the purpose of maintaining, reconditioning, reconstructing or removing asphalt pavement unless certain criteria are met.

In addition to the rules listed above, SCAQMD has developed an air quality guidance document with suggested measures to reduce the amount of fugitive dust that is re-entrained into the atmosphere from unpaved areas, parking lots and construction sites (SCAQMD 2005:5-2–5-3).



1 7-Eleven
2 Advanced Composite Products
3 AES Huntington Beach
4 Arco AM/PM
5 B & J Coatings
6 Baker Oil Tools
7 Barkley Machine Co
8 Beach City Events Rental
9 BeachCity Lift
10 Blue-White Industries
11 Boeing Company
12 CA AutoCollision
13 Cal Aurum Industries
14 Cambro Manufacturing Company
15 Chevron Products
16 Chevron/G&M Oil Company
17 Chevron/G&M Oil Company
18 Chevron/Russell Car Center
19 Circle K
20 Circle K
21 Cleveland Golf Srixon XXIO USA
22 Collings Interiors
23 Color Zone Designs
24 Costco Gasoline
25 Custom Rod Garage
26 CW Restoration Shop Inc
27 Dairy Convey or Corp
28 Delillo Chevrolet
29 En Core Interior Holdings
30 FANUC America Corporation
31 Foose Design
32 Geil Industries
33 Gemini III
34 Gemtech,Good Earth Mfg
35 HB Chrysler Dodge Jeep
36 HB City Water Dept
37 HB City Water Dept
38 HB City Water Dept
39 HB Murdy Fire Station 2
40 Intertrade Logistics
41 Laird Coatings Corp
42 Lightning Diversion Systems
43 LSP Engineering & Graphics
44 Madrid Pro Designs
45 Marina Auto Body
46 Metzler Lane
47 Mitsubishi Electric Automotive Inc.
48 Olin Engineering
49 Orange Co Sanitation District
50 Oxy USA
51 Pacific Electronics
52 Plasma Ruggedized Solutions
53 Pristine Motorsports
54 Quad Graphics Inc.
55 Rainbow Environmental Services
56 RM Custom Wood Finishing
57 Show Ready
58 Oxy USA Inc.
59 Solder Mask
60 Sonos Product Development
61 Specialized Coatings
62 Speedy Circuits
63 Streetscape
64 Sun View Park
65 Tiodize
66 Trivec Avant
67 Urethane Products

Source: City of Huntington Beach, Stantec 2014

FIGURE 1
TAC EMITTERS

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Biological Resources

This section describes the biological resources within the planning area. The information in this section is based on the existing conditions of the planning area's topography and hydrology, soils, climate, and plant and wildlife habitats.

METHODOLOGY

Several steps were taken to characterize the sensitive biological resources in the planning area. Existing published documentation was reviewed to identify the spatial distribution of special-status species habitat and other sensitive biological resources in the planning area. Unpublished data and reports were provided by resource agency staff.

Pertinent databases were queried to identify special-status species with the potential to occur in the area, including:

- U.S. Fish and Wildlife Service (USFWS) Information Planning and Conservation System (IPaC)[1]
- USFWS's Critical Habitat Portal[2]
- California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB)[3]
- California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California[4]

The USFWS IPaC System was queried to identify special-status species within the jurisdiction of the USFWS that have the potential to occur within the planning area. In addition, the USFWS Critical Habitat Portal was queried to identify designated critical habitat within one mile of the planning area. A query of the CNDDB provided a list of known occurrences for special-status species within a five-mile radius of the planning area. Lastly, the CNPS database was queried to identify special-status plant species with the potential to occur within the Seal Beach and Newport Beach, California, USGS 7.5-minute quadrangles.

Natural communities were delineated utilizing a variety of resources, including U.S. Forest Service Pacific Southwest Region CALVEG Vegetation Classification and Mapping data from 2013, aerial photo interpretation[5], a field evaluation, and a review of previous environmental documents.

Biological Resources Task Force meetings were held on January 29, 2014, and July 17, 2014. Task Force input was collected to help verify the important biological resources within the planning area.

Following the Task Force meeting, Michael Baker International biologists conducted a field evaluation during the week of February 24, 2014. The field evaluation involved ground-truthing the preliminary natural community map, preparing a detailed characterization of the composition of each identified community, evaluating the potential of each community to support wildlife, and preparing an informal delineation of aquatic features.

Additional outreach to state and federal agencies and local organizations was conducted following the field evaluation to collect detailed information on biological resources within the planning area.

1 U.S. Fish and Wildlife Service (USFWS). 2014a. Information, Planning, and Conservation System (IPaC). Accessed January 20.
2 USFWS. 2014b. Critical Habitat Portal. Accessed March 12.
3 California Department of Fish and Wildlife (CDFW). 2014a. California Natural Diversity Database – January 7, 2014 update. Sacramento: CDFW Biogeographic Data Branch.
4 California Native Plant Society (CNPS). 2014. Inventory of Rare and Endangered Vascular Plants of California (online edition, v8-01a). Sacramento: CNPS. Accessed January 20.
5 Google Earth. 2014. Google Earth Version 7.1.2.2041.

ENVIRONMENTAL SETTING

Regional Setting

The planning area is located within the Southern California Coast ecological section of the California Coastal Chaparral Forest and Shrub ecological province. The landscape of the Southern California Coast section is characterized by narrow ranges and broad fault blocks, as well as coastal terraces and alluviated lowlands. Predominant cover types in this section consist of chaparral, coastal sagebrush, southern oak forest, and valley oak savannah[6].

The Southern California Coast section is further subdivided into 10 subsections, including the Los Angeles Plain subsection, which includes the planning area. The subsection comprises the mountains, hills, alluvial fans, marine terraces, and floodplains located south of the San Gabriel Mountains. The subsection includes the Los Angeles Basin, San Fernando Valley, Verdugo Mountains, San Rafael Hills, and Palos Verdes Hills. Soils are predominantly well drained. Vegetation is largely characterized by California sagebrush—California buckwheat series and mixed sage series, with coast live oak series and California walnut series common, but not extensive. California sycamore series is common in riparian areas, and pickleweed series occurs in coastal salt marsh areas such as San Pedro Bay. At higher elevations, chamise and mixed chaparral shrublands dominate[7].

Topography and Hydrology

The planning area is characterized by broad, sandy beaches backed by low bluffs and mesas, and lowland areas that historically held extensive wetlands. There are two mesas within the planning area: Huntington Beach Mesa (to the south), and Bolsa Chica Mesa (to the north). The Bolsa Chica Gap is a lowland area separating the mesas, and includes Bolsa Bay and the Bolsa Chica Wetlands. Sunset Gap is located north of the Bolsa Chica Mesa, and includes Huntington Harbour and Anaheim Bay.

The planning area is associated with the Santa Ana Watershed (HUC 18070203). The Santa Ana River borders the planning area to the southeast and the Bolsa Chica and Anaheim-Barber City channels border the planning area to the north. Several other flood control channels traverse the planning area, including the Sunset, Westminster, Ocean View, East Garden Grove-Wintersburg, Huntington Beach, Talbert, and Fountain Valley channels. All surface water in the planning area ultimately drains into the Pacific Ocean via storm drains, flood control channels, and the Santa Ana River.

Soils

Soil types within the planning area vary in composition, drainage ability, and parent material, thus influencing which species of plants will grow in an area, including rare plants. The Natural Resources Conservation Service (NRCS) Web Soil Survey identifies 29 soil types within the planning area, as shown in Figure 1[8]. The mesas in the planning area comprise mostly the Bolsa and Hueneme soil types, whereas lowland areas are a mix of Marina, Myford, and Omni soil types.

Climate

Local climate data were obtained from the Western Regional Climate Center Historical Climate Information[9] for the Newport Beach Harbor station (046175).

6 McNab, W.H., D.T. Cleland, J.A. Freeouf, J.E. Keys, Jr., G.J. Nowacki, and C.A. Carpenter, comps. 2007. Description of ecological subregions: sections of the conterminous United States. General Technical Report WO-76B. Washington, DC: USDA, Forest Service.

7 Goudey, Charles B., and Scott R. Miles. 1998. Ecological Subregions of California: Section & Subsection descriptions. Major contributions by Earl B. Alexander and John O. Sawyer. UDSA, Forest Service, Pacific Southwest Region.

8 Natural Resources Conservation Service (NRCS). 2014. Web Soil Survey. Accessed April 14. Accessed at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

9 National Oceanic and Atmospheric Administration (NOAA). 2014a. Local Online Weather data – Newport Beach, CA. Reno, NV: WRCC. Accessed March 11. http://www.nws.noaa.gov/climate/xmacis.php?wfo=rah.

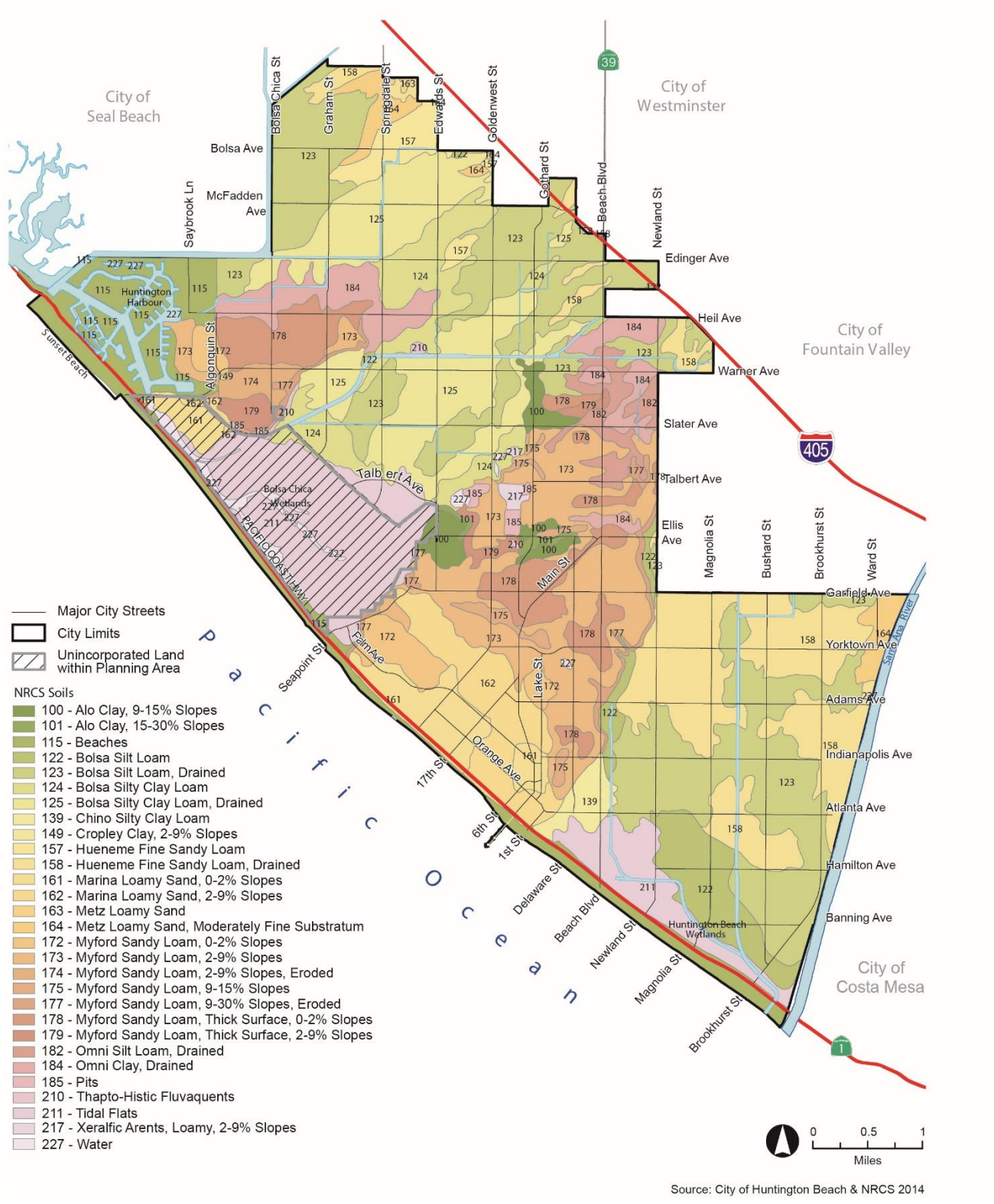


FIGURE 1
NRCS SOIL TYPES

The planning area is characterized by a Mediterranean climate with warm, hot, dry summers and cool, wet, rainy winters. Precipitation that falls as rain ranges from an average high of 2.30 inches in February to a low of 0.01 inches in July, for a total average annual rainfall of 11.0 inches. Average temperatures range from a high of 68.5 degrees Fahrenheit in August to a low of 55.2 degrees Fahrenheit in January.

Plant Communities and Wildlife Habitats

The planning area comprises a mix of urban land uses along with natural community types, including southern coastal salt marsh, annual grassland, coastal sage scrub, sandy beach, southern foredunes, southern dune scrub, willow riparian, freshwater emergent wetland, and eucalyptus groves. It also includes aquatic habitats such as marine waters, flood control channels, and other open waters. Urban land uses include residential, commercial, and industrial development, as well as open space with landscaped parks.

The natural communities designations are derived from *Preliminary Descriptions of the Terrestrial Natural Communities of California*[10]. Urbanized plant communities are derived from *A Guide to Wildlife Habitats of California*[11].

Table 1 summarizes the acreages of each natural and urbanized plant community in the planning area, which then are illustrated in Figure 2.

TABLE 1
NATURAL AND URBANIZED PLANT COMMUNITIES OCCURRING WITHIN THE PLANNING AREA

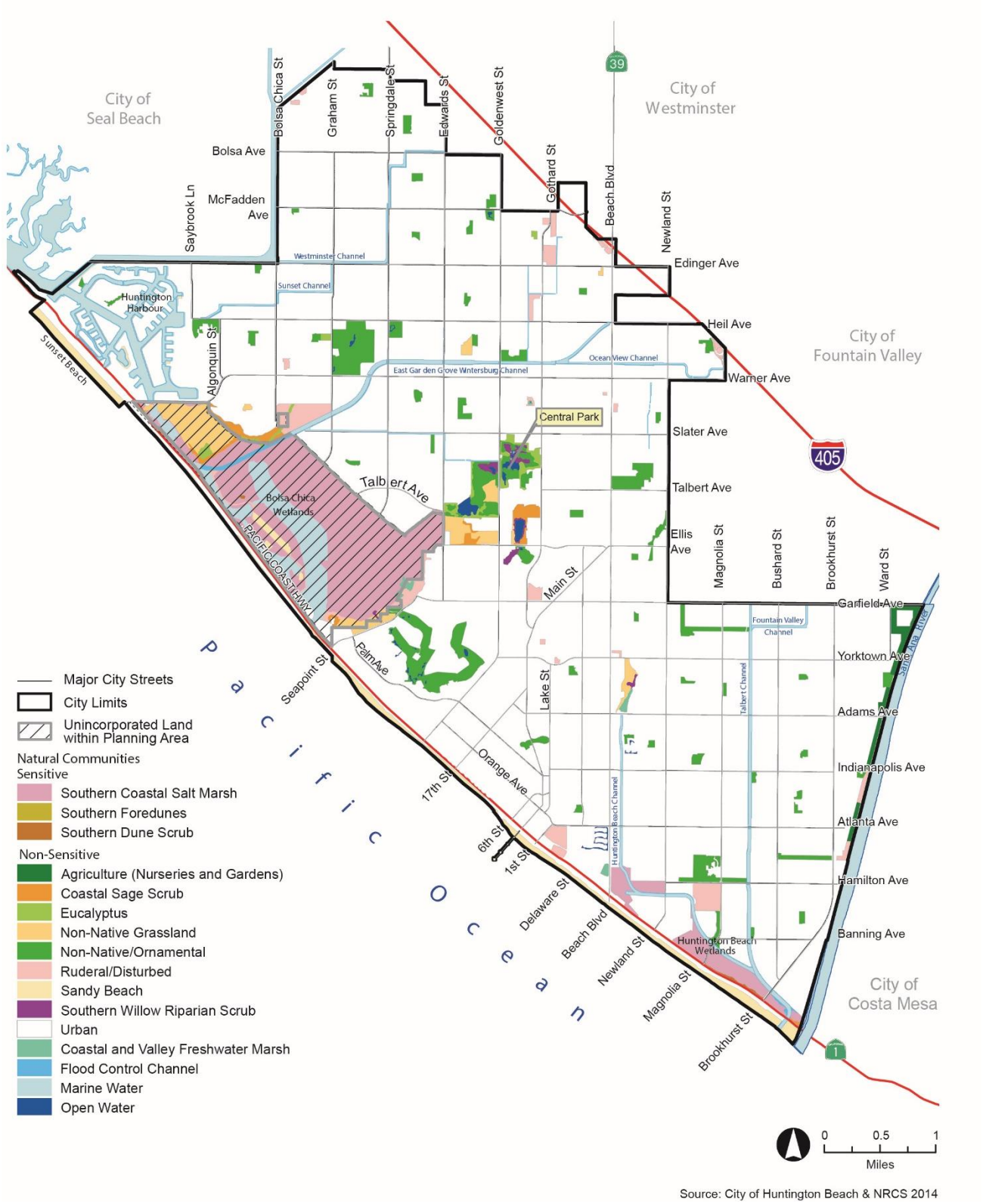
Natural Community	Area (acres)
Southern Coastal Salt Marsh*	1,068
Southern Foredunes*	6
Southern Dune Scrub*	4
Marine Water	546
Sandy Beach	291
Southern Willow Riparian Scrub	32
Non-Native Grassland	225
Coastal Sage Scrub	77
Coastal and Valley Freshwater Marsh	18
Urban	15,477
Non-Native/Ornamental	607
Eucalyptus	61
Ruderal/Disturbed	231
Agricultural (Nurseries and Gardens)	58
Flood Control Channels	263
Santa Ana River	N/A
Total Planning Area	18,964

Source: Data compiled by Michael Baker International, 2014

** Identified as a sensitive natural community by the CDFW.*

10 Holland, Robert F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Sacramento: California Department of Fish and Game Resources Agency.

11 CDFW. 2014d. A Guide to Wildlife Habitats of California (online edition). Sacramento: CDFW Biogeographic Data Branch CA. Accessed March 14. http://www.dfg.ca.gov/biogeodata/cwhr/wildlife_habitats.asp.



Source: City of Huntington Beach & NRCS 2014

FIGURE 2
VEGETATION COMMUNITIES

Sensitive Natural Communities

Sensitive natural communities include those that are of special concern to resource agencies. Four communities deemed sensitive by the CDFW were revealed in a query of the CNDDB, including southern coastal salt marsh, southern dune scrub, southern foredunes, and southern cottonwood willow riparian forest. All of these occur within the planning area except the southern cottonwood willow riparian forest, which has been extirpated due to channelization of the Santa Ana River.

In addition to the sensitive communities called out by the CDFW, there are several Environmentally Sensitive Habitat Areas (ESHAs) within the planning area. These are protected areas in the coastal zone that are designated by the California Coastal Commission, and include two areas in the Bolsa Chica Ecological Reserve: Warner Pond and the Northern Eucalyptus Grove[12] [13].

Finally, eelgrass (*Zostera marina*) habitat has been identified as a sensitive marine resource by the National Marine Fisheries Service, CDFW, and USFWS. Eelgrass beds function as refuges, nursery habitats, and foraging areas for various coastal and bay fishes and invertebrates. Eelgrass grows from the level of low tide to a depth of approximately 20 feet[14]. Eelgrass beds can be found in the Bolsa Chica Ecological Reserve, as well as in the Huntington Beach Wetlands and adjoining flood control channels[15] [16]. Eelgrass was transplanted during restoration efforts and the spread of this species is an indicator of successful salt marsh restoration.

Southern Coastal Salt Marsh

Southern coastal salt marsh is considered a sensitive natural community by the CDFW. This vegetative community is characterized by the presence of low-growing, salt-tolerant perennial herbaceous and shrubby plants that endure tidal inundation by sea water. This community can be found in bays, lagoons, and estuaries along the Southern California coast from Point Conception southward to the Mexican border. The southern coastal salt marsh community comprises tidal mudflats, pickleweed flats, alkali heath flats, salt pannes, saltgrass flats, eelgrass beds, and open water. This marsh community supports four distinct zones: low marsh that is inundated by virtually every high tide and supports primarily pickleweed (*Salicornia pacifica*) with some cordgrass (*Spartina* sp.); middle marsh, which is inundated by the highest tides and dominated by pickleweed with saltgrass (*Distichlis spicata*) and alkali heath (*Frankenia salina*); upper marsh, which is rarely inundated and dominated by pickleweed; and upland coastal sage scrub transition areas. Portions of this community have been heavily disturbed by oil drilling and tidal disruption.

This community comprises the bulk of the Bolsa Chica Ecological Resource and makes up the Huntington Beach Wetlands, including Talbert Marsh, Newland Marsh, Magnolia Marsh, and Brookhurst Marsh. Plants are primarily halophytic (salt tolerant), and include pickleweed, alkali heath, saltwort (*Batis maritima*), and saltgrass. The suite of plants changes at the meeting of salt marsh and dune habitats, and includes spiny rush (*Juncus acutus*), bulrush (*Scirpus* sp.), coastal goldenbush (*Ericameria menziesii*), and western goldenrod (*Solidago lepida*). Many species of fish can be found in the lagoons and channels flowing throughout the marsh.

Southern coastal salt marsh provides habitat for numerous invertebrate, reptile, mammalian, and bird species. This includes, but is not limited to sea slug (*Navanax* spp.), striped shore crab (*Pachygrapsus crassipes*), salt marsh snail (*Melampus olivaceus*), southern alligator lizard (*Elgaria multicarinata*), California kingsnake (*Hypsiglena ochrorhyncha nuchalata*), and San Diego gopher snake (*Pituophis catenifer annectens*). Other wildlife that may be present includes Audubon's cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), Virginia opossum (*Didelphis virginiana*), coyote (*Canis latrans*), and long-tailed weasel (*Mustela frenata*),

12 California Coastal Commission. 2014. W 24a Addendum. Long Beach, CA.
13 Bolsa Chica Land Trust (BCLT). 2011. Bolsa Chica Lower Mesa Restoration Project Initial Study/Mitigated Negative Declaration. Huntington Beach, CA: BCLT.
14 Tetra Tech, Inc. 2008. Davenport Bulkhead Repair Group Eelgrass Survey. Huntington Beach, CA.
15 Merkel & Associates, Inc. 2004. Huntington Beach Wetlands: Habitats and Sensitive Species (Draft). Prepared for Moffat & Nichol, San Diego, CA.
16 Merkel & Associates, Inc. 2009. Bolsa Chica Lowlands Restoration Project Monitoring Program Annual Report 2009. Prepared for California State Lands Commission, Sacramento, CA.

Birds that may be present are western grebe (*Aechmophorus occidentalis*), American widgeon (*Anas americana*), great blue heron (*Ardea herodias*), double-crested cormorant (*Phalacrocorax auritas*), snowy egret (*Egretta thula*), American coot (*Fulica americana*), great egret (*Ardea alba*), long-billed curlew *(Numenius americanus*), and black phoebe (*Sayornis nigricans*). In addition, Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), a state-listed endangered species, is known to nest in the coastal marsh communities in the planning area.

Southern Foredunes

The southern foredunes community is considered a sensitive natural community by the CDFW. Remnants of this community are present along Pacific Coast Highway, near Bolsa Chica and the Huntington Beach Wetlands. This community is dominated by low, often succulent, perennial subshrubs and herbs. Less wind and sand movement provides favorable conditions for plant establishment, which further reduces the movement of sand and stabilizes dunes. Drainage is rapid, and plants are subject to strong, dessicating, salt-bearing winds. This community often intergrades with southern coastal scrub. This community has been severely reduced by urban and other development.

Common associates of this community include pink sand verbena (*Abronia umbellata*), beach bur (*Ambrosia chamissonis*), beach saltbush (*Atriplex leucophylla*), sea rocket (*Cakile maritima*), beach morning glory *(Calystegia soldanella*), shrubby beach primrose (*Camissoniopsis cheiranthifolia* ssp. *suffruticosa*), and saltgrass (Holland 1986). Several reptile species may utilize this dune habitat, including southern alligator lizard and special-status silvery legless lizard (*Anniella pulchra pulchra*). Additionally, birds such as house finch (*Carpodacus mexicanus*), European starling (*Sturnus vulgaris*), and special-status loggerhead shrike (*Lanius ludovicianus*) use shrubby areas for perching and nesting. Finally, several mammal species likely utilize this community, including Audubon's cottontail, deer mouse (*Peromyscus maniculatus*), and house mouse (*Mus musculus*).

Southern Dune Scrub

The southern dune scrub community is considered a sensitive natural community by the CDFW. This is a dense community characterized by scattered, somewhat succulent, shrubs, subshrub, and herbs. This community is restricted to coastal areas on relatively stable backdune slopes. It has been virtually eliminated from mainland Southern California. Remnants of this community are present on Rabbit Island in Bolsa Chica and along the southern edge of the Huntington Beach Wetlands.

Common associates of this community include beach saltbush (*Atriplex leucophylla*), California croton (*Croton californicus*), California ephedra (*Ephedra californica*), California goldenbush (*Ericameria ericoides*), coastal goldenbush (*Isocoma menziesii* var. *vernonioides)*, dune lupine (*Lupinus chamissonis*), and desert thorn (*Lycium brevipes*) (Holland 1986). Coast woolly-head *(Nemacaulis denudata* var. *denudata*), a rare plant, is known to occur in this community in Bolsa Chica, specifically on Rabbit Island and along the dunes parallel to Pacific Coast Highway. Wildlife species found in this community are similar to those found in the southern foredunes community.

Eucalyptus

Eucalyptus groves have been separated from the non-native/ornamental cover classification due to the important role they play in the life history of certain sensitive species such as the monarch butterfly (*Danaus plexippus*). Eucalyptus trees are also structurally large enough to provide nesting habitat for raptors. Eucalyptus groves are found in Norma Gibbs Park, at Golden West College, on the Bolsa Chica Mesa, and in the urban forest and Shipley Nature Center in Central Park. Scattered eucalyptus trees can also be found throughout the planning area in landscaped parks and residential yards. The remnant eucalyptus groves in the Bolsa Chica Ecological Reserve have been designated as an ESHA by the California Coastal Commission[17].

17 California Coastal Commission. 2014. W 24a Addendum. Long Beach, CA.

Southern Cottonwood Willow Riparian Scrub

Riparian communities can be found in low elevation areas along waterways in the planning area. The southern willow riparian scrub community is characterized by dense, broad-leafed, deciduous thickets dominated by several willow (*Salix* spp.) species, along with scattered cottonwood (*Populus fremontii*), and California sycamore (*Platanus racemosa*). In most instances, stands are too dense to allow much understory development. Southern willow scrub usually occurs on loose, sandy, or fine-grained alluvium deposited near streambeds from flooding events. This community requires regular flooding to prevent succession to cottonwood-sycamore riparian forest. Specifically, this community can be found along the waterways in Central and Bartlett Parks and in a small area in the southeast portion of the Bolsa Chica Ecological Reserve that receives freshwater draining out of the Sea Cliff Golf Course.

This community is characterized by an overstory composed of black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), mule fat (*Baccharis salicifolia*), and California sycamore. The understory comprises mule fat, stinging nettle (*Urtica dioica*), cocklebur (*Xanthium strumarium*), smartweed (*Persicaria* spp.), and cattail (*Typha* spp.). Several non-native species can be found intermixed with the native vegetation, including castor bean (*Ricinis communis*), passion vine (*Passiflora sprucei*), tamarisk (*Tamarix ramosissima*), giant reed *(Arundo donax*), and pampas grass (*Cortaderia jubata*).

Willow scrub provides cover and nesting habitat for many species including several special-status birds such as southwestern willow flycatcher (*Empidonax traillii extimus*), olive-sided flycatcher (*Contopus cooperi*), tricolored blackbird *(Agelaius tricolor*), California black rail (*Laterallus jamaicensis coturniculus*), least Bell's vireo (*Viireo bellii pusillus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Special-Status Species

Candidate, sensitive, or special-status species are commonly characterized as species that are at potential risk or actual risk to their persistence in a given area, or across their native habitat. These species have been identified and assigned a status ranking by governmental agencies such as the CDFW and USFWS, and private organizations such as the CNPS. The degree to which a species is at risk of extinction is the determining factor in the assignment of a status ranking. Some common threats to the persistence of a species or population include habitat loss, degradation, and fragmentation, as well as human conflict and intrusion. For the purposes of this report, special-status species are defined by the following:

- Listed, proposed, or candidates for listing under the Federal Endangered Species Act (FESA) (50 Code of Federal Regulations (CFR) 17.11 – listed; 61 Federal Register (FR) 7591, February 28, 1996 candidates)
- Listed or proposed for listing under the California Endangered Species Act (CESA) (Fish and Game Code (FGC) 1992 Section 2050 et seq.; 14 California Code of Regulations (CCR) Section 670.1 et seq.)
- Designated as Species of Special Concern by the CDFW
- Designated as Fully Protected by the CDFW (FGC Sections 3511, 4700, 5050, 5515), and
- Species that meet the definition of rare or endangered under CEQA (14 CCR Section 15380) including CNPS List Rank 1b and 2.

The USFWS, CDFW, and CNPS database queries, in addition to other literature searches, identified several special-status species with the potential to occur in the planning area. The CNDDB results within one mile of the planning area are depicted on Figure 3. The key to this figure is provided in Table 2. Table 3 summarizes special-status species identified in the database results, describes the habitat requirements for each species, and provides conclusions regarding the potential for each species to occur in the planning area.

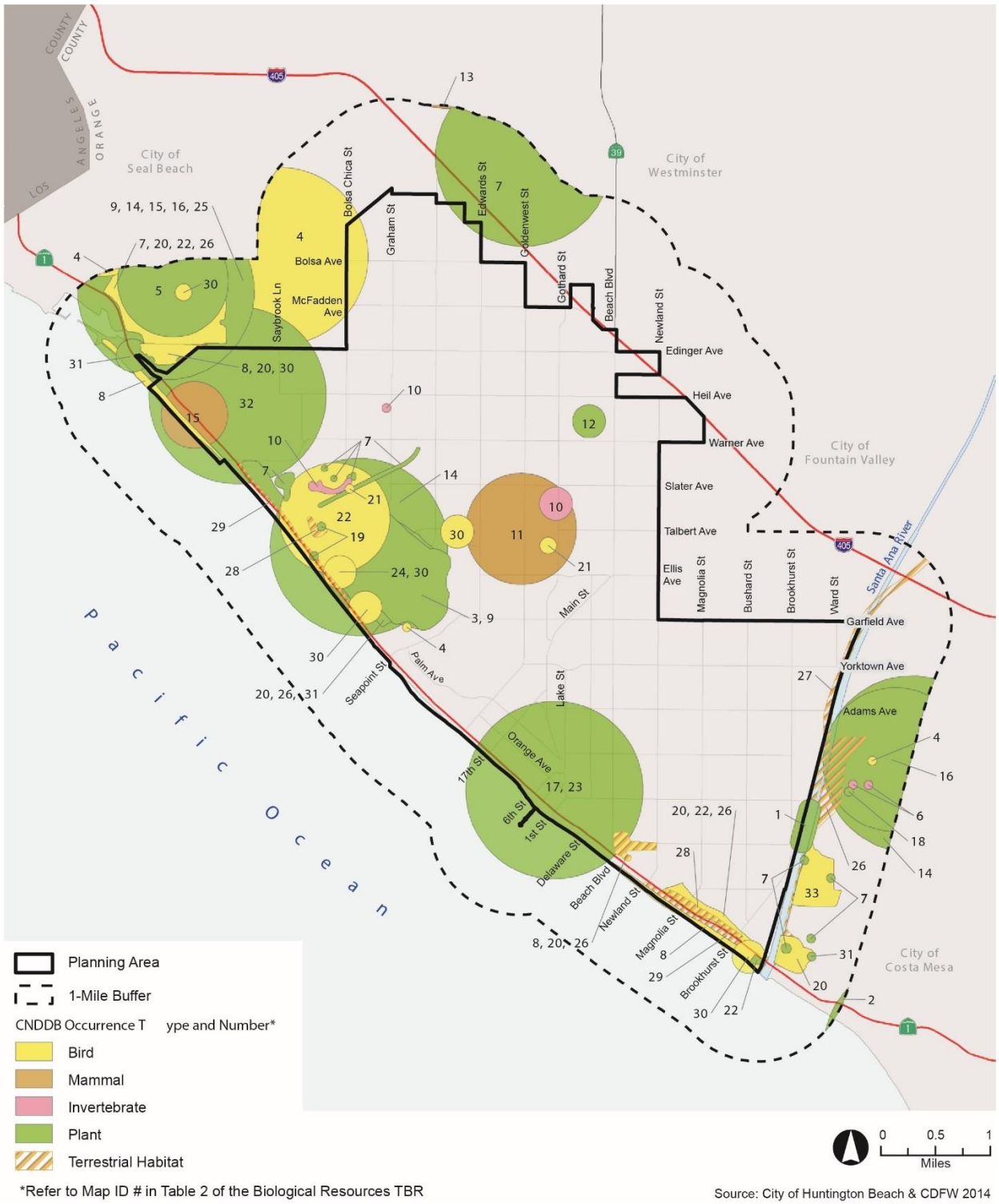


FIGURE 3
SPECIAL STATUS SPECIES

TABLE 2
CALIFORNIA NATURAL DIVERSITY DATABASE KEY

Figure 3 Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
1	*Abronia villosa* var. *aurita*	Chaparral sand-verbena	None	None	1B.1
2	*Aphanisma blitoides*	Aphanisma	None	None	1B.2
3	*Astragalus pycnostachyus var. lanosissimus*	Ventura Marsh milk-vetch	Endangered	Endangered	1B.1
4	*Athene cunicularia*	Burrowing owl	None	SSC	
5	*Atriplex serenana var. davidsonii*	Davidson's saltscale	None	None	1B.2
6	*Branchinecta sandiegonensis*	San Diego fairy shrimp	Endangered	None	
7	*Centromadia parryi* ssp. *australis*	Southern tarplant	None	None	1B.1
8	*Charadrius alexandrinus nivosus*	Western snowy plover	Threatened	SSC	
9	*Chloropyron maritimum* ssp. *maritimum*	Salt marsh bird's-beak	Endangered	Endangered	1B.2
10	*Danaus plexippus**	Monarch butterfly	None	None	
11	*Eumops perotis californicus*	Western mastiff bat	None	SSC	
12	*Helianthus nuttallii* ssp. *parishii*	Los Angeles sunflower	None	None	1A
13	*Lasiurus xanthinus*	Western yellow bat	None	SSC	
14	*Lasthenia glabrata ssp. coulteri*	Coulter's goldfields	None	None	1B.1
15	*Microtus californicus stephensi*	South coast marsh vole	None	SSC	
16	*Nama stenocarpum*	Mud nama	None	None	2B.2
17	*Nasturtium gambelii*	Gambel's watercress	Endangered	Threatened	1B.1
18	*Navarretia prostrata*	Prostrate vernal pool navarretia	None	None	1B.1
19	*Nemacaulis denudata var. denudata*	Coast woolly-heads	None	None	1B.2
20	*Passerculus sandwichensis beldingi*	Belding's savannah sparrow	None	Endangered	
21	*Polioptila californica*	Coastal California gnatcatcher	Threatened	None	
22	*Rallus longirostris levipes*	Light-footed clapper rail	Endangered	Endangered	
23	*Riparia*	Bank swallow	None	Threatened	
24	*Rynchops niger*	Black skimmer	None	None	
25	*Sorex ornatus salicornicus*	Southern California salt marsh shrew	None	None	
26	Southern Coastal Salt Marsh	Southern Coastal Salt Marsh	None	X	

Figure 3 Map ID	Scientific Name	Common Name	Federal Listing	State Listing	Rare Plant Rank
27	Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	None	X	
28	Southern Dune Scrub	Southern Dune Scrub	None	X	
29	Southern Foredunes	Southern Foredunes	None	X	
30	*Sternula antillarum browni*	California least tern	Endangered	Endangered	
31	*Suaeda esteroa*	Estuary seablite	None	None	1B.2
32	*Symphyotrichum defoliatum*	San Bernardino aster	None	None	1B.2
33	*Vireo bellii pusillus*	Least Bell's vireo	Endangered	Endangered	

Source: CDFW 2014a
Notes:
SSC = Species of Special Concern (CDFW)
X = Sensitive Natural Community (CDFW)
**Monarch butterfly considered "locally important"; thus, it is included in the discussion.*

TABLE 3
SPECIAL STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE VICINITY OF THE HUNTINGTON BEACH PLANNING AREA

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Plants						
Abronia villosa var. aurita	Chaparral sand-verbena	-	-	1B.1	Sandy soils in chaparral, coastal scrub, and desert dunes. Elev: 246-5,249 ft. (75-1,600 m.) Blooms: Jan-Sep (CNPS 2014).	May occur. Suitable habitat is present; however, species has not been seen in Orange County since 1935 (CDFW 2014c).
Aphanisma blitoides	Aphanisma	-	-	1B.2	Sandy soils in coastal bluff scrub, coastal dunes, and coastal scrub. Elev: 3-1,000 ft. (1-305 m.) Blooms: March-June (CNPS 2014).	May occur. Suitable habitat is present.
Astragalus pycnostachyus var. lanosissimus	Ventura Marsh milk-vetch	FE	SE	1B.1	Coastal dunes, coastal scrub, and the edges of coast salt or brackish marshes and swamps. Elev: 3-115 ft. (1-35 m.) Blooms: June-Oct (CNPS 2014).	May occur. Suitable habitat is present and historical records from Bolsa Chica are present; however, the only known extant population of this species occurs in Oxnard (CDFW 2014c).
Atriplex coulteri	Coulter's saltbush	-	-	1B.2	Alkaline or clay soils in coastal bluff scrub, coastal dunes, coastal scrub, and valley and foothill grassland. Elev: 10-1,509 ft. (3-460 m.) Blooms: Mar-Oct (CNPS 2014).	May occur. Suitable habitat is present.
Atriplex pacifica	South Coast saltscale	-	-	1B.2	Playas, coastal bluff scrub, coastal dunes, and coastal scrub. Elev: 0-459 ft. (0-140 m.) Blooms: Mar-Oct (CNPS 2014).	May occur. Suitable habitat is present.
Atriplex parishii	Parish's brittlescale	-	-	1B.1	Alkaline soils in playas, vernal pools, and chenopod scrub. Elev: 82-6,233 ft. (25-1900 m.) Blooms: June-Oct (CNPS 2014).	May occur. Suitable soils/habitat is present.
Atriplex serenana var. davidsonii	Davidson's saltscale	-	-	1B.2	Alkaline areas in coastal scrub and coastal bluff scrub. Elev: 33-656 ft. (10-200 m.) Blooms: Apr-Oct (CNPS 2014).	May occur. Suitable soils/habitat is present.
Calochortus weedii var. intermedius	Intermediate mariposa lily	-	-	1B.2	Rocky, calcareous substrates in chaparral, coastal scrub, and valley and foothill grassland. Elev: 345-2,805 ft. (105-855 m.) Blooms: May-July (CNPS 2014).	May occur. Suitable habitat present; however, species elevation range does not overlap with the planning area.

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Centromadia parryi ssp. australis	Southern tarplant	-	-	1B.1	Vernally mesic valley and foothill grassland, vernal pools, and the margins of marshes and swamps. Elev: 0-1,575 ft. (0-480 m.) Blooms: May-Nov (CNPS 2014).	Known to occur. Known to occur in Bolsa Chica and adjacent properties, as well as on the ASCON site (CDFW 2014c; PCR Services Corporation 2013).
Chaenactis glabriuscula var. orcuttiana	Orcutt's pincushion	-	-	1B.1	Sandy coastal bluff scrub and coastal dunes. Elev: 0-328 ft. (0-100 m.) Blooms: Jan-Aug (CNPS 2014).	May occur. Suitable habitat is present.
Chloropyron maritimum ssp. maritimum	Salt marsh bird's-beak	FE	SE	1B.2	Coastal dunes, coastal salt marshes, and swamps. Elev: 0-98 ft. (0-30 m.) Blooms: May-Oct (CNPS 2014).	May occur. Historical occurrence in Bolsa Chica from 1932 (CDFW 2014c).
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	FC	SE	1B.1	Sandy coastal scrub, and valley and foothill grassland. Elev: 492-4,003 ft. (150-1,220 m.) Blooms: Apr-July (CNPS 2014).	May occur. Suitable habitat is present, but elevation range does not overlap with the planning area.
Comarostaphylis diversifolia ssp. diversifolia	Summer holly	-	-	1B.2	Chaparral and cismontane woodland. Elev: 98-2,592 ft. (30-790 m.) Blooms: Apr-June (CNPS 2014).	Not expected to occur. Suitable habitat not present.
Dudleya multicaulis	Many-stemmed dudleya	-	-	1B.2	Clay soil in chaparral, coastal scrub, and valley and foothill grassland. Elev: 49-2,592 ft. (15-790 m.) Blooms: Apr-July (CNPS 2014).	May occur. Suitable habitat is present.
Dudleya stolonifera	Laguna Beach dudleya	FT	ST	1B.1	Rocky areas in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Elev: 33-853 ft. (10-260 m.) Blooms: May-July (CNPS 2014).	May occur. Suitable habitat is present; however, species has a very limited distribution restricted to the vicinity of Laguna Beach (CDFW 2014c).
Eryngium aristulatum var. parishii	San Diego button-celery	FE	SE	1B.1	Mesic soils in coastal scrub, valley and foothill grassland, as well as vernal pools. Elev: 66-2,046 ft. (20-624 m.) Blooms: Apr-June (CNPS 2014).	May occur. Suitable habitat is present.
Euphorbia misera	Cliff spurge	-	-	2B.2	Rocky areas in coastal bluff scrub, coastal scrub, and Mojavean desert scrub. Elevation: 33-1,640 ft. (10-500 m.) Blooms: Dec-Oct (CNPS 2014).	May occur. Suitable habitat is present.
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	-	-	1A	Coastal salt and freshwater marsh and swamps. Elev: 33-5,495 ft. (10-1,675 m.) Blooms: Aug-Oct (CNPS 2014).	May occur. Known from historical record in the planning area; however, species has not been seen since 1937 and is likely extinct (CDFW 2014c).

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Horkelia cuneata var. puberula	Mesa horkelia	-	-	1B.1	Sandy or gravelly soils in maritime chaparral, cismontane woodland, and coastal scrub. Elev: 230-2,657 ft. (70-810 m.) Blooms: Feb-Sept (CNPS 2014).	May occur. Suitable habitat is present.
Isocoma menziesii var. decumbens	Decumbent goldenbush	-	-	1B.2	Chaparral and sandy disturbed areas in coastal scrub. Elev: 33-443 ft. (10-135 m.) Blooms: Apr-Nov (CNPS 2014).	May occur. Suitable habitat is present.
Lasthenia glabrata ssp. coulteri	Coulter's yellow goldfields	-	-	1B.1	Coastal salt marshes and swamps, playas, and vernal pools. Elev: 3-4,003 ft. (1-1,220 m.) Blooms: Feb-June (CNPS 2014).	May occur. Suitable habitat is present and species known from a historical record in Bolsa Chica from 1932 (CDFW 2014c).
Nama stenocarpum	Mud nama	-	-	2B.2	Marshes and swamps on lake margins and riverbanks. Elev: 16-1,640 ft. (5-500 m.) Blooms: Jan-July (CNPS 2014).	May occur. Suitable habitat is present.
Nasturtium gambelii	Gambel's watercress	FE	ST	1B.1	Freshwater or brackish marshes and swamps. Elev: 16-1,083 ft. (5-330 m.) Blooms: Apr-Oct (CNPS 2014).	May occur. Suitable habitat is present and species known from a historical record in planning area from 1908; however, this was the last time the species was seen in the Los Angeles Basin (CDFW 2014c).
Navarretia prostrata	Prostrate vernal pool navarretia	-	-	1B.1	Mesic areas in coastal scrub, meadows and seeps, vernal pools, and alkaline valley and foothill grasslands. Elev: 49-3,970 ft. (15-1,210 m.) Blooms: Apr-July (CNPS 2014).	May occur. Suitable habitat is present; however, species has not been seen in the vicinity of the planning area since the late 1800s (CDFW 2014c).
Nemacaulis denudata var. denudata	Coast woolly-heads	-	-	1B.2	Coast dunes. Elev: 0-328 ft. (0-100 m.) Blooms: Apr-Sept (CNPS 2014).	Known to occur. Known to occur in Bolsa Chica and Huntington Beach Wetlands (CDFW 2014c; Merkel & Associates 2004).
Orcuttia californica	California Orcutt grass	FE	SE	1B.1	Vernal pools. Elev: 49-2,165 ft. (15-660 m.) Blooms: Apr-Aug (CNPS 2014).	May occur. Suitable habitat may be present.
Pentachaeta aurea ssp. allenii	Allen’s pentachaeta	-	-	1B.1	Openings in coastal scrub, and valley and foothill grassland. Elev: 246-1,706 ft. (75-520 m.) Blooms: Mar-June (CNPS 2014).	May occur. Suitable habitat is present; however, the elevation range of this species does not overlap with the planning area.
Pentachaeta lyonii	Lyon’s pentachaeta	FE	SE	1B.1	Rocky and clay substrates in chaparral openings, coastal scrub, and valley and foothill grassland. Elev: 98-2,067 ft. (30-630 m.) Blooms: Mar-Aug (CNPS 2014).	May occur. Suitable habitat is present.

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Phacelia stellaris	Brand's star phacelia	FC	-	1B.1	Coastal dunes and coastal scrub. Elev: 3-1,312 ft. (1-400 m.) Blooms: Mar-June (CNPS 2014).	May occur. Suitable habitat is present.
Quercus dumosa	Nuttall's scrub oak	-	-	1B.1	Sandy and clay loam substrates in closed-cone coniferous forest, chaparral, and coastal scrub. Elev: 49-1,312 ft. (15-400 m.) Blooms: Feb-Aug (CNPS 2014).	May occur. Suitable habitat is present.
Sagittaria sanfordii	Sanford's arrowhead	-	-	1B.2	Assorted shallow freshwater marshes and swamps. Elev: 0-2,133 ft. (0-650 m.) Blooms: May-October (CNPS 2014).	Not expected to occur. Extirpated from Southern California. Record for Wintersburg Channel (CDFW 2014a); however, this specimen is misidentified (CNPS 2014).
Senecio aphanactis	Chaparral ragwort	-	-	2B.2	Sometimes alkaline in chaparral, cismontane woodland, and coastal scrub. Elev: 49-2,625 ft. (15-800 m.) Blooms: Jan-Apr (CNPS 2014).	May occur. Suitable habitat is present.
Sidalcea neomexicana	Salt spring checkerbloom	-	-	2B.2	Alkaline and mesic areas in chaparral, coastal scrub, lower montane coniferous forest, playas, and Mojavean desert scrub. Elev: 49-5,020 ft. (15-1,530 m.) Blooms: Mar-June (CNPS 2014).	May occur. Suitable habitat is present.
Suaeda californica	California seablite	FE	-	1B.1	Coastal salt marshes and swamps. Elev: 0-49 ft. (0-15 m.) Blooms: Jul-Oct (CNPS 2014).	Not expected to occur. Only occurs in Morro Bay and near Cayucos Point. Does not occur in Southern California, but easily confused with S. esteroa and S. taxifolia (CNPS 2014).
Suaeda esteroa	Estuary seablite	-	-	1B.2	Coastal salt marshes and swamps. Elev: 0-16 ft. (0-5 m.) Blooms: May-Jan (CNPS 2014).	May occur. Suitable habitat is present and known from historical occurrence in Bolsa Chica (CDFW 2014c).
Symphyotrichum defoliatum	San Bernardino aster	-	-	1B.2	Near ditches, streams, and springs in coastal scrub, cismontane woodland, lower montane coniferous forest, marshes, meadows, seeps, swamps, and vernally mesic valley and foothill grasslands. Elev: 7-6,693 ft. (2-2,040 m.) Blooms: July-Nov (CNPS 2014).	May occur. Suitable habitat is present and known from historical occurrence in Huntington Harbour from 1933 (CDFW 2014c).
Verbesina dissita	Big-leaved crownbeard	FT	ST	1B.1	Maritime chaparral and coastal scrub. Elev: 148-673 ft. (45-205 m.) Blooms: Apr-July (CNPS 2014).	May occur. Suitable habitat is present.

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Invertebrates						
Branchinecta sandiegonensis	San Diego fairy shrimp	FE	-		Small, shallow vernal pools. Occasionally occur in ditches and roadruts with suitable conditions. Has never been found in permanent water bodies (USFWS 1998).	May occur. Suitable habitat may be present, though no vernal pools have been documented in the planning area. Critical habitat and records of this species occur adjacent to the planning area (CDFW 2014c; USFWS 2014b).
Danaus plexippus	Monarch butterfly	-	-		Typically overwinter in groves of eucalyptus (*Eucalyptus sp.*), Monterey pine (*Pinus radiata*), or Monterey cypress (*Cupressus macrocarpa*) along the California coast (IELP 2012).	Known to occur. Known to overwinter in groves throughout the planning area, including Bolsa Chica, Central Park, Gibbs Park, and Golden West College (CDFW 2014c).
Reptiles						
Anniella pulchra	Silvery legless lizard	-	SSC		Associated with sandy or loose organic soils in coastal dune, valley and foothill grassland, chaparral, and coastal scrub habitats (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Aspidoscelis hyperythra	Orange-throated whiptail	-	SSC		Semi-arid brushy areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, and coastal chaparral (Nafis 2014).	May occur. Suitable habitat is present.
Chelonia mydas	Green sea turtle	FT	-		Known from a variety of marine habitats, but spends most time along the coastline and in protected bays and lagoon. Nesting beaches are relatively undisturbed (NMFS and USFWS 2007).	May occur. Suitable habitat is present.
Emys marmorata	Western pond turtle	-	SSC		Found in a wide variety of habitats throughout California, but associated with permanent ponds, lakes, streams, irrigation ditches, and permanent pools along intermittent streams (CDFW 2014b).	May occur. Suitable habitat is present.
Phrynosoma blainvillii	Coast horned lizard	-	SSC		Occurs in valley-foothill hardwood, conifer and riparian habitats, as well as in pine-cypress, juniper, and annual grassland habitats. Ranges up to 4,000 ft (1,219 m) in the Sierra Nevada foothills, and up to 6,000 ft (1,800 m) in the mountains of Southern California (CDFW 2014b).	May occur. Suitable habitat is present.

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Birds						
Agelaius tricolor (nesting colony)	Tricolored blackbird	-	SSC		Dominant nest substrate species includes cattails, bulrushes, Himalaya berry, agricultural silage. Dense vegetation is preferred but heavily lodged cattails not burned in recent years may preclude settlement. Need access to open water. Strips of emergent vegetation along canals are avoided as nest sites unless they are about 10 or more meters wide but in some ponds, especially where associated with Himalayan blackberries and deep water, settlement may be in narrower fetches of cattails. If sites are hard for an observer to reach, the site is relatively suitable (Hamilton 2004).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Athene cunicularia	Burrowing owl	-	SSC		Nesting habitat includes open areas with mammal burrows, including rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub, vacant lots and human disturbed lands. Soils must be friable for burrows (Bates 2006).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Charadrius nivosus ssp. nivosus (nesting)	Western snowy plover	FT	SSC		Barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation ponds, river bars, along alkaline or saline lakes, reservoirs, and ponds (Cornell 2014).	Known to occur. Known from Bolsa Chica and beaches (USFWS 2012; Knapp and Peterson 2013).
	Critical Habitat, western snowy plover	X	-			Known to occur. Designated critical habitat units in Bolsa Chica and along beach (USFWS 2012).
Circus cyaneus	Northern harrier	-	SSC		Forage in meadows, grassland, rangeland, desert sinks, and fresh and saltwater emergent wetlands. Nests on ground near marsh edge, lake and river edges, grasslands, and sage brush flats (CDFW 2014b)	Known to occur. Known from Bolsa Chica (BCLT 2011).
Contopus cooperi	Olive-sided flycatcher		SSC		Preferred habitat is forest and woodland with adjacent meadows, lakes, or open terrain for foraging (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Dendroica petechia brewsteri	Yellow warbler		SSC		Riparian woodland, montane chaparral, and open ponderosa pine and mixed conifer habitats (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Elanus leucurus (nesting)	White-tailed kite	-	SSC		Forage in grasslands, meadows, farmlands, and emergent wetland. Nest in oaks, willows, or other tree stands (CDFW 2014b).	Known to occur. Known from Bolsa Chica and Central Park (BCLT 2011; BonTerra 2007).
Empidonax traillii extimus (nesting)	Southwestern willow flycatcher	FE	SE		Dense riparian forest and scrub habitats associated with rivers, swamps, wetlands, lakes and reservoirs (USFWS 2002).	May occur. Suitable habitat is present.
Falco peregrinus anatum	Peregrine falcon	DL	DL/FP		Breeds mostly in woodland, forest, and coastal habitats, near wetlands, lakes, rivers or other water on high cliffs, banks, dunes, or mounds. Will nest in human-made structures, tree or snag cavities, or old nests of other raptors (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Icteri virens	Yellow-breasted chat	-	SSC		Riparian habitats with thickets of willow and other brushy tangles (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Lanius ludovicianus	Loggerhead shrike	-	SSC		Hardwood, hardwood-conifer, riparian, pinyon-juniper, desert riparian, and Joshua tree habitats. Nest in trees or shrubs with dense foliage (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Laterallus jamaicensis coturniculus	California black rail	-	ST/FP		Yearlong resident of saline, brackish, and fresh emergent wetlands. Occurs most commonly in tidal emergent wetlands dominated by pickleweed or in brackish marshes supporting bulrushes, cattails, and saltgrass (CDFW 2014b).	May occur. Suitable habitat is present.
Passerculus sandwichensis beldingi	Belding's savannah sparrow	-	SE		Coastal salt marshes. Associated with dense pickleweed, particularly *Salicornia virginica*, for nesting (Zembal and Hoffman 2010).	Known to occur. Known from Bolsa Chica and Huntington Beach Wetlands (CDFW 2014c).
Pelecanus occidentalis californicus (nesting and roosting)	California brown pelican	DL	DL/FP		Warm coastal marine and estuarine environments. Rare inland. Breeds primarily on islands (Cornell 2014).	May occur. Suitable roosting habitat is present.
Polioptila californica	Coastal California gnatcatcher	FT	SSC		Scrub-dominated plant communities, strongly associated with coastal scrub, sage scrub, and coastal succulent scrub communities. Distribution ranges from southern Ventura County down through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties (USFWS 2010b).	Known to occur. Known from Bolsa Chica and near Central Park (CDFW 2014c).

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Rallus longirostris levipes	Light-footed clapper rail	FE	SE/FP		Coastal salt marshes, lagoons, and their maritime environs. Require shallow water and mudflats for foraging, with adjacent higher vegetation for cover during high tide (USFWS 2009).	Known to occur. Has been observed foraging in Bolsa Chica for several years (CDFW 2014c). Recent records of nesting in Bolsa Chica and Huntington Beach Wetlands (Zembal and Hoffman 2012; CSLC 2014).
Riparia (nesting)	Bank swallow	-	ST		Riparian areas with sandy vertical bluffs or riverbanks. Also nest in earthen banks and bluffs, as well as sand and gravel pits (CDFW 2014b).	May occur. Suitable habitat is present.
Rynchops niger (nesting)	Black skimmer	-	SSC		Requires calm, shallow water for foraging, and sand bars, beaches, or dikes for roosting and nesting (CDFW 2014b).	Known to occur. Has been observed nesting in Bolsa Chica (Knapp and Peterson 2013; CDFW 2014c).
Sternula antillarum browni (nesting colony)	California least tern	FE	SE/FP		Nest and roost in colonies on open beaches, forage near shore ocean waters and in shallow estuaries and lagoons (USFWS 2006).	Known to occur. Known to nest on beach near Santa Ana River mouth and in Bolsa Chica (CDFW 2014c).
Vireo bellii pusillus (nesting)	Least Bell's vireo	FE	SE		Obligate riparian breeder. Cottonwood willow, oak woodlands, and mule flat scrub along watercourses (Kus 2002).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Xanthocephalus	Yellow-headed blackbird	-	SSC		Nest in fresh emergent wetlands with deep water and dense vegetation, often along lake or pond edges. Forage in emergent wetlands, croplands, grasslands, and muddy shores of lacustrine habitats (CDFW 2014b).	Known to occur. Known from Bolsa Chica (BCLT 2011).
Mammals						
Eumops perotis californicus	Western mastiff bat	-	SSC		Open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban areas. Roosts in crevices on vertical cliff faces, high buildings, trees, and tunnels (CDFW 2014b).	Known to occur. Known from Central Park (CDFW 2014c).
Lasiurus xanthinus	Western yellow bat	-	SSC		Associated with palm trees in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats below 2,000 ft (600 m) (CDFW 2014b).	May occur. Suitable habitat is present.
Microtus californicus stephensi	South coast marsh vole	-	SSC		Tidal wetlands and associated grasslands along the coast (Bolster 1998).	May occur. Historical occurrence in Sunset Beach from 1916. Also known to occur in Seal Beach, adjacent to the planning area (CDFW 2014c).

Scientific Name	Common Name	Federal	State	CNPS	General Habitat Characteristics	Potential for Occurrence
Perognathus longimembris pacificus	Pacific pocket mouse	FE	SSC		Found predominantly on sandy substrates in coastal sage scrub on marine terraces within 2.5 miles of the ocean (USFWS 2010a).	May occur. Suitable habitat is present; however, all known populations in the Los Angeles Basin have been extirpated (CDFW 2014c).
Sorex ornatus salicornicus	Southern California salt marsh shrew	-	SSC		Salt marshes dominated by pickleweed, with saltgrass, willow, and bulrush associates. Requires dense vegetative ground cover and generally moist habitat (Bolster 1998).	May occur. Suitable habitat is present, and has been historically observed in Bolsa Chica (CDFW 2014c; Feldmeth et al. 1989).
Taxidea taxus	American badger	-	SSC		Dry, open stages of most forest, shrub, and herbaceous habitats with friable soils (CDFW 2014b).	May occur. Suitable habitat is present; however, heavy urbanization and lack of connectivity to known occurrences (CDFW 2014c).

Source: CDFW 2014a; USFWS 2014a; CNPS 2014; data compiled by Michael Baker International,2014

Notes:

Federal & State Status Definitions
(FE) Federal Endangered
(FT) Federal Threatened
(FC) Federal Candidate
(FD) Federally Delisted
(X) Federally Designated Critical Habitat
(SE) State Endangered
(ST) State Threatened
(SSC) State Species of Special Concern
(SCE) State Candidate Endangered
(SCT) State Candidate Threatened

CNPS Rare Plant Rank
Rareness Ranks
(1A) Presumed Extinct in California
(1B) Rare, Threatened, or Endangered in California and Elsewhere
(2) Rare, Threatened, or Endangered in California, But More Common Elsewhere
(3) More Species Information Needed
(4) Limited Distribution
Threat Ranks
(0.1) Seriously threatened in California
(0.2) Fairly threatened in California
(0.3) Not very threatened in California

Special-Status Plants

Special-status plant species with the potential to occur in the planning area are based on the data obtained from the CNPS *Inventory of Rare, Threatened, and Endangered Plants of California*[18]. Table 4 associates each special-status plant species with one or more of the natural communities identified in Figure 2.

TABLE 4
SPECIAL STATUS PLANT SPECIES AND THEIR ASSOCIATED VEGETATIVE COMMUNITIES

Vegetative Communities	Special-Status Plant Species	
Coastal Sage Scrub	chaparral sand-verbena Ventura Marsh milk-vetch South Coast saltscale southern tarplant San Fernando Valley spineflower Laguna Beach dudleya cliff spurge decumbent goldenbush Allen's pentachaeta Brand's star phacelia chaparral ragwort San Bernardino aster intermediate mariposa lily	San Diego button-celery aphanisma Coulter's saltbush Davidson's saltscale Orcutt's pincushion many-stemmed dudleya mesa horkelia prostrate vernal pool navarretia Lyon's pentachaeta Nuttall's scrub oak salt spring checkerbloom big-leaved crownbeard Parish's brittlescale
Coastal Salt Marsh	Ventura Marsh milk-vetch salt marsh bird's-beak Coulter's yellow goldfields Gambel's watercress estuary seablite	southern tarplant Los Angeles sunflower mud nama salt spring checkerbloom San Bernardino aster
Dunes (Southern Foredunes and Southern Dune Scrub)	chaparral sand-verbena Ventura Marsh milk-vetch South Coast saltscale salt marsh bird's-beak Brand's star phacelia	aphanisma Coulter's saltbush Orcutt's pincushion coast woolly-heads Parish's brittlescale
Non-Native Grassland	Coulter's saltbush San Fernando Valley spineflower Laguna Beach dudleya Coulter's yellow goldfields California Orcutt grass Lyon's pentachaeta intermediate mariposa lily	San Diego button-celery southern tarplant many-stemmed dudleya prostrate vernal pool navarretia Allen's pentachaeta San Bernardino aster Parish's brittlescale
Freshwater Emergent Wetland	Los Angeles sunflower Gambel's watercress	mud nama San Bernardino aster
Willow Riparian	mud nama	San Bernardino aster
Ruderal/Disturbed	No special-status plant species occur within this vegetative community type.	
Non-native/Ornamental	No special-status plant species occur within this vegetative community type.	
Urban	No special-status plant species occur within this vegetative community type.	
Agriculture	No special-status plant species occur within this vegetative community type.	
Eucalyptus	No special-status plant species occur within this vegetative community type.	
Sandy Beach	No special-status plant species occur within this vegetative community type.	
Marine Water	No special-status plant species occur within this vegetative community type.	
Open Water	No special-status plant species occur within this vegetative community type.	
Flood Control Channels	No special-status plant species occur within this vegetative community type.	
Santa Ana River	No special-status plant species occur within this vegetative community type.	

Source: CDFW 2014a; USFWS 2014a; CNPS 2014; data compiled by Michael Baker International 2014.

18 California Native Plant Society (CNPS). 2014. Inventory of Rare and Endangered Vascular Plants of California (online edition, v8-01a). Sacramento: CNPS. Accessed January 20.

Special-Status Wildlife

Species identified with the potential to occur in the planning area are based on the data obtained from the CDFW's *California Wildlife Habitat Relationships System Life History Accounts and Range Maps*[19] as well as other published data sources. Table 5 associates each special-status wildlife species with one or more of the natural communities identified in Figure 2.

TABLE 5
SPECIAL STATUS WILDLIFE SPECIES AND THEIR ASSOCIATED VEGETATIVE COMMUNITY

Vegetative Communities	Special-Status Wildlife Species	
Coastal Sage Scrub	silvery legless lizard northern harrier loggerhead shrike western mastiff bat peregrine falcon	coast horned lizard white-tailed kite (foraging) coastal California gnatcatcher Pacific pocket mouse American badger
Southern Coastal Salt Marsh	Orange-throated whiptail western snowy plover California black rail Belding's savannah sparrow light-footed clapper rail Southern California salt marsh shrew	tricolored blackbird northern harrier white-tailed kite (foraging) coastal California gnatcatcher south coast marsh vole peregrine falcon
Southern Foredunes	silvery legless lizard	western snowy plover
Southern Dune Scrub	silvery legless lizard coastal California gnatcatcher	western snowy plover
Non-Native Grassland	San Diego fairy shrimp coast horned lizard northern harrier yellow-headed blackbird (foraging) peregrine falcon (foraging)	silvery legless lizard burrowing owl white-tailed kite (foraging) western mastiff bat (foraging) American badger
Freshwater Emergent Wetland	tricolored blackbird white-tailed kite (foraging) yellow-headed blackbird	northern harrier California black rail peregrine falcon
Southern Willow Riparian Scrub	tricolored blackbird olive-sided flycatcher southwestern willow flycatcher loggerhead shrike bank swallow yellow-headed blackbird yellow warbler	northern harrier white-tailed kite yellow-breasted chat California black rail least Bell's vireo western yellow bat peregrine falcon
Ruderal/Disturbed	burrowing owl	white-tailed kite (foraging)
Non-native/Ornamental	monarch butterfly western mastiff bat	white-tailed kite
Urban	western mastiff bat	
Agriculture	No special-status wildlife species occur within this vegetative community type.	
Eucalyptus	monarch butterfly western mastiff bat	white-tailed kite peregrine falcon
Coastal Strand	green turtle California least tern	western snowy plover
Marine Water	green turtle light-footed clapper rail (foraging) California least tern (foraging)	California brown pelican (foraging) black skimmer (foraging)
Open Water	western pond turtle	California brown pelican (foraging)

19 CDFW. 2014b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). Sacramento: CDFW Biogeographic Data Branch. Accessed March 14. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx.

Vegetative Communities	Special-Status Wildlife Species	
Flood Control Channels	western pond turtle	
Santa Ana River	western pond turtle bank swallow	California brown pelican (foraging)

Source: Data compiled by Michael Baker International (2014)

Established Habitat Areas

Although most of Huntington Beach is urbanized, several open-space areas remain that are capable of supporting habitat, including that for special-status species. These areas are managed by a variety of agencies and organizations that have different levels of jurisdiction and authority over resources present. Several established habitat areas also support other uses requiring routine maintenance (e.g., beaches, parks). Table 6 identifies these areas and the organization(s) responsible for managing them.

TABLE 6
ESTABLISHED HABITAT AREAS WITHIN THE PLANNING AREA

Area	Acres	Management Organization
Within City Limits		
Bolsa Chica State Beach	130	California Department of Parks and Recreation
Brightwater Conservation Area (includes 5-acre eucalyptus ESHA)	34	Brightwater Homeowners Association
Brightwater Environmental Protection Area	2	Brightwater Homeowners Association
Flood Control Channels	368	County of Orange
Huntington Beach Wetlands	172*	Huntington Beach Wetlands Conservancy
Huntington City Beach (City Beach and Sunset Beach)	122	City of Huntington Beach
Huntington Harbour and associated shorelines	253	City of Huntington Beach and County of Orange
Huntington State Beach (includes Least Tern Natural Preserve)	144	California Department of Parks and Recreation
Waterfront Wetland	3	City of Huntington Beach
City parks and open spaces (includes open space areas, and parts of Central, Bartlett, and Norma Gibbs Parks)	256	City of Huntington Beach
Ridge Property	5	Property Owner
Seagate-created Wetland Area	5	Seagate Homeowners Association
Shea Property ESHA	1	California Department of Fish and Wildlife
Shea Property Wetlands/ Buffer	19	Future Homeowners Association
Outside City Limits		
Bolsa Chica Ecological Reserve (includes eucalyptus grove and Warner Pond ESHAs)	1,334	California Department of Fish and Wildlife
Bolsa Chica Basin State Marine Conservation Area	450	California Fish and Game Commission
Bolsa Bay State Marine Conservation Area	45	California Fish and Game Commission
Goodell Property	6	Property Owner
Unincorporated Open Space Areas	57	Various agencies and organizations

** Huntington Beach Wetlands acreage includes Newland Marsh, which was owned by Caltrans at the time this report was prepared.*
Source: Data compiled by Michael Baker International (2014) from sources identified above.
Note: Acreages cannot be totaled, as several established habitat areas overlap.

Connectivity and Conservation

Connectivity between open space areas is an essential element of species conservation. Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link otherwise fragmented acres of undisturbed area. Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by changes in vegetation, rugged terrain, or human disturbance. Fragmentation of open space areas by urbanization creates isolated islands of wildlife habitat. Maintaining the continuity of established wildlife corridors is important to: (1) sustain species with specific foraging requirements, (2) preserve the distribution potential of a species, and (3) retain diversity among many wildlife populations.

Available data on movement corridors and linkages was accessed via the CDFW BIOS 5 Viewer[20]. Data reviewed included the Essential Connectivity Areas [ds623] layer and the Missing Linkages in California [ds420] layer. With the exception of the Pacific Ocean to the west, the planning area is bounded on all other sides by urban land uses. There are pockets of open space areas adjacent to the planning area, such as Seal Beach National Wildlife Refuge to the north and Banning Ranch to the south. The majority of the planning area and its surroundings has been built out; however, the undisturbed portions around the perimeter and off-site could facilitate regional wildlife movement. Specifically, Huntington Harbour connects Bolsa Chica to the off-site Seal Beach National Wildlife Refuge.

Several linkages between habitat areas are known to, or have the potential to, serve as wildlife corridors in the planning area. One major corridor begins in Huntington Harbour, which is fed ocean water via Anaheim Bay just north of the planning area. From Huntington Harbour, water flows to the southeast into inner and outer Bolsa Bays and the Bolsa Chica Wetlands. From northern Bolsa Chica, wildlife could move east through the East Garden Grove-Wintersburg Channel and connect to any other water body that drains into that channel. From southern Bolsa Chica, terrestrial wildlife and bird movement could occur northeast into Central Park. Another important connection lies between the Huntington Beach Wetlands and the wetlands/riparian area in Bartlett Park via the Huntington Beach Channel. The beach, flood control channels, and the Santa Ana River provide other movement opportunities for wildlife.

Protections and Risks

This section summarizes some of the natural and human-caused risks to biological resources in the planning area. These risks include but are not limited to exotic pest plants, fire, development, sea level rise, and human use.

Exotic Pest Plants

The invasion of exotic plants can significantly degrade habitat quality by pushing out native species, ultimately decreasing biodiversity. Exotic plant species out-compete native plants for soil nutrients, water, and sunlight. In addition, exotic plants often have a competitive advantage over natives due to a lack of natural predators. As exotic plants drive out native plants, they in turn affect native wildlife by smothering natural food sources. Exotics can be especially threatening in areas supporting populations of rare plants. Sprawling stands of exotic monocultures also increase fire fuel loads and decrease aesthetic appeal in open space areas.

According to the Santa Ana River and Orange County Chapter of the California Invasive Plant Council, high-priority pest plants in proximity to the planning area include those listed below:

- Giant reed (*Arundo donax*)
- Salt cedar tamarisk (*Tamarix ramosissima*)
- Perennial pepperweed (*Lepidium latifolium*)
- Fennel (*Foeniculum vulgare*)
- Spanish broom (*Spatium junceum*)
- Yellow starthistle (*Centaurea solstitialis*)

20 CDFW. 2014c. BIOS 5 Viewer. Sacramento: CDFW Biogeographic Data Branch. Accessed March 14. https://map.dfg.ca.gov/bios/ ?bookmark=327.

- Tree tobacco (*Nicotiana glauca*)
- Tree-of-heaven (*Ailanthus altissima*)
- Artichoke thistle (*Cynara cardunculus*)
- Myoporum (*Myoporum laetum*)
- Dalmation toadflax (*Linaria genistifolia* ssp. *dalmatica*)
- Musk thistle (*Carduus nutans*)
- Chinese tallowtree (*Triadica sebifera*)
- Diffuse knapweed (*Centaurea diffusa*)
- Castor bean (*Ricinus communis*)
- Blessed milk thistle (*Silybum marianum*)
- Fivehook bassia (*Bassia hyssopifolia*)

Exotic plants negatively influence various ecosystem processes, such as hydrology, fire regimes, and soil chemistry. Giant reed, one of the highest priority invasives for management in the planning area, typically infests waterways. It clogs flood control channels and other drainages, reducing water-carrying capacity and increasing risk of flooding during storm events. Giant reed has been a serious problem in the Santa Ana River and was estimated to comprise almost 70 percent of the riparian vegetation in the river. Unlike native riparian plants, giant reed provides little shading in-stream, leading to a rise in water temperature and reduced habitat quality for aquatic life. It also reduces habitat and food supply, particularly insect populations, for several riparian special status species, including least Bell's vireo and southwestern willow flycatcher[21]. Salt cedar is another example of an exotic species that alters ecosystem processes in the planning area. This species consumes huge amounts of water with its long taproot. In turn, this water is lost to native plants, wildlife, and drinking. Salt cedar also increases salinity of surrounding soil by exuding salt from glands in the leaves. This increase in salinity inhibits growth and germination of native plants[22].

Certain open space areas have individualized lists of target species. For example, the Bolsa Chica Conservancy also targets iceplant, Russian thistle, sea rocket (*Cakile* sp.), Brazilian pepper tree, wild radish, sand plantain (*Plantago* sp.), and pampas grass. The Huntington Beach Wetlands Conservancy targets Russian thistle, Saharan mustard, and iceplant[23]. Several local organizations take part in invasive plant control projects, including the Santa Ana River and Orange County Chapter of the California Invasive Plant Council, the Bolsa Chica Conservancy, the Bolsa Chica Land Trust, and the Shipley Nature Center.

Development

The planning area is largely built out, with protected open space areas scattered throughout the western and southeastern portions. The remaining large open space areas such as the Bolsa Chica Ecological Reserve and the Huntington Beach Wetlands complex are protected from development. Vacant lots scattered throughout the planning area are the most probable for development. These areas are mostly isolated and degraded, with low habitat value. There are two vacant parcels adjacent to Bolsa Chica that are proposed for development. Several previously developed and/or disturbed lands in the planning area present potential for habitat restoration.

Sea Level Rise

The planning area is bordered on the west by the Pacific Ocean; therefore, sea level rise is a key consideration for the General Plan Update. Based on planning-level information available from the National Oceanic and Atmospheric Administration (NOAA), all of the protected areas identified in Table 6, except for Central Park, would be impacted under a five-foot sea level rise scenario during a 5.5-foot high tide[24] [25]. A

21 Dudley, T. 2000. Arundo donax in Bossard, C.C., J.M. Randall, and M.C. Hoshovsky. Invasive Plants of California Wildlands. Berkeley, CA: University of California Press.
22 Lovich, J.E. 2000. "Tamarix spp." In Bossard, C.C., J.M. Randall, and M.C. Hoshovsky. Invasive Plants of California Wildlands. Berkeley, CA: University of California Press.
23 Smith, Gordon. 2014. Chairman, Huntington Beach Wetlands Conservancy. E-mail to Leslie Parker, Biologist, Michael Baker International. July 17.
24 NOAA. 2014b. NOAA Sea Level Rise Impact Viewer. Accessed April 10. http://csc.noaa.gov/slr/viewer.
25 Moffat & Nichol. 2014. Sea Level Rise Task Force Memorandum. Prepared for City of Huntington Beach. Accessed April 10. http://www.hbthenextwave.org/wp-content/uploads/SLR-TaskForce-MeetingMemo.pdf.

Sea Level Rise Vulnerability Assessment has been prepared to support the Coastal Resiliency Plan (CRP) prepared for the General Plan Update (Volume III, Appendix P).

Human Use

Open space areas in the planning area undergo varying degrees of human use. For example, the entirety of Central Park is open to the public, whereas the Bolsa Chica Ecological Reserve has limited public access and visitors are restricted to maintained trails and lookout points. In addition, pets and bicycles are prohibited to reduce damage to vegetation and harassment of wildlife. Central Park and other city parks are already heavily used by humans and are typically utilized by species that are more tolerant of human presence. Certain parts of the planning area utilized by special-status species are completely blocked off from human use, such as the Least Tern Natural Preserve which consists of a fenced-off portion of Huntington State Beach.

Urban Runoff and Water Quality

Urban debris and litter can enter coastal and marine environments either from direct dumping or through the storm drain system. This can adversely affect terrestrial species living along the beach and in the wetlands, as well as marine species living in the open water off the coast, and in the Harbour, bays, wetland waters, and flood control channels. Debris and litter can be deadly for wildlife that may ingest or become tangled in it. In addition to the detrimental effect it has on wildlife, debris and litter also greatly reduce the aesthetic appeal of open space areas. Several local organizations and open space parks host public clean-up days multiple times per year.

Urban runoff can greatly reduce water quality by increasing turbidity, altering nutrient load, and introducing contaminants, all of which can result in negative impacts to marine life. For example, eelgrass beds, a sensitive marine community occurring in the planning area, are extremely threatened by excessive nutrients resulting from urban runoff. High nutrient levels can cause eutrophication and algal blooms, which have been shown to kill off entire stands of eelgrass by blocking sunlight. Decimation of eelgrass beds can leave marine species vulnerable, since many species use the beds as nurseries and foraging grounds. One of the properties of eelgrass is its ability to filter polluted runoff and absorb nutrients such as phosphorus and nitrogen; however, too much runoff can adversely affect eelgrass populations and the health of coastal marine communities[26].

REGIONAL RESOURCE PLANNING EFFORTS AND STUDIES

Regional resource planning efforts include the creation and adoption of Natural Community Conservation Plans (NCCP) and Habitat Conservation Plans (HCP). However, the planning area does not fall under the jurisdiction of any of the existing NCCP/HCPs in the area.

The Orange County Central-Coastal NCCP/HCP is a comprehensive, multi-jurisdictional natural community conservation plan and habitat conservation plan focusing on conservation of species and their associated habitats in portions of Orange County. This plan is one of several large, multi-jurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The NCCP/HCP will allow Orange County and its cities to better control local land use decisions and maintain a strong economic climate in the region while addressing the requirements of the state and federal endangered species acts. The NCCP/HCP serves as a habitat conservation plan pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act (16 United States Code (USC) 1531 et seq.), as well as a natural community conservation plan under the NCCP Act of 2001 (FGC Section 2800 et seq.). The NCCP/HCP allows the participating jurisdictions to authorize take of plant and wildlife species identified within the plan area. The USFWS and the CDFW have authority to regulate the take of threatened, endangered, and rare species. Under the NCCP/HCP, the wildlife agencies have granted “take authorization” for otherwise lawful actions, such as public and private development that may incidentally

26 NOAA. 2012. Habitat Conservation: Eel Grass—Habitat of the Month. http://www.habitat.noaa.gov/abouthabitat/eelgrass.html.

take or harm individual species or their habitat outside of the conservation area, in exchange for the assembly and management of a coordinated NCCP/HCP conservation area.

The plan was adopted in 1996 and encompasses roughly 208,000 acres with approximately 37,380 acres of reserve land. The planning area comprises two disconnected regions—one coastal and one inland. Several species covered by the Orange County Central-Coastal NCCP/HCP have the potential to occur in the planning area, including cliff spurge, peregrine falcon, coastal California gnatcatcher, coyote, intermediate mariposa lily, Laguna Beach dudleya, least Bell's vireo, Nuttall's scrub oak, orange-throated whiptail, Pacific pocket mouse, red-shouldered hawk, San Diego fairy shrimp, and southwestern willow flycatcher.

Other plans in the vicinity of the planning area are in the proposal and planning stages. The Palos Verdes Peninsula NCCP encompasses 8,661 acres, of which 1,428 acres will exist as a reserve system. The plan documents, EIR, and draft implementing agreement were released in 2004. Several species proposed for coverage by the Palos Verdes Peninsula NCCP have the potential to occur in the Huntington Beach planning area, including aphanisma, coastal California gnatcatcher, Lyon's pentachaeta, South Coast saltscale, and southern tarplant.

The Orange County Transportation Authority NCCP is another proposed plan drafted in 2009. Several species proposed for coverage by the Orange County Transportation Authority NCCP have the potential to occur in the planning area, including coast horned lizard, coastal California gnatcatcher, intermediate mariposa lily, least Bell's vireo, many-stemmed dudleya, orange-throated whiptail, southern tarplant, southwestern willow flycatcher, and western pond turtle. The planning area does overlap with this NCCP area; however, this NCCP is still in the early planning stages.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Endangered Species Act

As amended, FESA provides protective measures for federally listed threatened and endangered species, including their habitats, from unlawful take (16 USC Sections 1531–1544). FESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." In addition, 50 CFR Section 222 further defined "harm" to include "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including feeding, spawning, rearing, migrating, feeding, or sheltering."

FESA Section 7(a)(1) requires federal agencies to utilize their authority to further the conservation of listed species. FESA Section 7(a)(2) requires consultation with the USFWS or the National Marine Fisheries Service (NMFS) if a federal agency undertakes, funds, permits, or authorizes (termed the federal nexus) any action that may affect endangered or threatened species, or designated critical habitat. For projects that may result in the incidental take of threatened or endangered species, or critical habitat, and that lack a federal nexus, a Section 10(a)(1)(b) incidental take permit can be obtained from the USFWS and/or NMFS.

Clean Water Act

The basis of the Clean Water Act (CWA) was established in 1948; however, it was referred to as the Federal Water Pollution Control Act. The act was reorganized and expanded in 1972 (33 USC Section 1251), and at this time the CWA became the act's commonly used name. The basis of the CWA is the regulation of pollutant discharges into waters of the U.S. (WoUS), as well as the establishment of surface water quality standards.

Section 404

CWA Section 404 (33 USC Section 1344) established the program to regulate the discharge of dredged or fill material into WoUS, including wetlands. Under this regulation, certain activities proposed within WoUS require the obtainment of a permit prior to initiation. These activities include, but are not limited to, placement of fill for the purposes of development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and bridges), and mining operations.

The primary objective of this program is to ensure that the discharge of dredged or fill material is not permitted if a practicable alternative to the proposed activities exists that results in less impact to WoUS, or the proposed activity would result in significant adverse impacts to WoUS. To comply with these objectives a permittee must document the measures taken to avoid and minimize impacts to WoUS, and provide compensatory mitigation for any unavoidable impacts.

Section 401

Under CWA Section 401 (33 USC Section 1341), federal agencies are not authorized to issue a permit and/or license for any activity that may result in discharges to WoUS, unless a state or tribe where the discharge originates either grants or waives CWA Section 401 certification. CWA Section 401 provides states or tribes with the ability to grant, grant with conditions, deny, or waive certification. Granting certification, with or without conditions, allows the federal permit/license to be issued and remain consistent with any conditions set forth in the CWA Section 401 certification. Denial of the certification prohibits the issuance of the federal license or permit, and waiver allows the permit/license to be issued without state or tribal comment. Decisions made by states or tribes are based on the proposed project's compliance with EPA water quality standards as well as applicable effluent limitations guidelines, new source performance standards, toxic pollutant restrictions, and any other appropriate requirements of state or tribal law. In California, the State Water Resources Control Board is the primary regulatory authority for CWA Section 401 requirements (additional details below).

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Section 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR Section 21). The majority of birds found in the project vicinity would be protected under the MBTA.

Marine Mammal Protection Act

Under the Marine Mammal Protection Act (MMPA) of 1972, the Secretary of Commerce delegated the authority to protect all cetaceans and pinnipeds to the NMFS. The Secretary of the Interior is responsible for protecting sea otters and delegated this authority to the USFWS. The MMPA established a moratorium on the taking of marine mammals in waters under U.S. jurisdiction. Under the act, "taking" includes hunting, capturing, and killing and attempting to harass, hunt, capture, or kill any marine mammal. "Harassment" is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild.

Executive Order 13112 – Invasive Species

This Executive Order (EO) directs all federal agencies to refrain from authorizing, funding, or carrying out actions or projects that may spread invasive species. The order further directs federal agencies to prevent the introduction of invasive species, control and monitor existing invasive species populations, restore native species to invaded ecosystems, research and develop prevention and control methods for invasive species, and promote public education on invasive species. As part of the proposed action, the USFWS and the U.S. Army Corps of Engineers (USACE) would issue permits and therefore would be responsible for ensuring that the proposed action complies with Executive Order 13112 and does not contribute to the spread of invasive species.

The Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.)

The Fish and Wildlife Coordination Act requires that whenever any body of water is proposed or authorized to be impounded, diverted, or otherwise controlled or modified, the lead federal agency must consult with the USFWS, the NMFS, and the state agency responsible for fish and wildlife management. Section 662(b) of the act requires the lead federal agency to consider the recommendations of the USFWS and other agencies. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

Executive Order 11990 Protection of Wetlands (42 FR 26961, 25 May 1977)

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize destruction, loss, or degradation of wetlands and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless (1) no practicable alternative exists; and (2) all practical measures have been taken to minimize harm to wetlands.

Coastal Zone Management Act

In accordance with the Coastal Zone Management Act and the Coastal Zone Act Reauthorization Amendments of 1990, all federal activities must be consistent, to the maximum extent practicable, with the enforceable policies of each affected state's coastal zone management program. Each state's Coastal Zone Management program sets forth objectives, policies, and standards regarding public and private use of land and water resources in the coastal zone.

State Plans, Policies, Regulations, and Laws

California Endangered Species Act

Under CESA, the CDFW has the responsibility for maintaining a list of endangered and threatened species (FGC Section 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for potential addition to the list of endangered or threatened species, and a list of "species of special concern," which serves as a species watch list.

Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present, and determine whether the proposed project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may impact a candidate species.

Project-related impacts to species on the CESA endangered or threatened list would be considered significant. State-listed species are fully protected under the mandates of CESA. Take of protected species incidental to otherwise lawful management activities may be authorized under FGC Section 206.591. Authorization from the CDFW would be in the form of an Incidental Take Permit.

California Coastal Act

The California Coastal Act (Coastal Act) of 1976 and the California Coastal Commission, the state's coastal protection and planning agency, were established by voter initiative to plan for and regulate new development, and to protect public access to and along the shoreline. The Coastal Act contains policies to guide local and state decision-makers in the management of coastal and marine resources.

To provide maximum public access to the coast and public recreation areas, the Coastal Act directs each local government located within the coastal zone to prepare an LCP consistent with Section 30501 of the Coastal Act, in consultation with the Coastal Commission and with public participation. Important provisions of the Coastal Act relative to biological resources in the planning area include the following.

- **Section 30230** – Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological

productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

- **Section 30231** – The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

- **Section 30240** – Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

California Fish and Game Code

Streambed Alteration Agreement (FGC Sections 1600–1607)

State and local public agencies are subject to FGC Section 1602, which governs construction activities that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as waters of the state by the CDFW. Under FGC Section 1602, a discretionary Streambed Alteration Agreement must be issued by the CDFW to the project proponent prior to the initiation of construction activities within lands under CDFW jurisdiction. As a general rule, this requirement applies to any work undertaken within the 100-year floodplain of a stream or river containing fish or wildlife resources.

Native Plant Protection Act

The Native Plant Protection Act (FGC Sections 1900–1913) prohibits the taking, possessing, or sale within the state of any plants with a state designation of rare, threatened, or endangered (as defined by the CDFW). An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify the CDFW and give that state agency at least 10 days to retrieve the plants before they are plowed under or otherwise destroyed (FGC Section 1913). Project impacts to these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed project.

Birds of Prey

Under FGC Section 3503.5, it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey); or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

"Fully Protected" Species

California statutes also afford "fully protected" status to a number of specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. FGC Section 3505 makes it unlawful to take "any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird." FGC Section 3511 protects from take the following fully protected birds: (1) American peregrine falcon; (2) brown pelican; (3) California black rail; (4) California clapper rail (*Rallus longirostris obsoletus*); (5) California condor (*Gymnogyps californianus*); (6) California least tern; (7) golden eagle; (8) greater sandhill crane (*Grus canadensis tabida*); (9) light-footed clapper rail; (10) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (11) trumpeter swan (*Cygnus buccinator*); (12) white-tailed kite; and (13) Yuma clapper rail (*Rallus longirostris yumanensis*).

FGC Section 4700 identifies the following fully protected mammals that cannot be taken: (1) Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*); (2) bighorn sheep (*Ovis canadensis*), except Nelson bighorn sheep (subspecies *Ovis canadensis nelsoni*); (3) Northern elephant seal (*Mirounga angustirostris*); (4) Guadalupe fur seal (*Arctocephalus townsendi*); (5) ring-tailed cat (genus *Bassariscus*); (6) Pacific right whale (*Eubalaena sieboldi*); (7) salt-marsh harvest mouse (*Reithrodontomys raviventris*); (8) southern sea otter (*Enhydra lutris nereis*); and (9) wolverine (*Gulo gulo*).

FGC Section 5050 protects from take the following fully protected reptiles and amphibians: (1) blunt-nosed leopard lizard (*Crotaphytus wislizenii silus*); (2) San Francisco garter snake (*Thamnophis sirtalis tetrataenia*); (3) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*); (4) limestone salamander (*Hydromantes brunus*); and (5) black toad (*Bufo boreas exsul*).

FGC Section 5515 also identifies certain fully protected fish that cannot lawfully be taken even with an incidental take permit. The following species are protected in this fashion: (1) Colorado River squawfish (*Ptychocheilus lucius*); (2) thicktail chub (*Gila crassicauda*); (3) Mohave chub (*Gila mohavensis*); (4) Lost River sucker (*Catostomus luxatus*); (5) Modoc sucker (*Catostomus microps*); (6) shortnose sucker (*Chasmistes brevirostris*); (7) humpback sucker (*Xyrauchen texanus*); (8) Owens River pupfish (*Cyprinoden radiosus*); (9) unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*); and (10) rough sculpin (*Cottus asperrimus*).

California Wetlands and Other Waters Policies

The California Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine, or inland wetlands. Exceptions may be granted if all of the following conditions are met:

- The project is water-dependent.
- No other feasible alternative is available.
- The public trust is not adversely affected.
- Adequate compensation is proposed as part of the project.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1966 (California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15) is the primary state regulation that addresses water quality. The requirements of the act are implemented by the State Water Resources Control Board at the state level and at the local level by the Regional Water Quality Control Board (RWQCB). The RWQCB carries out planning, permitting, and enforcement activities related to water quality in California. The act provides for waste discharge requirements (WDRs) and a permitting system for land or water. Certification is required by the RWQCB for activities that can affect water quality.

Clean Water Act, Section 401 Water Quality Certification

CWA Section 401 (33 USC Section 1341) requires that any applicant for a federal license or permit, which may result in a pollutant discharge to WoUS, obtain a certification that the discharge will comply with EPA water quality standards. The state or tribal agency responsible for issuance of the Section 401 Certification may also require compliance with additional effluent limitations and water quality standards set forth in state/tribal laws. In California, the RWQCB is the primary regulatory authority for CWA Section 401 requirements.

The Santa Ana RWQCB is responsible for enforcing water quality criteria, and protecting water resources in the project area. In addition, the RWQCB is responsible for controlling discharges to surface waters of the state by issuing WDRs, or commonly by issuing conditional waivers to WDRs. The RWQCB requires that a project proponent obtain a CWA Section 401 water quality certification for CWA Section 404 permits issued by the USACE. A request for water quality certification (including WDRs) by the RWQCB and an application for a General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities are prepared and submitted following completion of the CEQA environmental document, and submittal of the wetland delineation to the USACE.

Delegated Permit Authority

California has been delegated permit authority for the National Pollutant Discharge Elimination System permit program including stormwater permits for all areas except tribal lands. Issuance of CWA Section 404 dredge and fill permits remains the responsibility of the USACE; however, the state actively uses its CWA Section 401 certification authority to ensure CWA Section 404 permits are in compliance with state water quality standards.

State Definition of Covered Waters

Under California state law, "waters of the state" means "any surface water or groundwater, including saline waters, within the boundaries of the state." Therefore, water quality laws apply to both surface and groundwater. After the U.S. Supreme Court decision in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, the Office of Chief Counsel of the Board released a legal memorandum confirming the state's jurisdiction over isolated wetlands. The memorandum stated that under the California Porter-Cologne Water Quality Control Act, discharges to wetlands and other waters of the state are subject to state regulation, and this includes isolated wetlands. In general, the State Water Resources Control Board regulates discharges to isolated waters in much the same way as it does for WoUS, using Porter-Cologne rather than CWA authority.

Nongovernmental Agency

California Native Plant Society

The CNPS is a nongovernmental agency that classifies native plant species according to current population distribution and threat level, in regard to extinction. These data are utilized by the CNPS to create/maintain a list of native California plants that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the *Inventory of Rare and Endangered Vascular Plants of California*[27]. Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review.

The following identifies the definitions of the CNPS listings:

- List 1A: Plants believed to be extinct
- List 1B: Plants that are rare, threatened, or endangered in California and elsewhere
- List 2: Plants that are rare, threatened, or endangered in California, but are more numerous elsewhere

All of the plant species on List 1 and 2 meet the requirements of the Native Plant Protection Act Section 1901, Chapter 10, or FGC Sections 2062 and 2067, and are eligible for state listing. Plants appearing on List 1 or 2 are considered to meet the criteria of CEQA Section 15380, and effects on these species are considered "significant." Classifications for plants on List 3 (plants about which we need more information) and/or List 4 (plants of limited distribution), as defined by the CNPS, are not currently protected under state or federal law. Therefore, no detailed descriptions or impact analysis was performed on species containing these classifications.

Regional and Local Ordinances

Huntington Beach Local Coastal Program

The California Coastal Act directs each local government located partially or wholly within the coastal zone to prepare an LCP for its portion of the coastal zone. An LCP typically consists of two parts: (1) a coastal element consisting of a land use plan and policies for development and conservation within the coastal zone, and (2) an implementation program consisting of ordinances, maps, and implementing actions for the land use plan and policies. The City of Huntington Beach fulfills the requirements of part (1) with its adopted

27 CNPS. 2014. Inventory of Rare and Endangered Vascular Plants of California (online edition, v8-01a). Sacramento: CNPS. Accessed January 20.

Coastal Element, which is part of the General Plan. The city Zoning Ordinance and Specific Plans fulfill part (2).

The Coastal Element was last comprehensively updated in 2001, and will be updated again following completion of the General Plan Update. The Coastal Element includes many of the city strategies, policies, and programs to protect and conserve biological resources within the planning area, many of which lie within the coastal zone.

Huntington Beach Municipal Code Chapter 13.50 Regulation of Trees

Chapter 13.50 of the Huntington Beach Municipal Code strives to preserve and protect trees in the public right-of-way. Trees may not be planted, trimmed, or removed from any public right-of-way, including residential parkways, without prior written authorization from the Tree Maintenance supervisor.

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Cultural Resources

This section describes cultural and paleontological resources within the planning area. The cultural resources information in this section is based on the Historic Context and Survey Report prepared by Galvin Preservation Associates[1]. The paleontological resource discussion is based on the Natural and Environmental Hazards Technical Report prepared by Michael Baker International[2].

ENVIRONMENTAL SETTING

Cultural Setting

The following discussion summarizes major paleontological, prehistoric, and historic developments primarily in and around the planning area. For the purpose of this section, cultural setting refers to the planning area's local historic context, which represents those aspects of the history of the planning area, or portions thereof.

Cultural resources are categorized into two subtopics: paleontological and archaeological. Paleontological resources are the mineralized (fossilized) remains of prehistoric plant and animal organisms, exclusive of man, as well as the mineralized impressions (trace fossils) left in geological formation from a past epoch as indirect evidence of the form and activity of such prehistoric plant and animal organisms. Paleontological resources can be thought of as including not only the actual fossil remains, but also the collecting localities and the geologic formations containing those localities. A geologic formation is a body of crustal rock identified by its lithic characteristics (e.g., grain size, texture, color, mineral content) and stratigraphic position. The fossil content of a formation may also be a defining characteristic of that formation.

Archaeological resources are divided into two categories: prehistoric and historic. Prehistoric archaeological resources (generally located below ground surface) date from before the onset of the Spanish Colonial period (1769-1848) and historic archaeological resources (generally located above ground) date from after the onset of the Spanish Colonial period. Historic resources include artifacts, landmarks, buildings, properties, features or other types of resources that represent a significant part of the history, architecture, archeology, engineering, or culture of the planning area, and must have the characteristics that make it a good representative of properties associated with that aspect of the past. Typically, the significance of a historic property is judged and explained when it is evaluated within its historic context. Historic contexts are those patterns, themes, or trends in history by which a specific occurrence, property, or site is understood and its meaning within prehistory or history is made clear. Historic contexts are found at a variety of geographical levels or scales. The geographic scale selected may relate to a pattern of historical development, a political division, or a cultural area. Regardless of the scale, the historic context establishes the framework from which decisions about the significance of related properties can be made[3].

Paleontological Resources Overview

The geological history of the planning area's region reflects dramatic changes in ocean levels and terrestrial life[4]. It was during the inter-glacial periods that the ocean extended as far inland as Santa Fe Springs and Buena Park. The largest and closest river to the planning area is the Santa Ana River, which over the millennia has changed course numerous times, particularly during flood events. For tens of thousands of years, the Santa Ana River plain was a large swamp, as thick peat deposits underlie the entire region. In

1 Galvin Preservation Associates. 2014. City of Huntington Beach Historic Context and Survey Report.
2 Michael Baker International. 2014. Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. May.
3 U.S. Department of the Interior National Park Service (DOI). 1990. "National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation." Available at http://www.nps.gov/nr/publications/bulletins/nrb15/.
4 Galvin Preservation Associates. 2014. City of Huntington Beach Historic Context and Survey Report.

the 1900s, the swamp lands were drained for agricultural farming, and today they have been developed over.

Geologic units within the planning area consist of the Peninsular Ranges and Geomorphic Province, characterized by Quaternary-aged (Pleistocene [11,000 to 1,600,000 years] and Holocene [less than 11,000 years]) deposits[5]. The older alluvium sediments typically are shallow marine terrace deposits that have been uplifted by seismic activity. These terraces are most prominent along the Bolsa Chica and Huntington Beach mesas. The mesas are surrounded and separated by young alluvial fan deposits. The younger alluvium deposits typically do not contain vertebrate fossils; however, they may be underlain by older deposits that do frequently contain fossils[6]. Fossil vertebrates that have been found within the planning area include marine, freshwater, and terrestrial specimens including leopard shark, three-spined stickleback, garter snake, desert shrew, pocket gopher, mammoth, bison, and horse.

Prehistoric Resources Overview

Indigenous people inhabited the planning area's region dating back to 8,000 years Before Present (BP). Prehistoric sites dating from between 7,000 and 1,200 BP have been discovered in the area. Those prehistoric sites have included large numbers of manos and milling stones, and a few projectile points such as arrowheads. Archaeologists have interpreted this assemblage to signify that the native groups had a greater dependence on seed collecting and shellfish gathering rather than hunting. Other tools discovered from this early period of occupation at millingstone sites along the coast and in the inland areas of present-day southern California are "cogged stones" of undetermined function made through pecking and grinding. The City of Huntington Beach owns the rights to the "cogged stone" type site, commonly referred to as ORA-83, and informally referred to as the "Cogstone Site." The site is particularly important to interpreting the prehistory of Orange County, including the planning area.

Ethnographically, the Gabrielino Indians occupied the area that later became the planning area. Their name is derived from their association with the San Gabriel Arcángel Mission during the Spanish period. These Native Americans also were known as the *Tongva*, which translates to "people of the earth." At the time of Spanish contact in the 18th century, they occupied a large swath of land along the California Coast that included most of present-day Los Angeles and Orange counties, plus several offshore islands. The Gabrielinos were one of the wealthiest, most populous, and reportedly most powerful ethnic nationalities in aboriginal southern California, and their influence spreads far to the north in the Central Valley and southern deserts.

The Gabrielinos lived in brush huts that were part of small villages with about 25 to 30 people. While no structures remain from this period of the planning area's prehistory or ethnohistory, there are several significant shell middens that have yielded important information regarding the lifestyles of these first inhabitants. It is also conceivable that, in the future, other village sites or satellite food procurement features may be uncovered during construction activities in certain parts of the planning area.

Historic Resources Overview

The Spanish and Mexican Eras (1770-1848)

European patterns of land use and ownership began when control of the area was taken from Native Americans by the Spanish approximately 200 years ago. The planning area became part of a large land grant made by the Spanish governor of California to one of his soldiers, Jose Manuel Nieto, around 1784. On May 22, 1834, Rancho Las Bolsas, which covered the 21 square miles in which the planning area, Westminster, and Garden Grove would develop, was granted to Catarina Ruiz, widow of Jose Antonio who was the son of Jose Manuel Nieto. After Mexico gained independence from Spain, a six square-mile rancho to the northwest, Rancho La Bolsa Chica, was split off and granted to Joaquin Ruiz in 1841. Americans

5 Michael Baker International. 2014. Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. May.
6 Bonterra Consulting. 2009. Phase I Cultural Resources Assessment for the Huntington Beach Poseidon Seawater Desalination Project. December.

began buying ranchos from the Mexicans in the 1850s, including Abel Stearns, who took over ownership of the Las Bolsas and La Bolsa Chica ranchos, which were transferred to the Stearns Rancho Company.

No buildings or structures representing the Spanish or Mexican land grant era are currently known to exist within the planning area.

Early Settlement and Agricultural Developments (1848-1919)

The early history of the planning area is tied largely to the development of ranches along the bluffs overlooking swamp lands and river channels. Pioneers were drawn to the region because of its potential for agricultural development. The Stearns Rancho Company decided to sell the swamplands to new settlers for a reasonable price, and sold the last of their holdings in 1896 to Colonel Bob Northam. Northam raised grains and sold seed to neighboring farmers and ranchers.

William T. and Mary Newland came to the area the same year and purchased acreage at the southeast edge of the mesa for farming. The Newlands farmed more than 500 acres of rich peat land, and raised celery, lima beans, chili peppers, sugar beets, and grain crops. William T. Newland died in 1933 and Mary Newland continued to operate the ranch without William into the 1940s.

The Newlands were not the only family to settle near the area's peatlands. A man named D.E. Smeltzer bought 40 acres from the Stearns holdings in the late 19th century and began to farm celery. Smeltzer's celery crop yields were substantial, and he formed the Earl Fruit Company and hired several workers, many of them Chinese, who lived in a company town that had formed in the area that is now known as Smeltzer. Other early settlers raised celery, alfalfa, corn, beets, and potatoes.

In the 1890s, there were a number of Chinese immigrants to the planning area who found work tending celery farms for farmers such as D.E. Smeltzer. As early as 1900, Japanese immigrants were beginning to settle in the area. Charles Mitsuji Furuta, a key member of the Japanese community in the planning area, came to the United States at the turn of the century and moved to Orange County in 1904.

Furuta leased land for farming for several years until he saved enough money to buy his own. He purchased five acres in 1908 and planted gum trees. After his marriage to Yukiko Furuta, they built a house that still stands on his property, at the intersection of what is now Warner Avenue and Nichols Lane. The Furutas later developed a thriving goldfish business, one of the largest in the nation.

By the late 1890s, a loose-knit network of small farming communities had developed, including Stanton, Westminster, Talbert, Gothard, Oceanview, and, most preeminently, Wintersburg. There were also fledgling communities, including Smeltzer and La Bolsa. All of these communities were linked by Huntington Beach Boulevard (now Beach Boulevard). Similarly, Wintersburg Avenue (now Warner Avenue) linked the communities of Long Beach, Sunset Beach, and Seal Beach with the agricultural lands in the planning area.

Architectural styles for this period in the planning area's history include brick or wood-front commercial buildings, along with Queen Anne and Late Victorian Era Vernacular residential housing. The Newland House still exists in the city, built in the Queen Anne Style. In 1974, the Huntington Beach Historical Society and the city negotiated an agreement for the restoration of the Newland House. Society volunteers worked to complete the major restoration tasks, and collected historical memorabilia, photographs, furniture, and artifacts for use in the house. Opened to the public in June of 1978, the Newland House now serves as a museum.

Wintersburg and Oceanview (1880s-1941)

Wintersburg was developed in the late 1880s, followed by Oceanview, which was located immediately to the east. Henry Winters is credited as the key figure for the creation of the Wintersburg community. In 1888, Winters came to California and purchased 20 acres of land in the Oceanview area of the planning area (near the intersection of present-day Warner Avenue and Beach Boulevard). He purchased several more acres for farming, including 20 acres in what would become Wintersburg and 20 acres in Fountain Valley. Through the efforts of Winters, the Orange County area became known for its celery production; so much so that he was named the president of the California Celery Company in 1898. Winters is credited as the

first person in Orange County to promote the agricultural value of peatlands, previously believed to not be good for cultivating. Other farmers were attracted to the Orange County area upon seeing Winters' success.

There were three principal crops that played important roles in the development of the area: celery, sugar beets and chili peppers. Orange County, and Wintersburg in particular, were known for their celery production due in part to the efforts of Henry Winters. In 1902, there were more than 2,000 acres of celery being raised in the peatlands of Wintersburg. Around the turn of the century, farmers began raising sugar beets. At least 1,000 acres were planted in Wintersburg alone. By 1909, the Colorado-based Holly Sugar Company began negotiations to build a sugar refinery in the planning area. The refining plant, which was completed in 1911, was a huge draw for new residents seeking jobs, and the population of the planning area essentially doubled as a result.

Charles Mitsuji Furuta and other Japanese farmers such as Masami Sasaki were instrumental in the transition from celery and beet crops to chili pepper crops. Sasaki was part of a large chili pepper growers' association that farmed thousands of acres and ran their own dehydrators and warehouses. By the 1920s, *Nikkei* farms (a term that refers to the Japanese community) were producing more than half the nation's supply of chili peppers.

An examination of U.S. Federal Census records from 1910 to 1930 reveals the diverse ethnic composition of the planning area's region. Most of the valuable agricultural lands in the planning area were held by a few families or companies, and then leased to tenant farmers, many of whom were Mexican and Japanese. This contract labor system was common to most of California's agricultural lands during the 20th century.

Although Wintersburg included residents of many different nationalities, its core agricultural workforce consisted primarily of Japanese immigrants and their families. In the early 1900s, the population of Wintersburg dramatically increased with large numbers of Japanese farmers settling in the area. By 1911, there were at least 800 Japanese men and women working in the peatlands surrounding the planning area.

As Wintersburg and its agriculture continued to prosper, demand for social institutions such as churches and schools grew. Two churches were constructed in Wintersburg, including the Wintersburg Methodist Church designed in 1906, known today as the Warner Avenue Baptist Church. The second Wintersburg church was the Japanese Presbyterian Church, built on land donated by Charles Mitsuji Furuta in 1932.

Apart from the Furuta family, other Japanese residents owned businesses in the community and worked together to establish the Wintersburg Japanese Presbyterian Mission, schools, and social institutions. In 1911, the Japanese women who resided in Wintersburg, Talbert, Smeltzer, and other nearby communities banded together to form the first Japanese ladies' society in the nation. A year later in 1912, a Japanese-language school was organized in a small house in Talbert for the children of the first Japanese families to settle in the planning area. This would be the first of several Japanese schools started in the area.

Following the Japanese bombing of Pearl Harbor in December 1941, many of the Japanese living and working in the planning area were forcibly removed and incarcerated by the federal government. By March 1942, the Federal Bureau of Investigation (FBI) had seized 250 Japanese residents, including Japanese priests, ministers, and language teachers, who were detained in southern California. Furuta, who was elected President of the Japanese Association in 1940, was taken by the FBI in early 1942 for questioning and later incarcerated with his family at Poston, Arizona. The houses of Japanese families incarcerated during wartime were later occupied by oil workers.

From 1942 through 1943, chili pepper production in California withered due to the incarceration of Japanese American farmers, who had contributed to the growth of more than half the nation's crop before the war. While it is not known how many Japanese families returned to the planning area after being forcibly removed and incarcerated, the Furuta family returned to Wintersburg shortly before the war ended to raise sweet peas and water lilies for another 30 years.

The Furuta family home, barn, ponds, and gardens are still standing at the corner of Warner Avenue and Nichols Street. The Warner Baptist Church, Japanese Mission, and Japanese Presbyterian Church also still exist within the planning area.

Beach Town Resort (1901-1920)

In 1901, the West Coast Land Company purchased 40 acres in what is now the planning area's Downtown. However, after constructing a pier and pavilion and creating a business district for their "Pacific City," the syndicate had run out of money and could not continue. They sold the company to a group of Los Angeles-based businessmen. The company, under new ownership, was named The Huntington Beach Company.

The Huntington Beach Company (Company) expanded its real estate holdings and was soon the principal land owner in the area. The Company laid out the planning area's early infrastructure in 1904. Electricity, water, telephone lines and roads were all installed, and the Company constructed a cemetery, a city dump and a hotel. Nearly all the lots in the original town site were reportedly sold by 1904. Henry Huntington extended his Pacific Electric "Red Car" railroad line from Long Beach to the planning area, and the first cars on the new line began running hourly in July of 1904. An 80-foot-wide boulevard was graded and oiled, running north to south along the bluff next to the Red Car line. The main thoroughfare would become known as Ocean Boulevard. The first business in town was reportedly built at the corner of Walnut Street and Main Street. Soon, other commercial lots were purchased and buildings erected.

In 1909, the city was formally incorporated and encompassed an area of 3.57 square miles. However, it was not until 1916 that City Engineer George W. Spencer surveyed and filed the Official Plat Map of the city.

While agriculture helped sustain the local economy, the beach and the pier were two of the most important tourist attractions. The planning area's first wooden pier, completed in 1902 of untreated wood, was replaced in 1914 with a new 1,350-foot-long concrete pier located at the foot of Main Street. The pier was lengthened by 500 feet in 1930, but the extension was destroyed in 1939 by a hurricane. The pier was reconstructed and reopened in 1940.

Another of the planning area's famous tourist attractions, the "Saltwater Plunge," was constructed in 1909 by The Huntington Beach Company. The enclosed, open-air structure was pumped full of sea water that was heated for a week's use before being drained and refilled. The surf was considered by many to be too dangerous and cold, so the heated water was very popular. A roof was added to the Saltwater Plunge in 1922 and filters were later installed to allow continual fresh water to be pumped into the pool. High school swimming teams and professional swimmers and divers made use of the plunge until 1961, when it was closed and demolished to make way for a hotel and office building.

Architectural styles for this period in the planning area's history include small hipped-roofed Neoclassical box residential houses, and simple front-gabled residential houses. The planning area's pier still exists at the end of Main Street, along with the 80-foot-wide boulevard, which was renamed as Ocean Boulevard and the Pacific Coast Highway.

Oil Boom Years (1920-1950)

In October 1919, Standard Oil leased land from the Huntington Beach Company for oil exploration in the northwestern area of the planning area. In May of that year, Standard Oil Company announced that the Huntington #1 well showed traces of oil, and it began producing about 100 barrels per day. At the same time, the Huntington #2 well became the first gusher in the field at 500 barrels per day. The Bolsa Chica #1 well was located a short distance from the first two Huntington wells. Following these discoveries, other major oil companies, including Union and General Petroleum, entered the field at the planning area. The population in the planning area increased from 815 in 1910 to 7,000 people in 1920.

Oil workers often were housed in tourist apartments over commercial buildings, with three men on different shifts sharing one room during the boom period of 1920-1922. Standard Oil Company leased the largest hotels in town, the Huntington Inn and the Evangeline, as boarding houses for single men. Later, the company gave up the leases and built bunk houses on the Barley Field oil lease for the workers. In 1930, the U.S. Federal Census designated the numbered streets between Orange Avenue and the Pacific Coast Highway (the 100-300 blocks) and south toward 9th Street as "Standard Oil Company Camp." This area was part of Standard Oil Company's fields, and those who occupied property in this section rented or leased

from the Standard Oil Company. Consequently, the nearby numbered streets were occupied by oil workers and their families, many from the Midwest, who lived in modest residential homes, intermixed with oil wells.

During the oil boom, new subdivisions were created around the perimeter of the oil field for oil workers and their families. These subdivisions included Midway City and Liberty Park, which were later annexed into the city. In 1947, approximately 70 percent of all the parcels in the original subdivision were developed. Liberty Park's success was largely due to its location along Beach Boulevard, which became the major thoroughfare between the beach communities and inland cities of Westminster, Buena Park, Orange, and Santa Ana. By 1964, the Liberty Park subdivision appears to have been fully developed with modest single-family residential homes.

Compelled to take some form of action to stabilize the expansion of oil drilling in the planning area, in September 1920, the Board of Trustees of Huntington Beach proposed a restricted zone, encompassing the west side residential area, an east side section, and the business district, in which oil drilling would be prohibited. Outside the restricted area, California Department of Oil and Gas statistics show that by April 1923, the field was producing 124,406 barrels of oil per day from 149 wells. The maximum production of the Huntington Beach Field was reached on July 13, 1923 at 127,163 barrels per day from 199 wells.

By November of 1926, city residents voted to lift drilling restrictions from the rest of the planning area except the Main Street commercial area. By 1928, Standard Oil leased the Pacific Electric right-of-way on the sand and placed drilling rigs near the shoreline. By the 1930s, the composition of the planning area had dramatically changed with the discovery of oil. The oil boom of the 1920s and 1930s resulted in a decline in farm land, as oil wells subsumed previously cultivated lands. Equally important was the decline of farm families and an increase in petroleum workers, many from the southwestern United States. Unfortunately, the great wealth generated by the discovery of oil in the planning area was not reinvested into other industrial development. Industries such as the Holly Sugar Refinery, the Huntington Beach Broom Factory, and the La Bolsa Tile Factory that had come to the planning area before the discovery of oil once provided a number of jobs for residents; however, with the increase in oil activity, these industries were forced to relocate or turn their focus to oil production. The Holly Sugar Refinery was converted to a petroleum refinery. The planning area remained a one-industry town and its geographical isolation prevented absorption into other thriving cities. Only in the late 1950s, after the freeways were located through Orange County, did the city incorporate the oil land and residential areas around the fields.

Between 1910 and 1950, there were significant changes in both the economic and cultural history of the planning area. Prior to 1930, the planning area was equally divided between agricultural or farm laborers and non-farm laborers, most of who lived in the core Downtown area. Excluding farm laborers, who were comprised primarily of Mexicans and Japanese, the Downtown area was occupied principally by Anglo-European families, most of whom were born in the United States. By 1930, census figures illustrated the in-migration of oil workers, primarily single men. This mass influx to the planning area included drillers, machinists, chemists, engineers, plumbers, truck drivers, steam engine operators, and cutters from across the United States, including Texas, Kansas, West Virginia, Mississippi, Pennsylvania, and Indiana.

Small one-story front-gable oil boom residences were constructed to support the influx of residents and oil drillers. Single-family residences typically consisted of wood framed Craftsman or Craftsman Airplane style, or Neo-Classical Cottage styles. The larger residences were constructed on bigger lots and typically had more stylistic ornamentation. A few dozen of the original circa 1920s-1930s single-story, wood-frame homes still exist within the Liberty Park neighborhood, surrounded by infill built since the 1940s. In addition, drilling derricks, single occupancy rental housing (such as 124 7th Street), and small commercial stores (such as 601 11th street) still exist within the planning area.

Surf Culture (1901-1950)

Like other southern California beach communities, the planning area offered a variety of outdoor recreation pursuits associated with the Pacific Ocean. While the city retains the official moniker of “Surf City, USA” to this day, most early-day residents and visitors to the planning area pursued much tamer recreation, such as bathing and fishing.

Today, it is hard to separate the sport of surfing from the planning area, which for many has become a commercial business and way of life. Interest in ocean sports in southern California received a major boost in the 1950s with the proliferation of magazines such as *The Skin Diver*, published in Lynwood beginning in 1951, and later *Surfer Magazine* in 1960. Other influences popularized beach recreation as well as bathing beauty contests and popular teen movies such as the Gidget films in the 1960s.

The recorded history of surfing itself, or "surf riding" as it was called early on, begins in the late 18th century, as noted in the Journal of Captain King, Cook's Voyages, on March 1779. Ancient Hawaiians left evidence of their sport, including petroglyphs or rock art of purported surf riders, carved into the lava-rocks and chants that tell the stories of great surfing feats.

Descriptions of surf riding began to emerge in southern California just after the turn of the 20th century. The advent of California surfing is generally attributable to the famed surf rider George Freeth, an Irish-Hawaiian, who relocated to Los Angeles County in 1907. He conducted surf riding demonstrations in southern California, including demonstrations at Redondo Beach, at the request of Henry Huntington in the spring of 1907 and at the inauguration of the second Huntington Beach pier in June 1914. By 1911, surf boards were being used for rescues in Long Beach and Venice. Almost simultaneously, surf riding spread from Redondo Beach and surrounding beaches to the south into Orange County.

In August 1927, longtime resident of the planning area Delbert “Bud” Higgins and Gene Belshe began to design new boards, and are credited with bringing modern surfing and surfboards to the planning area. Surfboard design continued to develop throughout the 1930s and 1940s as surfers used different materials and techniques, utilizing anything from old telephone poles to balsa wood. In the 1950s, surfboards were made of Styrofoam and resin, and skegs (i.e., fins) were added to assist in maneuvering the board.

Surfing gained mainstream popularity in the planning area in the 1950s, as was evidenced by the opening of surf clubs, surf shops, and the city's moniker "Surf City, USA." Gordie's was reportedly the first surf shop in the planning area. It opened in 1956 and was quickly followed by Jack's Surfboards in 1957.

In September 1959, the city hosted the first West Coast Surfboard Championship. Events included the men's open, women's open, boys 17 and younger, mixed tandem free style, and open race around the pier. On September 22, 1960, the second West Coast Surfing Championship was held again at the pier in the city. It was anticipated that there would be 200 surfers competing in the day-long event, and more than 7,000 spectators reportedly attended the competition.

By the early 1960s, surfing had become a mainstream accepted part of life in the planning area. Each year the West Coast Surfing Championships brought tourists and much needed income to the planning area to support its growing infrastructure. Surfing had evolved into a world-wide sport, and the planning area was ground-zero for recreational and professional surfers. Surfing contests had become an annual event with local meets held at various times during the year. By the early 1970s, Huntington Beach High School had formed the first "varsity" surf team in the United States.

The prominent architectural style during this period of the planning area’s history included small gabled and hipped one-story cottages built in areas close to the beach from 1905-1920, typically with Victorian or Craftsman-style influences. These early cottages were modest in scale and size, and most were typically used as seasonal cottages. Bungalow courts were another building type constructed within this era. These multi-family residences were typically constructed similar to single-family housing in scale and modest ornamentation. In addition, “Googie” style architecture reflecting Polynesian gardens, Tiki Rooms, and South Sea Islands emerged in Southern California and popularized the Polynesian influenced style.

Post World War II Boom Years (1946-Present)

Following World War II, factories and businesses previously outfitted for wartime production began to retool to address the quickly evolving post-war economy. Servicemen and women returning home from the war, a rapid rise in the birth rate in the country, and the creation of maritime ports such as Long Beach, created a marked need for new housing throughout Southern California.

In 1956, with the demand for electricity quickly rising due to the housing boom, the Southern California Edison Company greatly expanded its electrical generating plant located on the Pacific Coast Highway, one mile south of Main Street near Newland Avenue. Lights on the huge plant were visible for miles and became a locational point of reference for airplanes and ships. Soon Southern California Edison Company's Steam Plant had the second largest payroll in the planning area with 350 employees.

City annexations that had started in the mid-1940s continued throughout the 1950s, with several large annexations occurring between 1957 and 1960. By 1960, the city had grown from 3.57 square miles to more than 25 square miles, and many farmers requested annexation to the city primarily because of its sound tax base. By the 1970s, the city had reportedly become the fastest growing city in the continental United States as housing tract after housing tract blanketed great swaths of former farmland.

The 1960s witnessed the development of industries associated with aerospace and engineering, such as the establishment of McDonnell Douglas in the northern section of the planning area. By 1965, with approximately 6,800 employees, McDonnell Douglas provided the largest payroll in the planning area. Construction of housing tracts continued to respond to the demand for more residences. With construction of the new Interstate 405 in progress, the planning area needed to accommodate the social and economic needs of a maturing community by creating more industrial, commercial, and recreational spaces.

In 1961, the State of California purchased a privately owned three-mile stretch of beach northwest of the Downtown area. After years of uncontrolled use by campers, fishermen, and squatters who left the area littered with bottles, cans, and trash, this beach ultimately became the family recreation facility known today as Bolsa Chica State Beach. The 900 acres directly east of Sunset Colony and north of the former Tin Can Beach were once wrought with ambiguous land titles, the remnants of oil wells, and abandoned derricks, lack of fresh water, and the absence of civic support. Plans for an upscale harbor-based residential community had been in the works in the early 1960s. When permits were finally acquired, 620 acres of land and 258 acres of waterway were subdivided and developed at a cost of $200 million into what is known as "Huntington Harbour." The community is at the far north end of the planning area, immediately south of Seal Beach and running east toward Bolsa Chica Avenue. When the massive undertaking was finished, the new land and seascape offered 18 miles of waterfront property, shopping, sailing races, boating, fishing, swimming, and a variety of other recreation and activities.

Shopping malls were quickly gaining popularity with landowners, developers, and city planners in Orange County in the 1960s. The ability to attract shoppers from several nearby communities provided economic advantages. The Huntington Center was a $20 million development that opened in November 1966. The center was not only Orange County's only enclosed mall, but also one of the earliest of its type in the United States.

In 1965, the city established Golden West College, a community college designed for residents to further their education. The original campus of 15 buildings was located on 122 acres between Goldenwest, Edinger, McFadden and Gothard Avenues. It included a 370-seat lecture hall and classrooms for science, math, technology, the fine arts, and humanities. By 1967, the city had selected 10-acres on Talbert Avenue, including a portion of Talbert Lake, to construct a new library. The facility, located on a 10-acre site in the planning area's Central Park, was originally 70,000 square feet. In 1986, an $8.5 million expansion increased the size of the library to 120,000 square feet.

One of the most iconic buildings in the planning area that did not survive the onslaught of redevelopment was the "Golden Bear." The Spanish Revival/California Eclectic style building faced Pacific Coast Highway just south of Main Street. By the early 1960s, the Golden Bear Cafe had reemerged as a cabaret. Janis Joplin and many others played there while the venue was in operation. Junior Wells cut a live album there, and Peter Tork washed dishes there just prior to becoming one of the Monkees. In the 1970s, under new ownership by Rick and Charles Babiraki, the Golden Bear Café continued to grow as a seminal performance space. Linda Ronstadt, Patti Smith, Peter Gabriel, The Ramones, Neil Young, and dozens of major label acts visited the planning area to play at the Golden Bear Cafe. It was famous for booking an eclectic variety of poets, comedians, and musicians, including Huey Lewis, Muddy Waters, Bob Dylan, Robin Williams, and Charles Bukowski. The venue finally closed in 1986 and was subsequently demolished.

During the 1970s, the planning area experienced an aggressive development boom, and was considered one of the fastest growing cities in the nation. As more and more land was annexed during the late 1950s and early 1960s, large tracts of residential houses were constructed. Many of these tracts are located north and east of Edward's Hill and south of Beach Boulevard. In June 1974, the city dedicated one of its largest parcels of land and developed it into Central Park. Central Park is located in the middle of the planning area and encompasses roughly 350 acres. Central park includes two lakes, a natural area, an equestrian facility and trails, and a regional sports complex.

The rise in the oil industry resulted in several post-war residences and civic buildings within the planning area. Residences were built in the Minimal Traditional style, with lingering influences of early hipped-roof cottages. Other residences and civic buildings embraced the Mid-Century Modern architectural style.

California Historical Resources Information System (CHRIS) Records Search

A California Historical Resources Information System (CHRIS) Records Search was conducted to identify the presence/absence of cultural resources and historic buildings for the planning area and all lands within 1 mile. The results of the records search indicate that eight previously recorded cultural resources exist within the record search area and that a total of 68 resources are known within the 1 mile search radius. One of the eight previously recorded resources is a multi-component site containing resources of both Prehistoric and Historic ages. The remaining resources consist of three Prehistoric sites and four Historic age sites. The multi-component site contains lithic debitage and cores, mano fragments, fire affected rock, and worked glass. The three prehistoric sites consist primarily of small lithic tools and debitage, manos, metates and notably a phallic fetish, effigy and bowl made of stone. Notably, CA-ORA-346 contained three burials. The four historic sites consist of two residences, a church and an oil infrastructure.

There are also two existing properties included in the Directory of Historic Properties, a short length of the East Garden Grove-Wintersburg Channel and the Huntington Youth Shelter. East Garden Grove Wintersburg Channel was built in 1959 for the purpose of collecting stormwater and urban runoff from neighboring cities and diverting them to the Bolsa Chica Wetlands. The channel comes into contact with the Area of Potential Effect (APE) in the southeast portion of Goldenwest Street and the south west portion of Gothard Street, north of Warner Avenue. The Huntington Youth Shelter was built in 1950 and is in the southern end of the eastern APE block, near the intersection of Gothard Street and Talbert Avenue.

Additional information on the records search and specific resources identified can be found in the Huntington Beach Cultural Letter Report.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966 and its implementing regulations (36 Code of Federal Regulations Part 800, as amended in 1999) requires federal agencies to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP).

The NRHP is a register of districts, sites, buildings, structures, and objects of significance in American history, architecture, archaeology, engineering, and/or culture. The NRHP is administered by the National Park Service (NPS), which is part of the U.S. Department of the Interior. Cultural resources can be significant on the national, state, or local level. Properties may be listed in the NRHP if they are generally 50 years of age and possess integrity of location, design, setting, materials, workmanship, feeling, and association, and if they meet at least one of the following criteria:

A. Are associated with events that have made a significant contribution to the broad patterns of our history;

B. Are associated with the lives of persons significant in our past;

C. Embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess an artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

Listing in the NRHP does not entail specific protection or assistance for a property, but it does guarantee recognition in planning for federal or federally assisted projects, eligibility for federal tax benefits, and qualification for federal historic preservation assistance. The NRHP is influential beyond its statutory role because it achieves uniform standards of documentation and evaluation. Additionally, project effects on properties listed in the NRHP must be evaluated under CEQA.

State Plans, Policies, Regulations, and Laws

Assembly Bill 52

Assembly Bill (AB) 52 requires that lead agencies undertaking CEQA review must, upon request of a California Native American tribe, begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a project. Where a tribe requests, in writing, that a public agency inform it of proposed projects, the lead agency must notify the tribe within 14 days of determining that a project application is complete or deciding to undertake a project. If the tribe responds by requesting consultation within 30 days of the notification, the lead agency must begin the consultation process within 30 days of receiving the request. In addition, under AB 52, lead agencies must evaluate a project's potential impact to a "tribal cultural resource". A tribal cultural resource is defined as a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American tribe.

California Health and Safety Code Section 7050

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, the contractor or the project proponent must immediately halt potentially damaging excavation in the area of the burial and notify the County Coroner to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the Native American Heritage Commission (NAHC) by phone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). Following the coroner's findings, the property owner, contractor or project proponent, and the NAHC-designated Most Likely Descendent shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting on notification of a discovery of Native American human remains are identified in Public Resources Code Section 5097.9.

Senate Bill 18

Senate Bill (SB) 18 requires that cities and counties contact, and consult with, California Native American tribes before adopting or amending general plans, specific plans, or when designating land as open space. The intent of SB 18 is to establish meaningful consultation between tribal governments and local governments at the earliest possible point in the planning process, to avoid potential conflicts, and to allow tribes to manage and act as caretakers of cultural places. A Native American cultural place is defined in Public Resources Code Sections 5097.9 and 5097.995 as "any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine" (Section 5097.9), or as "a Native American historic, cultural or sacred site, that is listed or may be eligible for listing in the California Register of Historical Resources…including any historic or prehistoric ruins, any burial ground, or any archaeological or historic site" (Section 5097.995).

California Register of Historical Resources

The California Register of Historical Resources (CRHR) includes resources that are listed in, or are formally determined eligible for listing on, the NRHP, as well as some California State Landmarks and Points of

Historical Interest (Public Resources Code Section 5024.1, 14 California Code of Regulations, Section 4850). Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA, unless a preponderance of evidence indicates otherwise (CEQA Guidelines Section 15064.5[a][2]). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. Cultural resources may be eligible for listing in the CRHR if they:

1) Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2) Are associated with the lives of persons important in our past;

3) Embody the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4) Have yielded, or may be likely to yield, information important in prehistory or history.

California State Historical Landmarks

California officially began commemorating sites that convey statewide historic importance of the state in 1932. California Historical Landmarks (CHLs) are buildings, structures, sites, or places that have been determined to have statewide historical significance and meet specific criteria. The resource also must be approved for designation by the county or local jurisdiction, be recommended by the State Historical Resources Commission, and be officially designated by California State Parks. CHLs are automatically listed in the CRHR.

California Points of Historical Interest

California Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific, technical, religious, experimental, or other value. No historical resource may be designated as both a CHL and a Point of Historical Interest. If a Point of Historical Interest is subsequently granted status as a CHL, the Point designation will be retired. To be eligible for designation as a Point of Historical Interest, a resource must meet at least one of the following criteria. It must be:

1) The first, last, only, or most significant of its type in the state or within the local geographic region (city or county);

2) Associated with an individual or group having a profound influence on the history of the local area;

3) A prototype of, or an outstanding example of, a period, style, architectural movement, or construction; or

4) One of the more notable works or the best surviving work in the local region of a pioneer architect, designer or master builder.

Regional and Local Plans, Policies, Regulations, and Ordinances

Huntington Beach General Plan Historic and Cultural Resource Element

The adopted Huntington Beach General Plan Historic and Cultural Resource Element contains a discussion of historic and cultural resources within the city. The General Plan lists adopted policies designed to protect and preserve archaeological and paleontological resources. These policies were adopted to support the city's commitment to, and objective of, identifying and preserving architecturally, historically, or archeologically significant sites, structures, and districts, and paleontological resources within the city.

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Energy

This section describes energy resources within the city of Huntington Beach. The information in this section is based on the Greenhouse Gas Emissions Inventory and Forecast Technical Report prepared by Michael Baker International[1].

ENVIRONMENTAL SETTING

Energy Setting

California is the most populous state in the United States, and its total energy demand is second only to Texas[2]. However, California state policy promotes energy efficiency, and it has one of the lowest per capita total energy consumption levels, ranking 49th in the U.S. in 2012. The state's extensive efforts to increase energy efficiency and the implementation of alternative technologies have restrained energy demand growth. In addition, California's mild weather minimizes energy demand for heating and cooling.

To measure energy use within the planning area, energy consumption inventories are broken down into different sectors. The different energy sectors include the following:

- Residential energy: electricity and natural gas used in residential settings;
- Non-residential energy: electricity and natural gas used in non-residential settings, including offices, stores, restaurants, and industries; and
- Water and wastewater: energy used (in the form of electricity) to treat and pump water used and wastewater created, along with the energy used from the processing of wastewater.

As detailed in the Greenhouse Gas Emissions Inventory and Forecast Technical Report, inventories of the city energy use was collected for the years 2005 and 2012, showing the energy trends over time.

Residential and Non-Residential Energy Use

Electricity

Southern California Edison (SCE) is the electricity provider to the city. Major SCE facilities located in the planning area include a generating station, six substations, and switching yards. The SCE electrical system begins with the generating stations that send power to a transformer. The transformer then distributes the electricity through the switching yards to the distribution lines, which then are disbursed throughout the planning area. The distribution lines may be underground or on electrical poles that connect to households and businesses and supply electrical energy to the users.

Electricity provided by SCE is broken down into residential buildings, non-residential uses, and direct access[3]. Residential buildings include single-family and multi-family homes located throughout the planning area. Non-residential buildings include offices, stores, restaurants, and industrial uses throughout the planning area. Direct access electricity is electricity purchased from a source other than the normal electricity provider. Although SCE does not indicate which customers or types of activities purchase direct access electricity, it is most likely major industrial operations.

1 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory and Forecast Technical Report. May 23.
2 Energy Information Administration (EIA). 2014. California State Energy Profile. Accessed October 20, 2014, available at http://www.eia.gov/state/print.cfm?sid=CA
3 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory and Forecast Technical Report. May 23.

As detailed in Table 1, the city used a total of 1,211,966,610 kilowatt-hours (kWh) of electricity in 2005[4]. Residential buildings used 485,753,410 kWh (40 percent), while nonresidential electricity used 601,304,530 kWh (50 percent). The remaining 124,908,670 kWh (10 percent) was direct access electricity purchased from a provider other than SCE. By 2012, the city used a total of 1,190,357,920 kWh. The city residential customers used 487,243,550 kWh (41 percent), non-residential purposes used 598,350,330 kWh (50 percent), and direct access electricity accounted for nine percent of electricity use, equating to 104,764,040 kWh.

From 2005 to 2012, the city reduced electricity use by 2 percent. The largest reduction of electricity came from the direct access subsector, with a reduction of 16 percent over the seven-year period. This decrease may be the result of some direct access customers closing down during this period, coinciding with the economic downturn. Alternatively, some direct access customers may have ended their direct access contracts and begun obtaining electricity from SCE.

TABLE 1
ELECTRICITY ACTIVITY DATA

Subsector	2005 Electricity (kWh)	Percentage of 2005 Total	2012 Electricity (kWh)	Percentage of 2012 Total	2005-2012 Percent Change
Residential Electricity	485,753,410	40%	487,243,550	41%	<1%
Non-residential Electricity (SCE)	601,304,530	50%	598,350,330	50%	<-1%
Direct Access Electricity	124,908,670	10%	104,764,040	9%	-16%
Total	**1,211,966,610**		**1,190,357,920**		**-2%**

Source: Michael Baker 2014

Note: Due to rounding, the totals may not equal the sum of the individual parts.

Natural Gas

The Southern California Gas Company (SCG) is the planning area's natural gas provider. The SCG receives its supply of natural gas from several sources, including southern California, northern California, and out-of-state suppliers. The out-of-state natural gas enters California through transmission lines, which contain natural gas ranging from 500 to 1,000 pounds of pressure. These lines connect to transmission compressor stations that decrease the pressure to 150 to 500 pounds and clean the natural gas. From the compressor stations, the natural gas is transmitted through supply lines to distribution stations to further reduce pressure, and the gas is then provided to consumers.

Like electricity, natural gas consumers consist of residential customers and non-residential customers[5]. The planning area is home to the AES Huntington Beach natural gas-fired power plant, which is among the largest power plants in California as measured by output. AES Huntington Beach, like other very large natural gas users, does not buy natural gas from retail-serving companies like SCG, but instead purchases it directly from suppliers or from other entities. Therefore, non-residential natural gas use, as detailed in Table 2, does not include natural gas used by AES Huntington Beach. Instead, Table 2 describes natural gas supplied by SCG, which provides natural gas to end-use customers in the planning area.

4 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory and Forecast Technical Report. May 23.
5 Ibid

As detailed in Table 2, SCG supplied 40,484,550 therms of natural gas to the planning area in 2005. Residential customers used 31,156,530 therms (77 percent), while non-residential customers used 9,328,020 therms (23 percent). In 2012, SCG customers in the planning area used 40,574,040 therms of natural gas. Residential uses accounted for 75 percent of the total, or 30,363,590 therms, while non-residential uses comprised the remaining 25 percent, or 10,210,450 therms.

From 2005 to 2012, the city increased natural gas use by less than 1 percent. Non-residential uses increased by 9 percent over the seven-year period, while residential natural gas use decreased by 3 percent.

TABLE 2
NATURAL GAS ACTIVITY DATA

Subsector	2005 Therms	Percentage of 2005 Total	2012 Therms	Percentage of 2012 Total	2005-2012 Percent Change
Residential Natural Gas	31,156,530	77%	30,363,590	75%	-3%
Non-residential Natural Gas	9,328,020	23%	10,210,450	25%	9%
Total	**40,484,550**		**40,574,040**		**<1%**

Source: Michael Baker 2014

Note: Due to rounding, the totals may not equal the sum of the individual parts.

Water and Wastewater Energy Use

Water

The city provides water service to residential customers and businesses[6]. A majority of the city water (roughly two-thirds) comes from local groundwater, while the remaining portion is imported from the Municipal Water District of Orange County (MWDOC). Water from the MWDOC comes from regional groundwater and surface water supplies, recycled water, and water obtained from the State Water Project and the Colorado River. Electricity is needed to extract, convey, treat, and distribute the water supply throughout the planning area. The amount of electricity needed varies depending on the source of the water. Table 3 shows the amount of energy (in kWh) per million gallons (MG) needed to extract, convey, and treat imported water. The kWh per MG values listed in Table 3 are unique to the city and are reported as the electricity use of the city water infrastructure.

As detailed in Table 4, the city supplied 10,630 MG of water to customers in 2005, resulting in a total electricity use of 23,253,970 kWh. Of this total, 5,356,940 kWh (23 percent) was used to distribute water to customers through the city water infrastructure, while the majority of electricity, 17,897,030 kWh (77 percent), was used to process and deliver imported water to the planning area. The city supplied 9,710 MG of water to customers in 2012, requiring 21,830,840 kWh. Of this total, 4,894,040 kWh (22 percent) was used to distribute water to customers, and 16,936,800 kWh (78 percent) was used to process and deliver imported water.

It is important to note that the 2005 data detailed in Table 4 excludes customers in the community of Sunset Beach, as the community was not incorporated into the city until 2011. Water use in Sunset Beach is, therefore, not part of the community total in 2005, but is included in 2012. Despite the community of Sunset Beach being added to the 2012 city total, the city reduced its electricity use from water by 6 percent over the seven-year period.

6 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory and Forecast Technical Report. May 23.

TABLE 3
STATE AVERAGES OF EMBEDDED ENERGY IN WATER, BY ACTIVITY AND SOURCE

Activity	kWh per MG
Extraction	
Surface water	0
Groundwater	4[(1)]
Conveyance	
State Water Project	8,235[(2)]
Colorado River	6,140
Local sources	120
Treatment	
All sources	100

Source: Michael Baker 2014

(1) kWh per MG per foot of well depth

(2) kWh per MG for the State Water Project varies by location. The figure given here is for the Los Angeles region.

TABLE 4
WATER ACTIVITY DATA

Subsector	2005 MG	2005 Electricity (kWh)	Percentage of 2005 Total	2012 MG	2012 Electricity (kWh)	Percentage of 2012 Total	2005-2012 Percent Change
Local water infrastructure	6,950	5,356,940	23%	6,020	4,894,040	22%	-9%
Imported Water	3,690	17,897,030	77%	3,690	16,936,800	78%	-5%
Total	**10,630**	**23,253,970**		**9,710**	**21,830,840**		**-6%**

Source: Michael Baker 2014

Note: Due to rounding, the totals may not equal the sum of the individual parts. 2005 data excludes customers in the community of Sunset Beach as the community was not incorporated into the city until 2011.

Wastewater

Wastewater treatment service in the city is provided by the Orange County Sanitation District (OCSD)[7]. The city operates infrastructure within the city limits to convey wastewater from properties to OCSD treatment plants. Similar to water, wastewater activity includes electricity needed to convey, treat, and discharge wastewater.

In 2005, uses within the planning area (not including the community of Sunset Beach) generated wastewater that required 8,671,310 kWh of electricity for conveyance and treatment (Table 5). Of this total, 998,120 kWh (12 percent) was used by the city wastewater delivery infrastructure and 7,673,190 kWh (88 percent) was used by the OCSD to treat and discharge wastewater. In 2012, uses within the planning area generated wastewater that required 7,922,950 kWh of electricity for conveyance and treatment. Of this total, 906,990 kWh (11 percent) was used by the city wastewater delivery infrastructure and 7,015,960 (89 percent) was used by the OCSD to treat and discharge the wastewater. Despite the community of Sunset

7 Michael Baker International. 2014. Greenhouse Gas Emissions Inventory and Forecast Technical Report. May 23.

Beach being added to the 2012 city total, the city reduced its electricity use due to wastewater conveyance and treatment by 9 percent over the seven-year period.

TABLE 5
WASTEWATER ACTIVITY DATA

Subsector	2005 Electricity (kWh)	Percentage of 2005 Total	2012 Electricity (kWh)	Percentage of 2012 Total	2005-2012 Percent Change
City delivery infrastructure	998,120	12	906,990	11	-9%
OCSD treatment and discharge	7,673,190	88	7,015,960	89	-9%
Total	**8,671,310**		**7,922,950**		**-9%**

Source: Michael Baker 2014

Note: Due to rounding, the totals may not equal the sum of the individual parts. 2005 data excludes customers in Sunset Beach as the community was not incorporated into the city until 2011.

Energy Production

In addition to consuming energy, the city produces energy through solid waste disposal, oil drilling, and electricity production from the AES Huntington Beach power plant, as discussed below.

Solid Waste

In 2005 and 2012, approximately two tons and five tons of the city's solid waste, respectively, were sent to a facility to be burned for energy. Waste-to-energy (WTE) facilities feed unrecyclable garbage into a furnace, and the steam generated from burning the trash is used to drive a turbine generator, thereby producing electricity. There are three WTE facilities in California located in Commerce, Long Beach, and Stanislaus County[8]. These three facilities have a combined capacity to burn approximately 2,540 tons of trash per day, and generate approximately 69.5 megawatts (MW) of electricity. The city's solid waste burned for energy accounted for less than 1 percent of the facilities' capacity. The electricity produced at the Stanislaus County WTE facility is sold to Pacific Gas & Electric, while the Long Beach and Commerce WTE facilities sell their electricity to Southern California Edison.

Oil Drilling

Oil was first discovered in the planning area in 1920, and while local drilling reached a peak in the 1960s, oil extraction continues to occur in the planning area. In the U.S., oil is mostly used for transportation or home heating purposes, although a small percentage is used as a fuel for electricity-generating plants[9]. Crude oil is removed from the ground by drilling deep wells and pumping it to the surface. The oil then is transported to a refinery, where it is refined into fuel products such as gasoline, kerosene, propane, and industrial fuels. From the refinery, oil is transported to power plants by ship, pipelines, truck, or train. At power plants, oil can be used to generate electricity through methods such as boilers that create steam, or it can be burned in combustion turbines. Approximately 338,260 barrels of oil were extracted within the planning area's limits in 2005, and approximately 337,390 barrels of oil were extracted in 2012. However, it is difficult to calculate the amount of the city oil that was used as fuel for electricity-generating plants.

AES Huntington Beach Power Plant

AES Huntington Beach is a natural gas power plant located within the planning area, and is among the largest power plants in California as measured by output. The facility generates approximately 450 MW of

8 Energy Recovery Council (ERC). 2016. ERC Directory of Waste-To-Energy Plants.
9 U.S. Environmental Protection Agency (EPA). 2013. Electricity from Oil. Accessed November 12, 2014, available at http://www.epa.gov/ cleanenergy/energy-and-you/affect/oil.html

electricity, enough power to light more than 400,000 California homes and businesses[10]. The energy produced from the AES Huntington Beach facility is critical in replacing electricity no longer produced from the San Onofre Nuclear Generating Station. AES Huntington Beach sells the generated electricity to utilities, wholesalers, and commercial buyers through both long-term contracts and in competitive markets. AES recently received approval to decommission their existing plant and construct a new plant that does not use ocean water cooling (per State mandate). The new plant will have a capacity of up to 844 MW, but, if constructed, the earliest it would be online is 2020.

REGULATORY SETTING

Federal Policies and Laws

National Energy Act

The National Energy Act of 1978 was a legislative response by the U.S. Congress to the 1973 energy crisis. It includes the following statutes:

- Public Utility Regulatory Policies Act (Public Law 95-617): Passed by Congress in 1978 to promote greater use of renewable energy. This law created a market for nonutility electric power producers to permit independent power producers to connect to their lines and to pay for the electricity that was delivered. Although a federal law, implementation was left to the states and a variety of regulatory regimes developed; virtually nothing was done in many states.

- Energy Tax Act (Public Law 95-318): Passed by Congress in 1978 as a response to the 1973 oil crisis and promoted fuel efficiency and renewable energy through taxes and tax credits.

- National Energy Conservation Policy Act (NECPA) (Public Law 95-619): NECPA requires utilities to provide residential consumers with energy conservation audits and other services to encourage slower growth of electricity demand. NECPA was amended in 1985 by the Energy Policy and Conservation Act Amendments of 1985 (Public Law 99-58).

Energy Policy Act

The Energy Policy Act of 2005 (House Resolution 6) was signed into law by President Bush on August 8, 2005. The Act established a number of federal agency goals for federal facilities and fleets and amended portions of the NECPA. The Act set federal energy management requirements for metering and reporting, energy-efficient product procurement, energy savings performance contracts, building performance standards, renewable energy requirements, and alternative fuel use[11].

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) regulates the interstate transmission of electricity, natural gas, and oil[12]. FERC is the U.S. federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. FERC also reviews and authorizes liquefied natural gas terminals, interstate natural gas pipelines, and nonfederal hydropower projects. Electricity is run by the states; however, FERC has jurisdiction over certain matters.

10 AES California. 2013. AES Huntington Beach. Accessed November 12, 2014, available at http://www.aescalifornia.com/facilities/huntington-beach

11 U.S. Department of Energy (DOE). 2014. Energy Policy Act of 2005. Accessed on October 23, 2014, available at http://www1.eere. energy.gov/vehiclesandfuels/epact/

12 Federal Energy Regulatory Commission (FERC). 2014. What FERC Does. Accessed October 23, 2014, available at http://www.ferc.gov/about/ferc-does.asp

State Plans, Policies, and Laws

Senate Bill 1037 and Assembly Bill 2021

SB 1037, signed into law in September 2005, mandates that all publicly owned utilities report to the California Energy Commission (CEC) on cost-effective and feasible energy efficiency programs. The CEC is the state's primary energy policy and planning agency. AB 2021 was created in 2006 and built upon SB 1037, further requiring publicly owned utilities to develop energy efficiency targets on a triennial basis. The CEC is authorized to set targets for all municipal utilities.

California Public Utilities Commission General Order 131-D

The California Public Utilities Commission (CPUC) has authority to set electric rates, regulate natural gas utility service, protect consumers, promote energy efficiency, and ensure electric system reliability. It also has jurisdiction over the siting of natural gas transmission lines. CPUC General Order 131-D (adopted by Decision 94-06-014 and modified by Decision 95-08-038) contains the rules for the planning and construction of new transmission facilities, distribution facilities, and substations. This decision requires utility companies to obtain permits to construct certain power line facilities or substations if the voltage would exceed 50 kilovolts (kV), or if the substation would require the acquisition of land or an increase in voltage rating above 50 kV. Utilities do not need to comply with this decision for distribution lines and substations with voltage less than 50 kV; however, they must obtain any nondiscretionary local permits required for the construction and operation of these projects. Compliance with CEQA is required for construction of facilities.

Senate Bills 1078, 107, and X1-2, and Executive Order S-14-08

SB 1078 created the California's Renewable Portfolio Standard in 2002, which originally required retail electricity providers to procure at least 1 percent of their electricity supplies from renewable resources to achieve a 20 percent renewable mix by no later than 2017[13]. In 2006, SB 107 accelerated the previous standard by requiring 20 percent of electricity retail sales be served by renewable energy by 2010. In 2008, Executive Order S-14-08 was signed requiring that all retail sellers of electricity must serve 33 percent of their load with renewable energy by 2020. SB X1-2 was signed in 2011 to codify the 33 percent renewable standard, which applies to publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. The bill also includes interim targets of procuring 20 percent renewable energy by 2014 and 25 percent renewable energy by 2017.

Regional and Local Plans

Huntington Beach Energy Action Plan

The city created an Energy Action Plan (EAP) in 2011 to measure the energy used by the city municipal buildings and facilities[14]. The EAP evaluated the city municipal use in 2005 and 2009, and projected the city municipal energy use to 2020. In addition, the EAP described the city's recent energy retrofits and energy efficiency projects, and set goals to increase the energy efficiency of the city municipal buildings over time. Some of the EAP's goals include the following:

- Reduce city facility energy use by 20 percent from a 2005 baseline by 2020;
- Achieve platinum partner status with SCE through 20 percent energy savings both community wide and in government facilities; and
- Seek funding to continuously improve value for taxpayer expenditures on energy.

13 California Energy Commission (CEC). 2014. Renewable Portfolio Standard. Accessed October 23, 2014, available at http://www.energy.ca.gov/portfolio/
14 Huntington Beach, City of. 2011. Energy Action Plan. April 12.

California Code of Regulations (CCR) Title 24

New buildings in California are required to conform to energy conservation standards specified in Title 24 of the CCR. The standards establish “energy budgets” for different types of residential and non-residential buildings, which all new buildings must comply with. The energy budget has a space-conditioning component and a water-heating component, both expressed in terms of energy (British thermal units [BTU]) consumed per year. The regulations allow for trade-offs within and between the components to meet the overall budget. Energy consumption of new buildings in California is regulated by the State Building Energy Efficiency Standards, embodied in Title 24 of the CCR. The efficiency standards apply to new construction of both residential and nonresidential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The building efficiency standards are enforced through the local building or individual agency permit and approval processes. The city requires all new buildings to meet Title 24 standards.

Geology, Soils, and Mineral Resources

This section describes the geology, soils, and mineral resources within the planning area. Information in this section is based on the Natural and Environmental Hazards Technical Report prepared by Michael Baker International[1].

ENVIRONMENTAL SETTING

Regional Geology

The planning area encompasses 29.6 square miles on the western edge of Orange County. The planning area is located within the Coastal Plain of the Peninsular Ranges Geomorphic Province of California. This area is characterized by northwest-southeast-trending mountain ranges intermingled with low-lying valleys and coastal plains. Bordered by the Transverse Range Geomorphic Province to the north and northeast, the Colorado Desert Geomorphic Province to the east, and the Pacific Ocean to the west, this province contains a portion of one of the largest geologic units in western North America, a large portion of which extends south into Baja California, Mexico.

Surficial Geology/Soils

This area of the Peninsular Ranges Geomorphic Province is characterized by Quaternary-aged (Pleistocene [11,000 to 1,600,000 years] and Holocene [less than 11,000 years]) deposits. The older sediments typically are shallow marine terrace deposits that have been uplifted by seismic activity. These terraces are most prominent along the Bolsa Chica and Huntington Beach mesas. The surficial deposits mapped along these two mesas are characterized as old lacustrine, playa, and estuarine (paralic) deposits, which are characterized as slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types.

The Bolsa Chica and Huntington Beach mesas are surrounded and separated by young alluvial fan deposits (Holocene to Late Pleistocene) that are interbedded with paralic and young paralic deposits. The paralic and young paralic deposits are similar to the older paralic deposits; however, they are less consolidated. In addition, the young alluvial fan deposits are characterized by unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon. Many areas within these low-lying portions of the planning area also are known to contain peat and organic soils, which can be problematic from a geological perspective and often contain high levels of methane gas.

Geologic Hazards

Earthquake Faults and Fault Rupture

Earthquake magnitude generally is measured on a logarithmic scale known as the Moment Magnitude Scale (M). This scale describes a seismic event in terms of the distance a fault moves and the force required to move it. In contrast, the Modified Mercalli Intensity scale describes the magnitude of an earthquake in terms of actual physical effects. Table 1 compares the Modified Mercalli Intensity scale to the Moment Magnitude Scale, providing a summary of the two scales and how they relate to one another.

1 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.

TABLE 1
EARTHQUAKE MAGNITUDE/INTENSITY COMPARISON[2]

Moment Magnitude	Typical Modified Mercalli Index Intensity—Description
<3.0	I. Not felt except by a very few under especially favorable circumstances (I Rossi-Forel scale).
3.0–3.9	II. Felt only by a few persons at rest, especially on upper floors of high-rise buildings. Delicately suspended objects may swing.
	III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing automobiles may rock slightly. Vibration like passing of truck. Duration estimated.
4.0–4.9	IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like a heavy truck striking a building. Standing automobiles rocked noticeably.
	V. Felt by nearly everyone, many awakened. Some dishes, windows, and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
5.0–5.9	VI. Felt by all, many frightened and run outdoors. Some heavy furniture moved; few instances of fallen plaster and damaged chimneys. Damage slight.
	VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars.
6.0–6.9	VII. See above.
	VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving cars disturbed.
	IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
7.0 and Higher	VIII. See above.
	IX. See above.
	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks.
	XI. Few if any (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
	XII. Damage total. Waves seen on ground surface. Lines of sight and level distorted. Objects thrown into air.

Surface rupture describes cracking or breaking of the ground along a fault during an earthquake. Structures built over an active fault can be torn apart if the ground ruptures.

Earthquake faults located within the region that could affect the planning area are identified in Figure 1 and listed in Table 2.

2 USGS. 2014. Magnitude/Intensity Comparison. Available at http://earthquake.usgs.gov/learn/topics/mag_vs_int.php. Accessed October 31, 2015.

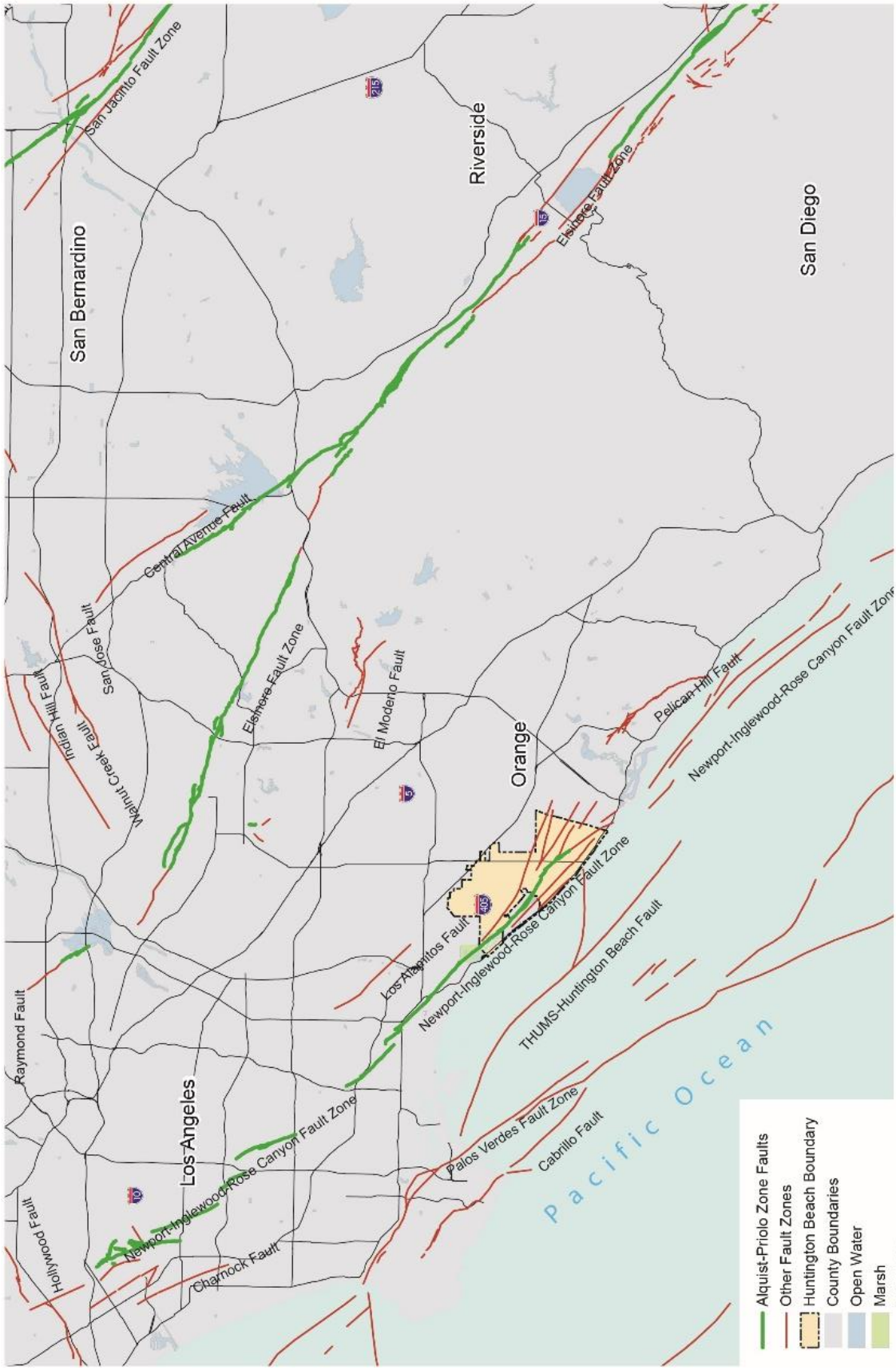


FIGURE 1
REGIONAL FAULT LOCATIONS

TABLE 2
EARTHQUAKE FAULTS

Name	Distance from City Center (miles)	Fault Type	Orientation (compass direction)	Maximum Probable Magnitude (Moment [Mw])
San Andreas Fault Zone	51	Right Lateral Strike Slip	NW–SE	6.8–8.0
Newport-Inglewood Fault Zone	Less than 2	Right Lateral Strike Slip	NW–SE	6.0–7.4
Elsinore Fault Zone	28	Right Lateral Strike Slip	NW–SE	6.5–7.5
San Jacinto Fault Zone	48	Right Lateral Strike Slip	NW–SE	6.5–7.5
San Joaquin Hills Thrust Fault	30	Blind Thrust	E–W	6.8–7.2
Puente Hills Thrust Fault	25	Blind Thrust	E–W	7.0–7.5 (approximate)

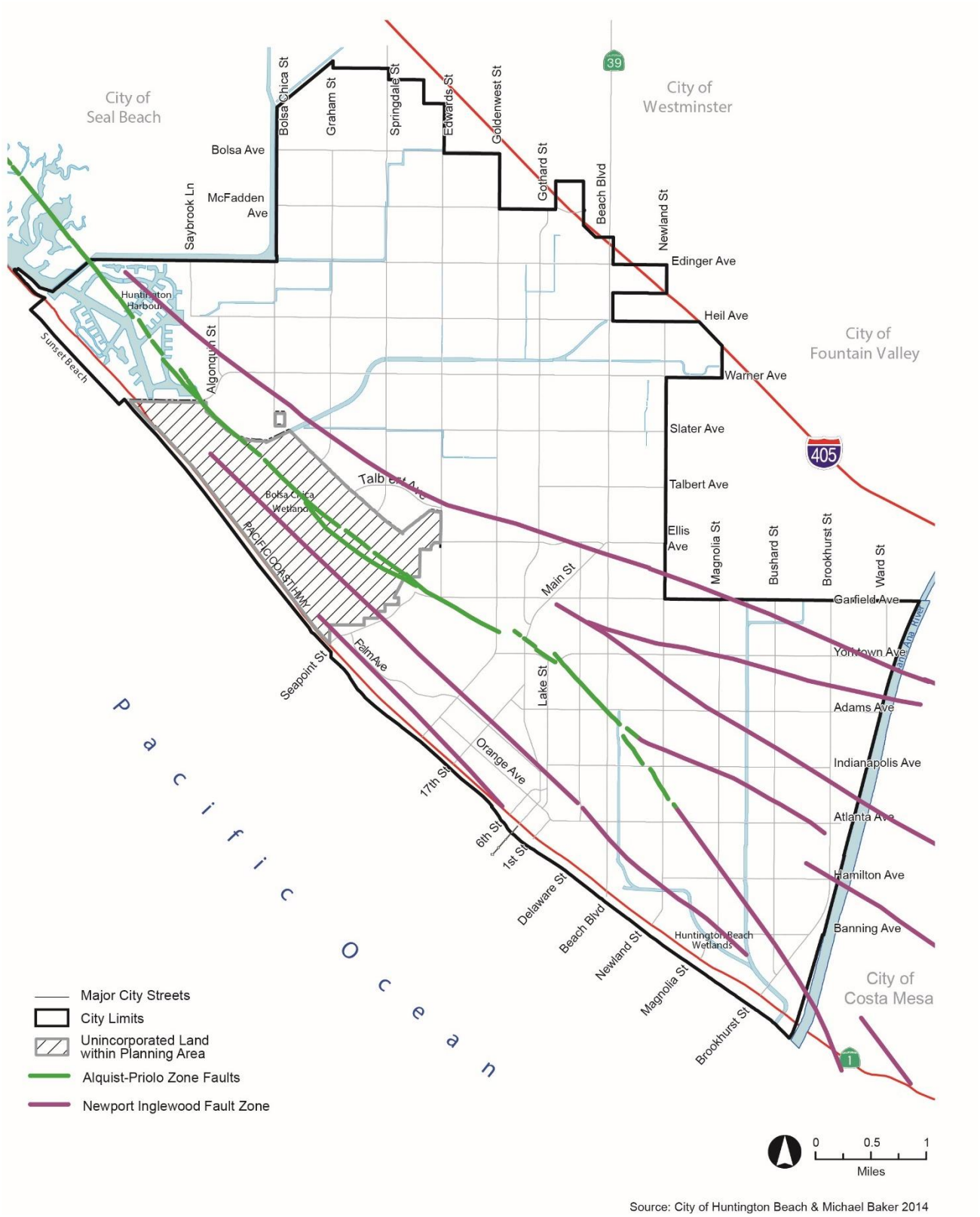
Sources: SCEC 2014

San Andreas Fault Zone. The San Andreas Fault is located approximately 70 miles east of Huntington Beach. This fault is the dominant active fault in California and is the main element of the boundary between the Pacific and North American tectonic plates, extending approximately 650 miles from Cape Mendocino in Northern California to east of San Bernardino in Southern California. This fault was the source of the 1906 San Francisco earthquake, which resulted in some 700 deaths and millions of dollars in damage. The southern section of the fault is currently of greatest concern to the scientific community. Geologists can demonstrate that at least eight major earthquakes (magnitude 7.0 and larger) have occurred along the southern San Andreas Fault in the past 1,200 years, with an average spacing in time of 140 years, plus or minus 30 years. The last such event occurred in 1857 (the Fort Tejon earthquake). Based on that evidence and other geophysical observations, the Working Group on California Earthquake Probabilities has estimated the probability of a similar rupture (magnitude 7.8) to be about 50 percent between years 1994 and 2024 (a 30-year range). The range of probable magnitudes on the San Andreas Fault Zone is reported to be 6.8–8.0[3].

Newport-Inglewood Fault. The Newport-Inglewood Fault Zone is an active right-lateral fault system consisting of a series of fault segments located mostly parallel to the coastline. This fault is considered the second most active fault in California. It extends from the Santa Monica Mountains southeastward through the western part of Orange County to the offshore area near Newport Beach. This fault was the source of the destructive 1933 Long Beach earthquake (magnitude 6.4), which caused 120 deaths and considerable property damage. During the past 60 years, numerous other shocks ranging from magnitude 3.0 to 5+ have been recorded. The Southern California Earthquake Center (SCEC) reports probable earthquake magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4[4]. Figure 2 depicts the Newport-Inglewood Fault in the planning area and identifies the segments that are located within Alquist-Priolo Earthquake Fault Zones.

Elsinore Fault Zone. The Elsinore Fault is located in the northeast part of Orange County. This fault follows a general line easterly of the Santa Ana Mountains into Mexico. The main trace of the Elsinore Fault is approximately 112 miles long. The last major earthquake on this fault occurred in 1910 (magnitude 6.0). The interval between major ruptures is estimated to be approximately 250 years. The SCEC reports probable earthquake magnitudes for the main trace of the Elsinore Fault to be in the range of 6.5 to 7.5. At the northern end of the Elsinore Fault Zone, the fault splits into two segments: the 25-mile-long Whittier Fault (probable magnitudes between 6.0 and 7.2) and the 25-mile-long Chino Fault (probable magnitudes between 6.0 and 7.0)[5].

3 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
4 Southern California Earthquake Center (SCEC). 2014. Significant Earthquakes and Faults. Available at http://scedc.caltech.edu/significant/. Accessed October 31, 2015.
5 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 2
LOCAL FAULT LOCATIONS

San Jacinto Fault Zone. The San Jacinto Fault is approximately 30 miles north and east of Orange County. This fault generally runs northeast-southwest along the western edge of the San Jacinto Mountains until it intersects the San Andreas Fault in San Bernardino. The interval between ruptures on this 130-mile-long fault zone has been estimated by the SCEC to be between 100 and 300 years, per segment. The most recent event (in 1968 and at magnitude 6.5) occurred on the southern half of the Coyote Creek segment. The SCEC reports probable earthquake magnitudes for the San Jacinto Fault Zone to be in the range of 6.5 to 7.5[6].

San Joaquin Hill Thrust Fault. The San Joaquin Hills Fault is a recently discovered southwest-dipping blind thrust fault originating near the southern end of the Newport-Inglewood Fault close to Huntington Beach, at the western margins of the San Joaquin Hills. Rupture of the entire area of this fault could generate an earthquake as large as magnitude 7.3. In addition, a minimum average recurrence interval of between 1,650 and 3,100 years has been estimated for moderate-sized earthquakes on this fault[7].

Puente Hills Thrust Fault. The Puente Hills Thrust Fault is another recently discovered blind thrust fault that runs from northern Orange County to downtown Los Angeles. This fault is now known to be the source of the 1987 Whittier Narrows earthquake. Recent studies indicate that this fault has experienced four major earthquakes ranging in magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years[8].

Seismic Ground Shaking

Ground shaking (i.e., motion that occurs as a result of energy released during faulting) could potentially result in the damage or collapse of buildings and other structures, depending on the magnitude of the earthquake, the location of the epicenter, and the character and duration of the ground motion. The characteristics of the underlying soil and rock and, where structures exist, the building materials used and the workmanship of the structures are important details when considering the potential impacts of seismic shaking.

Landslide

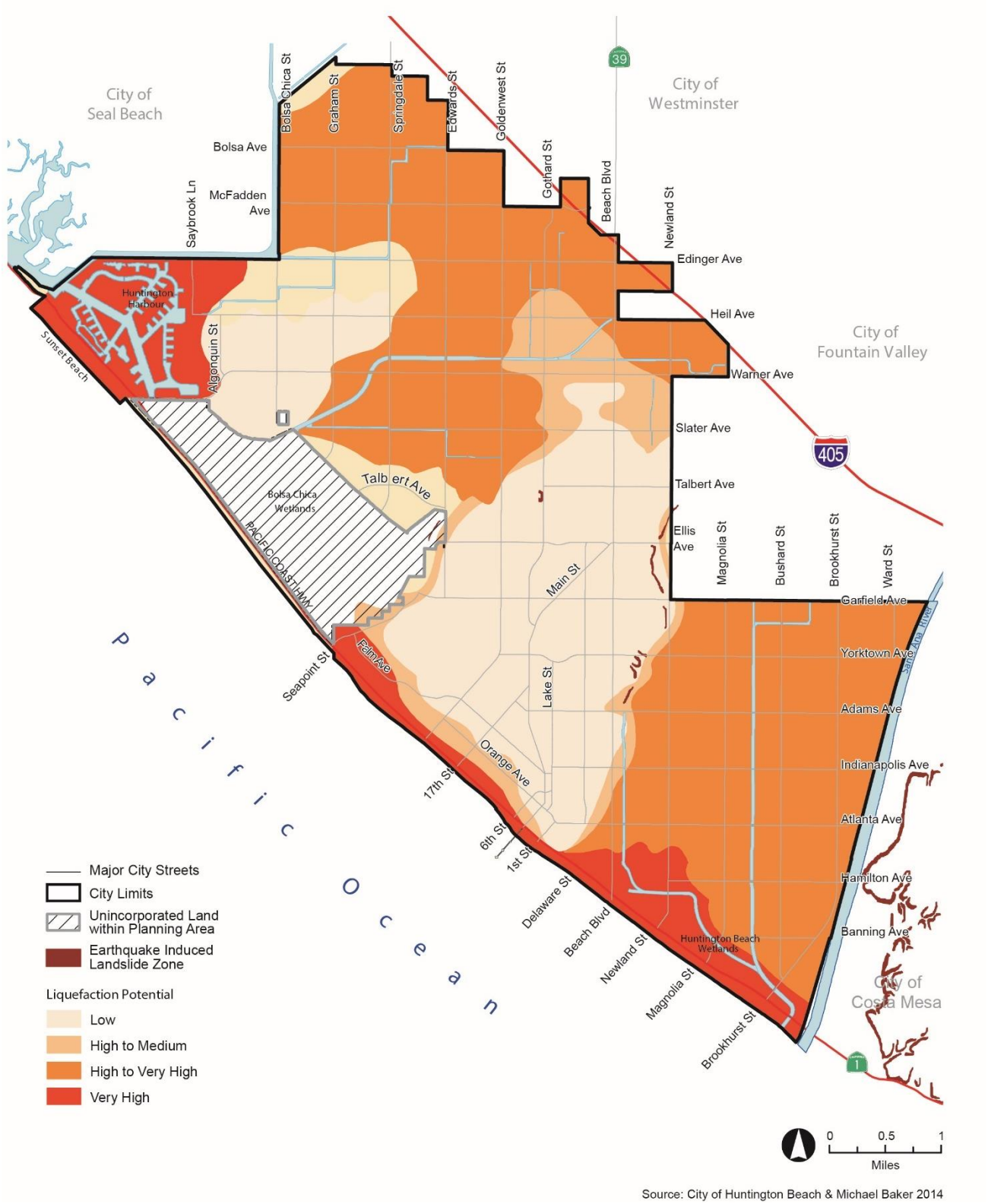
A landslide is the downhill movement of masses of earthen material under the force of gravity. Factors contributing to landslide potential are steep topography, unstable terrain, and proximity to earthquake faults. Typical landslides involve movement of surficial soils and an upper portion of the underlying bedrock. Movement may be very rapid or slow (occurring over a period of weeks or years) and can vary in size from several square feet to several square miles.

Landslide susceptibility is identified by the State of California Seismic Hazard Zone Map for the Newport Beach and Seal Beach Quadrangles[9], as depicted in Figure 3. Based on this mapping and the topography of the planning area, there are small areas along coastal bluffs that have the potential for earthquake-induced landslides.

Liquefaction

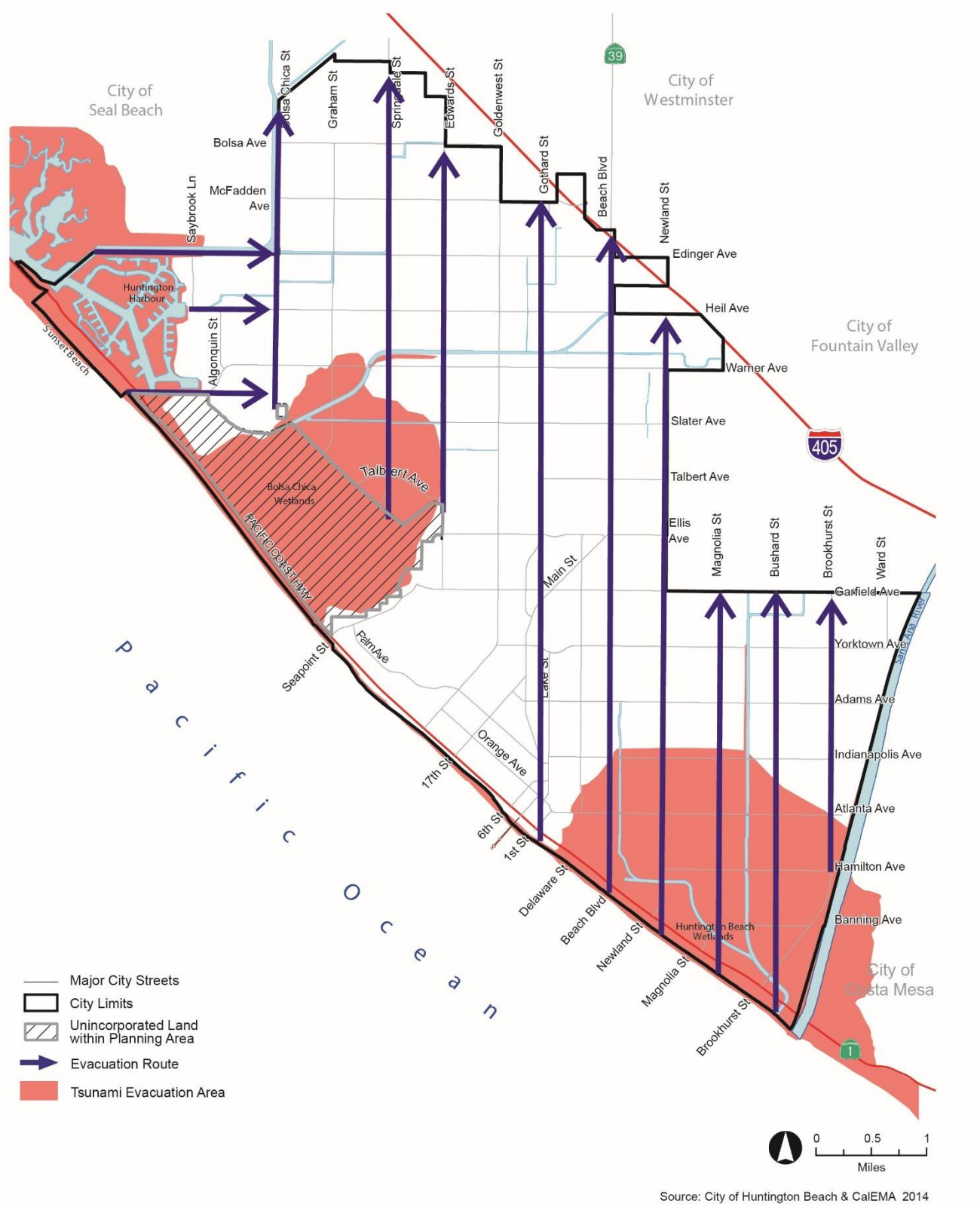
Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other events. Liquefaction occurs in saturated soils, those soils in which the space between individual soil particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. Because liquefaction only occurs in saturated soil, resulting effects are most commonly observed in low-lying areas. Liquefaction is typically associated with shallow groundwater, in which the groundwater table is located less than 50 feet beneath the Earth's surface.

6 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
7 Ibid
8 Ibid
9 Ibid



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 3
SEISMIC HAZARD ZONES



Source: City of Huntington Beach & CalEMA 2014

FIGURE 4
TSUNAMI EVACUATION AREAS

Most of the corridor north of Warner Avenue, in the vicinity of Beach Boulevard and Slater Avenue, and south of Adams Avenue is known to be within a Liquefaction Hazard Zone as identified by the State of California Seismic Hazard Zone Map for the Newport Beach and Seal Beach Quadrangles[10]. Liquefaction Hazard Zones are depicted on Figure 3.

Tsunami Inundation

Tsunamis are large, fast-moving waves or walls of water that can inundate low-lying coastal areas. Tsunamis are an important hazard of concern for Huntington Beach, with the ability to impact the entire length of coastline in the planning area. They can travel at speeds greater than 500 miles per hour and can reach heights of more than 100 feet, although much smaller waves still can be very destructive. Tsunamis often are caused by earthquakes occurring below or near the ocean floor, although underwater volcanic eruptions and landslides also can generate these waves.

Tsunamis can travel vast distances, and are capable of causing damage far away from the site of the event that generated them. Huntington Beach may be affected by a tsunami caused by a local event, or by an event thousands of miles away elsewhere in the Pacific Ocean. The California Office of Emergency Services (Cal OES) estimates that the Huntington Harbour neighborhood, the area northeast of the Bolsa Chica wetlands, and the southeast corner of Huntington Beach are at an elevated risk of a tsunami, as shown in Figure 4.

Soil Hazards

Soil Erosion

Erosion is a normal and inevitable geologic process whereby earthen materials are loosened, worn away, decomposed, or dissolved and are removed from one place and transported to another location. Within the planning area, opportunities for accelerated erosion include beach and bluff erosion. Continual erosion could degrade highway and beach access and possibly cause bluff failure. The principal natural causes of erosion are wave action, wind action, sea level rise, and overland runoff. Erosion can be exacerbated by human-caused influences, shoreline hardening, seawalls, groins, jetties, navigation inlets, boat wakes, dredging, and other interruptions of physical coastal processes that reduce or interrupt longshore sediment transport. As a coastal community, Huntington Beach is constantly susceptible to coastal erosion. The coast of Southern California is markedly different from the rest of the state. Coastal bluffs and marine terraces are widespread and typically fronted by narrow beaches. This section is the most urbanized and developed stretch of coast in California and also is the most extensively populated[11].

The magnitude of coastal erosion can be reduced by the presence of a protective beach. A protective beach can partly absorb wave energy, instead of allowing coastal bluffs to take the direct impact. The coastline of Huntington Beach has benefitted from numerous beach nourishment projects in an effort to restore the beach and reduce the effects of coastal bluff erosion. Nourishment projects have occurred in the Surfside-Sunset Beach area, totaling approximately 20 million cubic yards of sediment placement between 1945 and 2009[12]. As a result of these activities, it is estimated that beach widths along the coastline of the planning area have increased between 1.6 and 5.2 feet per year.

Coastal erosion also can occur from rapid, short-term daily, seasonal, or annual natural events such as waves, storm surge, wind, coastal storms, and flooding or from human activities including boat wakes and dredging.

10 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
11 Ibid
12 Ibid

Expansive Soils

Expansive soils are soils that contain types of clays that swell when wetted and shrink when dried. The change in volume associated with shrink/swell can exert stress on building foundations, potentially causing aesthetic and even structural damage. According to the most recent Soil Conservation Survey mapping for the Orange County region, approximately 21 percent (3,615 acres) of the soils located within the planning area are described as clay-bearing soils[13].

Based on the descriptions of the geologic units (and soil classifications) identified within the planning area, locations underlain by younger alluvium are considered prone to moderate to high expansion potential, depending on the presence and amount of organic content in the soils. In addition, younger alluvial soils with high organic content are considered collapsible. This condition typically occurs when the soils come into contact with moisture while placed under load.

Subsidence and Settlement

According to the U.S. Geological Survey (USGS), land subsidence is the gradual settling or sudden shrinking of the Earth's surface owing to subsurface movement of earthen materials. This geologic hazard occurs when subsurface earthen materials such as silt, sand, and gravel compact, becoming denser. When this compaction occurs, surface elevations tend to drop. The primary cause of subsidence in the southwestern United States is groundwater pumping; however, in areas where historical and/or active oil production occurs, extraction of these resources also can cause subsidence.

Additional causes of subsidence include tectonic subsidence (faulting and folding of the ground surface causes a drop) and earthquake-induced subsidence (settlement associated with seismic shaking), drainage of organic and peat soils, underground mining (mine-related subsidence), hydrocompaction (first-time wetting of moisture-deficient low-density soils), natural compaction, crustal deformation, sinkholes, and thawing of permafrost. Common issues resulting from subsidence include:

- Changes in elevation and slope of streams, canals, and drains
- Damage to bridges, roads, railroads, storm drains, sanitary sewers, canals, and levees
- Damage to private and public buildings
- Failure of well casings from forces generated by compaction of fine-grained materials in an aquifer system

After an area has been impacted by subsidence, high tides can gather in an area previously unreachable by tidal patterns. This occurs due to the lowering in elevation of coastal land.

While subsidence can occur naturally, a majority of the subsidence that has occurred within the planning area is the result of oil and water extraction during the city's history. Figure 5 identifies areas most prone to subsidence and the amount of subsidence that has occurred in the planning area. Based on this information, approximately half of the planning area is susceptible to subsidence greater than 0.1 foot per year. Notable subsidence has occurred along Gothard Street near the Murdy Fire Station and the City Corporation Yard.

Mineral Resources

Oil

California is the fourth largest oil producer in the United States, behind Alaska, Texas, and Louisiana, respectively, making the oil industry an integral part of the state's economy and a major contributor to the nation's economic health.

Huntington Beach has been the site of oil extraction since the 1920s, and large-scale oil and gas production continues today. Oil wells in Huntington Beach are scattered throughout much of the planning area. Most are concentrated along the coastal areas and mesas. According to the USGS, oil reserves within the

13 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.

Huntington Beach oil field are estimated to be between 117 and 866 million barrels of recoverable oil. The estimates vary significantly due to the assumptions used in the study, which include the estimated amount of oil in place, the recovery efficiency (i.e., how much oil is removed from the ground), and the regulations that affect extraction activities. As a result, the conservative estimate of 117 million barrels of oil has the highest probability of being recovered out of the Huntington Beach oil field[14].

According to the California Department of Conservation's Division of Oil, Gas, and Geothermal Resources (Division), hydraulic fracturing (also known as fracking) is the high-pressure injection of a mix of fluids and substances into an oil or gas reservoir, which fractures the reservoir rock. In California, hydraulic fracturing has been used as a production stimulation method for more than 30 years with no reported damage to the environment. The development of horizontal shale gas wells in various regions of the United States requires the use of hydraulic fracturing. Just as oil and gas production operations differ from region to region nationwide, so too do regional methods of hydraulic fracturing. To date, the Division is aware of very little, if any, fracturing of horizontal shale gas wells in California of the type performed in other parts of the United States. Most oil and gas production to date in California and in Huntington Beach has been from vertical wells into traditional oil and natural gas reservoirs.

Methane Hazards

The presence of methane in subsurface soils is usually caused by biogenic sources (decay of peat and other organic materials) or petrogenic sources (petroleum reservoirs or petroleum products within contaminated soils). Given the history of oil extraction activities within the planning area, there is a high potential for methane to be present in subsurface soils. Methane hazards have resulted in city regulations and procedures to ensure proper mitigation and abatement for the methane overlay districts within the planning area, as shown on Figure 6.

Sand and Gravel

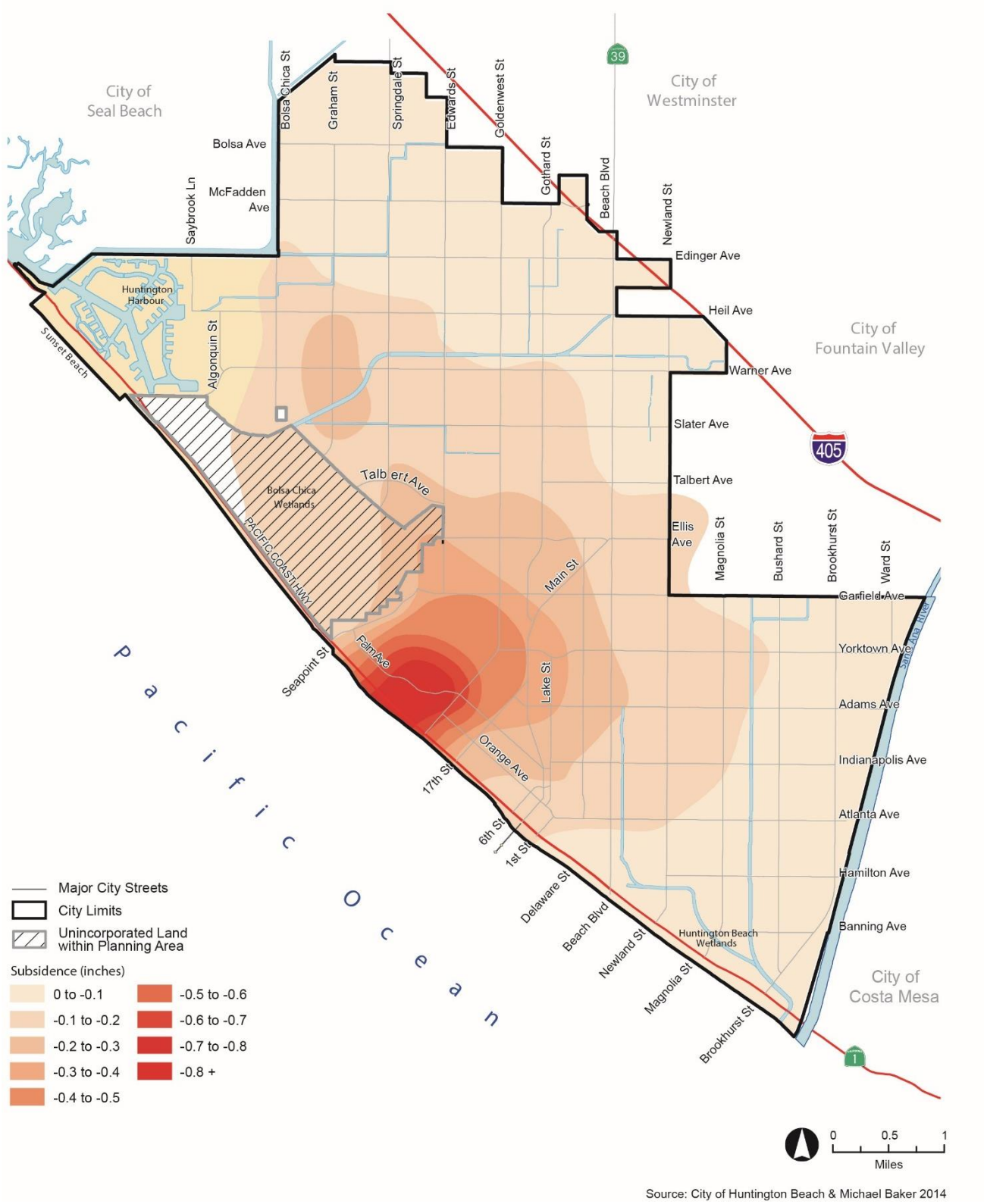
The State Mining and Geology Board (SMGB) Generalized Aggregate Resource Classification Map for the Orange County-Temescal Valley and Adjacent Production-Consumption Regions identifies the Mineral Resource Zone (MRZ) classifications for land located in the planning area[15]. Based on this mapping, a majority of the planning area is designated as MRZ-1 or MRZ-3. The MRZ-1 classification indicates that adequate information is available to determine the absence of significant construction deposits, while the MRZ-3 classification indicates that the significance of mineral resources could not be evaluated from available data. Although mineral resources may be present, the classification of this MRZ-3 area was not broken down to the more detailed MRZ-3a or MRZ-3b categories, because no mining has occurred in the area. Additionally, the urbanized character of the planning area generally precludes mining activities.

A small area of land within the planning area is designated as MRZ-2, which identifies that adequate information is available to indicate significant construction aggregate deposits are present. This area is generally located along the uplifted mesa north of Talbert Avenue, west of Beach Boulevard, and east of Huntington Harbour. Active mining no longer occurs at these sites, and new uses have been introduced, which deters future mining activities.

Peat

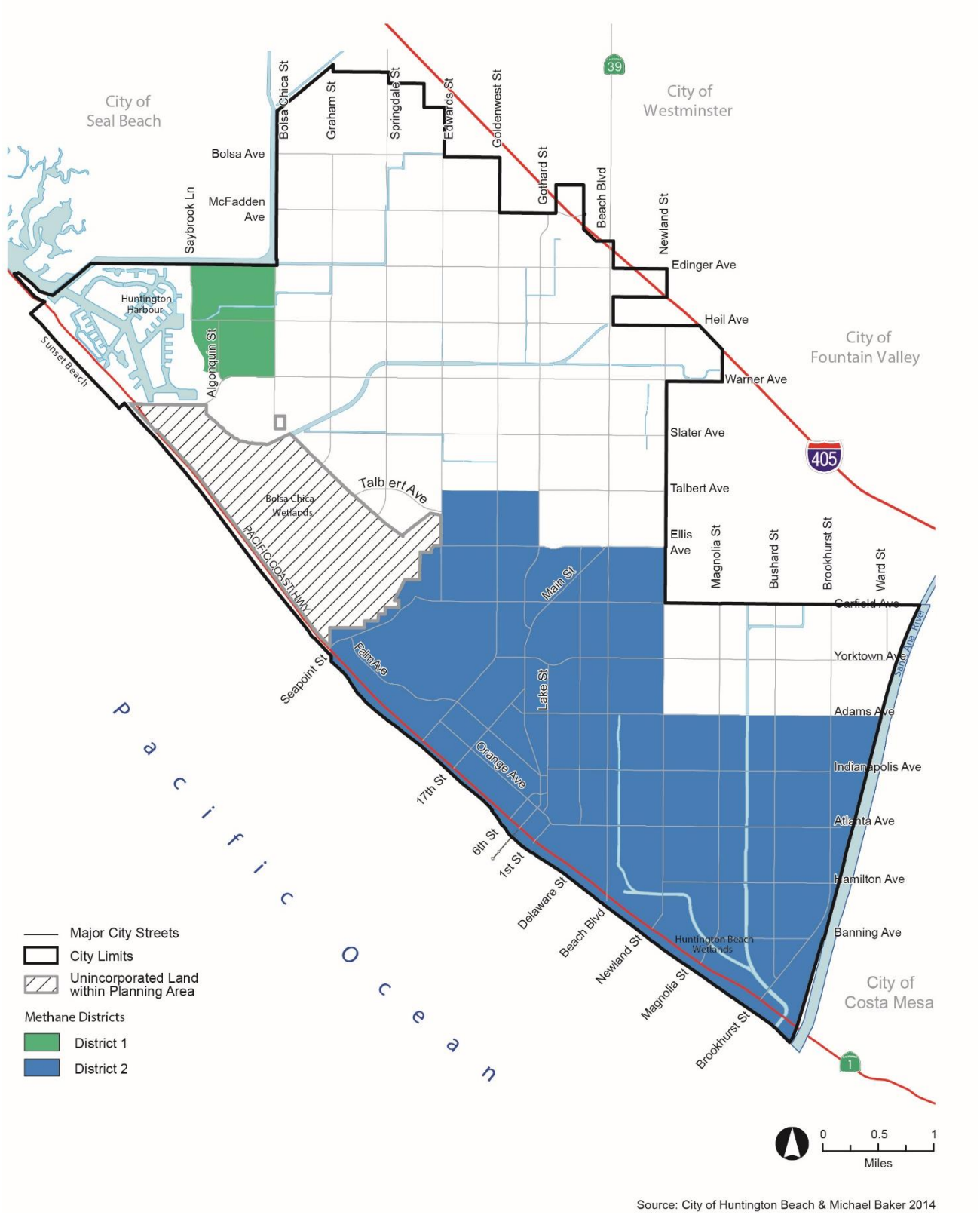
Peat production existed within Huntington Beach from 1941 to 1954. No further mining of peat or other soils conditioners has been known to occur since then. However, peat is present in various parts of the planning area, associated with young alluvial/floodplain soils. Soils containing peat have poor engineering properties, as they are prone to liquefaction, collapse, and settlement and are not suitable for building purposes. In addition, soils high in organic content (such as peat) can generate methane as part of the decomposition process and are considered a source of methane that should be addressed within the planning area (see the discussion of Methane Hazards).

14 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
15 Ibid



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 5
AREAS PRONE TO SUBSIDENCE



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 6
METHANE DISTRICTS

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Earthquake Hazards Reduction Act

In October 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

The mission of NEHRPA includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

State Plans, Policies, Regulations, and Laws

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (Public Resources Code Sections 2621–2630) was passed in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. To aid agencies responsible for approving projects, the Alquist-Priolo Act requires the California Geological Survey (CGS) to establish regulatory zones known as Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Seismic Hazards Mapping Act

The 1990 Seismic Hazards Mapping Act (Public Resources Code Sections 2690–2699.6) addresses hazards such as strong ground shaking, earthquake-induced landslides, and, in some areas, zones of amplified shaking. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. CGS is the primary state agency charged with implementing the Seismic Hazards Mapping Act and provides local jurisdictions with the seismic hazard zone maps that identify areas susceptible to liquefaction, earthquake-induced landslides, and amplified shaking. Site-specific hazard investigations are required by the Seismic Hazards Mapping Act when a development project is located within one of the Seismic Hazard Mapping Zones defined as a “zone of required investigation.” The law also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

Natural Hazards Disclosure Act

The Natural Hazards Disclosure Act (effective June 1, 1998), requires “that sellers of real property and their agents provide prospective buyers with a Natural Hazards Disclosure Statement when the property

being sold lies within one or more state-mapped hazard areas, including a Seismic Hazard Zone." The law specifies two ways in which this disclosure can be made:

1. The Local Option Real Estate Transfer Disclosure Statement as provided in Section 1102.6a of the California Civil Code.

2. The Natural Hazard Disclosure Statement as provided in Section 1103.2 of the California Civil Code.

The Local Option Real Estate Disclosure Statement can be substituted for the Natural Hazards Disclosure Statement if it contains substantially the same information and substantially the same warning as the Natural Hazards Disclosure Statement.

California Building Code

The California Building Code (CBC) protects the public from geo-seismic hazards. The requirements apply to private and public buildings intended for human occupancy. Chapters 16 and 16A, Structural Design, of the 2013 CBC deal with structural design requirements governing seismically resistant construction, including, but not limited to, factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design. Chapters 18 and 18A, Soils and Foundations, of the 2013 CBC include, but are not limited to, the requirements for foundation and soil investigations (Sections 1803 and 1803A); excavation, grading, and fill (Sections 1804 and 1804A); allowable load-bearing values of soils (Sections 1806 and 1806A); foundation walls and retaining walls (Section 1807 and 1807A); design of foundations and slope clearances (Sections 1808 and 1808A); and footings and pier, pile, driven, and cast in place foundation support systems (Sections 1809, 1809A, 1810, and 1810A). Chapter 33, Safeguards during Construction, of the 2013 CBC includes, but is not limited to, requirements for safeguards at work sites to ensure stable excavations and cut or fill slopes (Section 3304). These requirements from the 2013 CBC are still applicable as part of the most current version of the CBC, adopted in 2017.

Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act (SMARA) of 1975 (Public Resources Code, Division 2, Chapter 9, Section 2710 et seq.) mandated the classification of mineral lands throughout the state to help identify and protect mineral resources in areas subject to urban expansion or other irreversible land uses that would preclude mineral extraction. Since 1975, the SMGB has mapped areas throughout California that contain regionally significant mineral resources. Deposits of construction aggregate resources (sand, gravel, or crushed stone) were the initial commodity targeted for classification by the SMGB because of its importance to the state. When mapped, the SMGB is required to designate for future use those areas that contain aggregate deposits that are of prime importance to meeting the region's future need for construction-quality aggregates.

The key objective of mineral lands classification under SMARA is for each jurisdiction to develop policies that will conserve important mineral resources, if feasible, when such resources are needed. SMARA requires that when policies are adopted, land use decisions by the local agency must be in accordance with that local agency's management policies for mineral resources. These decisions also must balance the mineral value of the resource to the market region as a whole, not just its importance to the local jurisdiction. At this time, there are no active mining sites in the planning area.

The State Geologist developed the California Mineral Land Classification System to assist in the implementation of SMARA. The system identifies the following types of MRZs for mapping and reporting purposes:

- **MRZ-1:** Areas where adequate geologic information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2a:** Areas underlain by mineral deposits where geologic data show that significant measured or indicated resources are present. Areas classified MRZ-2a contain discovered mineral deposits

that are either measured or indicated reserves as determined by such evidence as drilling records, sample analysis, surface exposure, and mine information. Land included in the MRZ-2a category is of prime importance because it contains known economic mineral deposits.

- **MRZ-2b:** Areas underlain by mineral deposits where geologic information indicates that significant inferred resources are present. Areas classified MRZ-2b contain discovered deposits that are either inferred reserves or deposits that are presently sub-economic as determined by limited sample analysis, exposure, and past mining history.
- **MRZ-3a:** Areas containing known mineral deposits that may qualify as mineral resources, which could be considered hypothetical resources. MRZ-3a areas are considered to have a moderate potential for the discovery of economic mineral deposits.
- **MRZ-3b:** Areas containing inferred mineral deposits that may qualify as mineral resources, which could be considered speculative resources. Land classified MRZ-3b represents areas in geologic settings that appear to be favorable environments for the occurrence of specific mineral deposits.
- **MRZ-4:** Areas where geologic information does not rule out either the presence or absence of mineral resources. The distinction between the MRZ-1 and MRZ-4 categories is important for land use considerations. It must be emphasized that the MRZ-4 classification does not imply that there is little likelihood for the presence of mineral resources, but rather that there is a lack of knowledge regarding mineral occurrence.

Local Plans, Policies, Regulations, and Laws

Huntington Beach Municipal Code

The City adopts the current CBC as the basis for its own Building Code (Municipal Code Title 17, Chapter 17.04). The city Building Code, as adopted, includes acceptable variations to the CBC related to minimum slab thickness, fire-extinguishing systems, building security, and methane district regulations. The Grading and Excavation Code sets forth rules and regulations to control excavation, grading, earthwork, and site improvement construction, and establishes administrative requirements for issuance of permits, approvals of plans, and inspection of grading construction. Specifically, the Grading and Excavation Code identifies, defines, and regulates grading design and operations, including hazardous conditions, plans and specifications, soils and geology reports, fills, setbacks, drainage and terracing, asphalt concrete pavement, and erosion control systems. These two code chapters stipulate the requirements for proposed new development in the city to address geotechnical issues, including all aspects of geologic and engineering site investigation, seismic-resistant foundation and building design, and slope and soil stability including erosion and sediment control. Development is required to comply with the Huntington Beach Building Code, Grading and Excavation Code, and all state requirements pertaining to geologic, soil, and seismic hazards. With this regulatory framework in place, the city has the authority to enforce General Plan policies protecting the public from geotechnical hazards associated with proposed development.

Given the long history of oil extraction in the planning area, methane hazards have resulted in city regulations and procedures to ensure proper mitigation and abatement. Huntington Beach Municipal Code Section 17.04.085 specifies the city Methane District Regulations, including appropriate testing and mitigation measures for new buildings within established methane overlay districts. In addition, the city also created Specification No. 429, which identifies the specific testing requirements and protocols for adequate analysis and mitigation of methane-related hazards within the methane overlay district.

Greenhouse Gas Emissions

INTRODUCTION

This technical background report summarizes the results of a GHG emissions inventory for the City of Huntington Beach. It includes inventories of activities occurring within the community and the resulting GHG emissions for the years 2005 (the baseline) and 2012.

ENVIRONMENTAL SETTING

Protocols

Over the last decade, a number of local government agencies and organizations have collaborated to develop a set of protocols to assist communities in conducting GHG inventories of emissions from community activities. The Governor's Office of Planning and Research recommends use of the 2012 *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, commonly referred to as the U.S. Community Protocol. The protocol is not regulatory, but provides guidance on how to measure and report communitywide GHG emissions, including identification of relevant sources or activities, methods to estimate GHG emissions from each source, and consistency in the identification, assessment, and presentation of emissions results across multiple jurisdictions.

Included Emissions

The inventory covers activities occurring within the planning area by both private and public sectors. In some instances, GHGs generated by these activities may be emitted within Huntington Beach, such as an individual car passing through the planning area. In other cases, the emissions may occur elsewhere but are included because the activity responsible for generating the emissions is within Huntington Beach, such as a community member using electricity generated by a power plant in another part of the state.

Consistent with the U.S. Community Protocol, the inventory addresses activities and GHG emissions from seven types of activities, referred to throughout this report as sectors.

- **Residential built environment:** electricity and natural gas used in residential settings.
- **Nonresidential built environment:** electricity and natural gas used in nonresidential settings.
- **Transportation:** on-road vehicle trips that begin and/or end in Huntington Beach.
- **Off-road equipment:** use of equipment and vehicles not on roads.
- **Solid waste:** materials deposited in landfills.
- **Water and wastewater:** energy used to treat and pump water used and wastewater created, along with emissions from the processing of wastewater.
- **Oil drilling:** fuel used to extract oil in Huntington Beach and surrounding areas from on-shore wells, and emissions from intentional releases of vapors and unintentional leaks from pipes and machinery as part of the oil drilling process.

The U.S. Community Protocol also includes agricultural activities and the resulting emissions. This sector is not included in the inventory because agricultural activities do not occur within Huntington Beach to any substantial degree.

Key Terms

The following terms are used frequently to discuss GHG:

- **Baseline year:** A year that sets a level against which future changes are measured. The baseline year for the Huntington Beach inventory, consistent with the AB 32 Scoping Plan and common practice throughout California, is 2005. In addition, it includes emissions for 2012, the most recent year of data available at this time, to allow a comparison of recent emissions to 2005 levels.

- **Greenhouse gas:** A gas that traps heat radiated out by the Earth and reflects it back rather than allowing it to escape into space, similar to the glass walls and roof of a greenhouse. While some level of GHGs in the atmosphere is necessary to keep the planet at a comfortable temperature for life to exist, human activities since the Industrial Revolution have significantly increased the concentrations of these gases, causing more heat to be trapped and resulting in climate change. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). GHGs often are measured in carbon dioxide equivalents (CO_2e).

- **Carbon dioxide equivalent:** A unit of measurement commonly used for GHGs that accounts for the varying potency of different GHGs. For example, 1 metric ton (MT) of CO_2 is equal to 1 MT of CO_2e. Methane is about 21 times as potent as CO_2 in trapping heat, and so 1 MT of CH_4 is equal to 21 $MTCO_2e$.

- **Emission factor:** A number that describes the amount of GHGs released per unit of a certain activity (e.g., GHGs per kilowatt-hour of electricity used). Emission factors are provided by utility companies, state agencies, and guidance documents.

- **Sector:** A category of activities responsible for GHG emissions, such as transportation, solid waste, or residential built environment. Sectors may comprise multiple subcategories, referred to as "subsectors."

STATE GHG INVENTORY

The ARB prepares an annual GHG inventory for all activities occurring within the state. The sectors in the statewide inventory are similar, although not identical, to the U.S. Community Protocol sectors used in the inventory for Huntington Beach. The ARB prepared a statewide inventory for 2005, as well as a recent inventory for 2012, which are identified in Table 1. The 2012 inventory of 459 million metric tons is approximately 2 percent higher than the 2011 inventory prepared by the ARB due to increased natural gas electricity generation compensating for: (1) the closure of the San Onofre Nuclear Generating Station (SONGS), and (2) a drop in hydropower resulting from a drier-than-average winter. The statewide inventory and forecast data are expressed as millions of metric tons of carbon dioxide equivalent ($MMTCO_2e$).

TABLE 1
CALIFORNIA STATEWIDE GHG EMISSIONS, 2005 AND 2012

Sector	2005 $MTCO_2e$	2012 $MTCO_2e$
Transportation	189.08	167.38
Electric power	107.86	95.09
Commercial and residential	41.24	42.28
Industrial	92.29	89.16
Recycling and waste	7.75	8.49
High Global Warming Potential	10.36	18.41
Agriculture	36.54	37.86
Total	**485.13**	**458.68**

Source: ARB 2009, 2014

Note: Due to rounding, totals may not equal the sum of the individual parts.

HUNTINGTON BEACH GHG INVENTORY

Inventory Summary

In 2005, activities within the planning area resulted in 1,452,070 $MTCO_2e$. On-road transportation was the largest sector and contributed 723,440 $MTCO_2e$, or 50 percent of the total. The residential built environment sector was the second-largest contributor of GHG emissions with 313,310 $MTCO_2e$, followed by the nonresidential built environment sector at 286,260 $MTCO_2e$. The solid waste sector was the fourth-largest emitter at 67,210 $MTCO_2e$, followed by the off-road equipment sector at 35,240 $MTCO_2e$ and the oil drilling sector at 16,610 $MTCO_2e$. The water and wastewater sector generated 10,000 $MTCO_2e$.

The same activities in 2012 resulted in the emission of 1,432,540 $MTCO_2e$. As in 2005, on-road transportation was the largest sector, contributing 726,190 $MTCO_2e$, or 51 percent of the total. Emissions from the residential built environment totaled 327,340 $MTCO_2e$, followed by emissions from the nonresidential built environment at 301,840. The solid waste sector contributed 38,620 $MTCO_2e$, with the oil drilling sector contributing 16,560 $MTCO_2e$ and the off-road equipment sector contributing 11,580 $MTCO_2e$. The water and wastewater sector had the smallest share of emissions at 10,410 $MTCO_2e$. GHG emissions estimates for 2005 and 2012 are summarized by sector in Table 2 and Figure 1. Overall emissions declined by 1 percent from 2005 to 2012. Changes in emissions between 2005 and 2012 are attributed to the following factors:

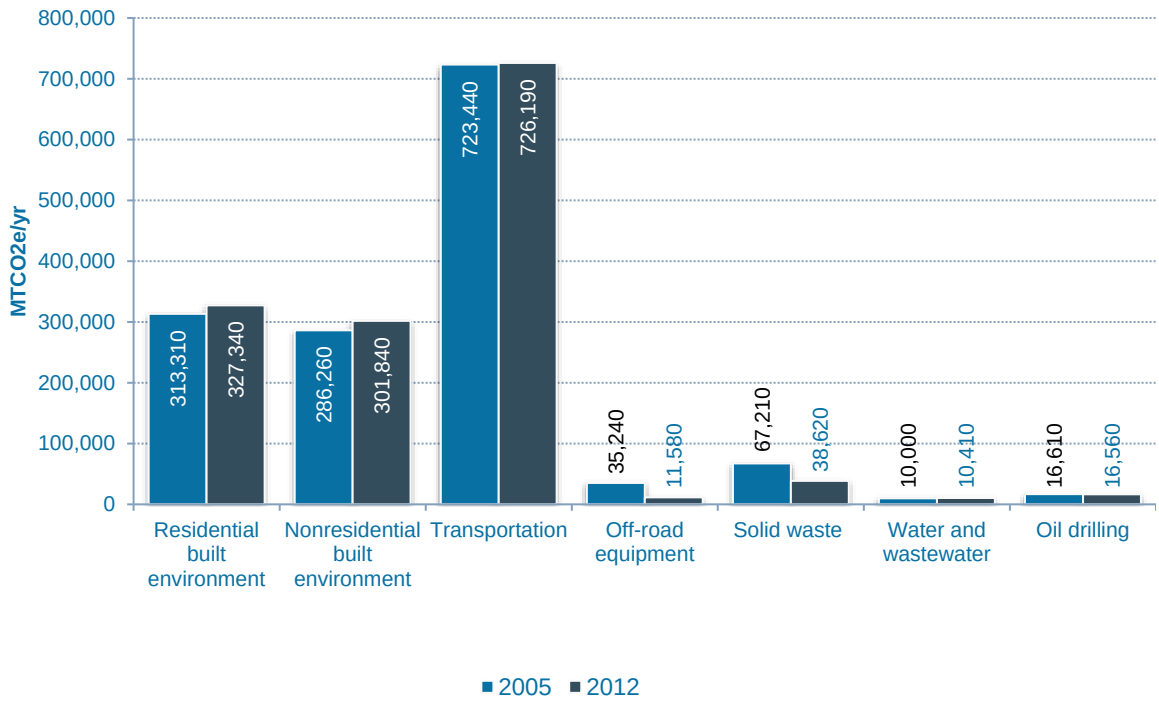
- Substantially fewer houses were built in 2012 than in 2005, and the decline in construction activity caused a decrease in emissions from off-road equipment.
- Huntington Beach sent less waste to landfills in 2012 than in 2005, likely due to increased education about recycling and a decrease in construction activity, resulting in fewer GHG emissions in the solid waste sector.
- The closure of the SONGS facility resulted in an increase in emissions from electricity use.
- An overall reduction in economic activity due to the recession may have modestly reduced energy, water, and fuel consumption in all sectors.

TABLE 2
HUNTINGTON BEACH GHG EMISSIONS BY SECTOR, 2005 AND 2012

Sector	2005 $MTCO_2e$	2005 Percentage	2012 $MTCO_2e$	2012 Percentage	Percentage Change, 2005-2012
Residential built environment	313,310	22%	327,340	23%	4%
Nonresidential built environment	286,260	20%	301,840	21%	5%
Transportation	723,440	50%	726,190	51%	<1%
Off-road equipment	35,240	2%	11,580	1%	-67%
Solid waste	67,210	5%	38,620	3%	-43%
Water and wastewater	10,000	1%	10,410	1%	4%
Oil drilling	16,610	1%	16,560	1%	<-1%
Total	**1,452,070**	**100%**	**1,432,540**	**100%**	**-1%**

Source: Data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

FIGURE 1
HUNTINGTON BEACH GHG EMISSIONS BY SECTOR, 2005 AND 2012



Inventory Method

For each sector, the GHG inventory relies on activity data provided by service providers (e.g., Southern California Edison, the City of Huntington Beach, Southern California Gas Company, Republic Services) or obtained through analysis tools provided by state agencies such as the ARB or the California Department of Resources Recycling and Recovery (Cal Recycle). To determine GHG emissions for each sector, activity data are multiplied by an emission factor (a number that describes how many GHGs are released per unit of activity). Emission factor values used in the Inventory are shown in Table 3 for 2005 and 2012 (note that subsectors without emission factors are not included). For the off-road equipment and solid waste sectors, activity data were used to calculate GHG emissions using publicly available analysis tools.

TABLE 3
HUNTINGTON BEACH GHG EMISSIONS BY SECTOR, 2005 AND 2012

Sector	Subsector	2005 Inventory Emission Factor	2012 Inventory Emission Factor	Emission Factor Source
Residential built environment	Electricity	0.000304 $MTCO_2e$/kWh	0.000340 $MTCO_2e$/kWh	SCE, EPA, ARB
	Natural gas	0.005320 $MTCO_2e$/therm	0.00532 $MTCO_2e$/therm	U.S. Community Protocol
Nonresidential built environment	Electricity (SCE)	0.000304 $MTCO_2e$/kWh	0.000340 $MTCO_2e$/kWh	SCE, EPA, ARB
	Electricity (direct access)	0.000432 $MTCO_2e$/kWh	0.000419 $MTCO_2e$/kWh	U.S. Community Protocol
	Natural gas	0.005320 $MTCO_2e$/therm	0.005320 $MTCO_2e$/therm	U.S. Community Protocol
Transportation	n/a	0.000488 $MTCO_2e$/VMT	0.000407 $MTCO_2e$/VMT	ARB
Off-road equipment	n/a	Emission factors not provided for this sector		
Water and wastewater	n/a	0.178144 $MTCO_2e$/ton	0.177821 $MTCO_2e$/ton	Cal Recycle
Oil drilling	Energy use	0.000304 $MTCO_2e$/kWh	0.000340 $MTCO_2e$/kWh	SCE, EPA, ARB
	Fuel use	0.044035 $MTCO_2e$/barrel	0.0344035 $MTCO_2e$/barrel	ARB
	Fugitive emissions	0.004336 $MTCO_2e$/barrel	0.004336 $MTCO_2e$/barrel	ARB

Source: Data compiled by Michael Baker International (2014)

Residential and Nonresidential Built Environment

Electricity

Huntington Beach's electricity provider, SCE, reported that the community used a total of 1,211,966,610 kWh of electricity in 2005. Residential buildings used 485,753,410 kWh, while nonresidential buildings (including offices, stores and restaurants, and industry) used 726,213,200 kWh. Of the nonresidential electricity, 601,304,530 kWh was supplied by SCE. The remaining 124,908,670 kWh was "direct access" electricity purchased from a source other than the normal electricity provider. SCE does not indicate which customers or which types of activities are purchasing direct access electricity, although direct access customers often are large industrial users.

In 2012, Huntington Beach used 1,190,357,920 kWh of electricity, with 487,243,550 kWh used by residential customers and 703,114,370 kWh used for nonresidential purposes. Of the nonresidential electricity, 598,350,330 kWh was supplied by SCE-purchased energy and 104,764,040 kWh was direct access electricity. Table 4 shows activity data and GHG emissions for 2005 and 2012, as well as changes in activity data.

Emission factors for electricity change annually depending on the sources of electricity. The composition of SCE's energy portfolio changed considerably in 2012 compared to previous years with the temporary closure (and eventual decommissioning) of the SONGS facility.[1] Prior to 2012, the SONGS facility, a GHG-free power source, accounted for approximately 19 percent to 24 percent of the utility's energy portfolio, depending on the year[2] [3]. In 2012, nuclear energy use made up 7 percent of the SCE portfolio, while unspecified sources made up 41 percent[4], likely due to short-term energy purchases made by SCE to meet customer demand while the SONGS facility was temporarily closed.

Direct access emission factors were provided by the U.S. Community Protocol and represent an average of emission factors for all electricity generated in California. Because a 2012 emission factor for direct access energy was unavailable, the most recent available factor (2007) was used. The SONGS facility did not supply electricity to direct access customers; thus, the direct access emission factor is not affected by the closure.

Emissions from electricity supplied by SCE increased from 2005 to 2012 despite small declines in overall electricity use. As a result of the closure of the SONGS facility, SCE replaced the electricity from the nuclear power plant (which produced no GHG emissions) with electricity largely from natural gas-fired power plants (which do emit GHG emissions)[5]. This increase in the carbon intensity of SCE's electricity resulted in an increase of GHG emissions from 2005 to 2012.

The kWh and GHG emissions for direct access electricity declined significantly from 2005 to 2012. This decrease may be the result of some direct access customers closing down during this period, coinciding with the economic downturn. Alternatively, some direct access customers may have ended their direct access contracts and begun obtaining electricity from SCE. If this occurred in conjunction with substantial energy efficiency measures, there would be little net difference in the total amount of nonresidential electricity supplied by SCE.

1 SCE closed the SONGS facility permanently in 2013, although it had not been operational since early 2012. SCE has identified and entered into long-term energy contracts to fill the void created by closing the SONGS facility, primarily using natural gas power generating facilities (Davis and Hausman 2014).
2 California Energy Commission (CEC). 2011. Utility Annual Power Content Labels for 2010 – Investor Owned Utilities (IOUs). http://www.energy.ca.gov/sb1305/labels/2010_index.html.
3 CEC. 2012a. Utility Annual Power Content Labels for 2011 – Investor Owned Utilities (IOUs). http://www.energy.ca.gov/sb1305/labels/2011_index.html.
4 CEC. 2013. Utility Annual Power Content Labels for 2012 – Investor Owned Utilities (IOUs). http://www.energy.ca.gov/sb1305/labels/2012_labels/IOUs/.
5 Davis, L., and C. Hausman. 2014. The Value of Transmission in Electricity Markets: Evidence from a Nuclear Power Plant Closure. http://ei.haas.berkeley.edu/pdf/working_papers/WP248.pdf.

TABLE 4
ELECTRICITY ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 kWh	2005 $MTCO_{2e}$	% of kWh	% of $MTCO_{2e}$	2012 kWh	2012 $MTCO_{2e}$	% of kWh	% of $MTCO_{2e}$	kWh % Change	$MTCO_{2e}$ % Change
Residential electricity	485,753,410	147,570	40%	38%	487,243,550	165,820	41%	40%	<1%	12%
Nonresidential electricity (SCE)	601,304,530	182,680	50%	48%	598,350,330	203,640	50%	49%	<-1%	11%
Direct access electricity	124,908,670	53,960	10%	14%	104,764,040	43,880	9%	11%	-16%	-19%
Total	**1,211,966,610**	**384,210**	**100%**	**100%**	**1,190,357,920**	**413,340**	**100%**	**100%**	-2%	8%

Source: Activity data from SCE (2014); Percentage change data compiled by Michael Baker International (2014)

Note: Due to rounding, totals may not equal the sum of the individual parts.

Natural Gas

In 2005, Huntington Beach's natural gas provider, SCG, supplied 40,484,550 therms of natural gas to the community. Residential customers used 31,156,530 therms, while nonresidential customers used 9,328,020 therms. In 2012, SCG customers in the planning area used 40,574,040 therms of natural gas. Residential uses accounted for 30,363,590 therms and nonresidential uses comprised the remaining 10,210,450 therms. Table 5 shows activity data and GHG emissions for 2005 and 2012, as well as the change in activity data and GHG emissions during this time period.

Huntington Beach is home to a natural gas power plant (AES Huntington Beach), which is among the largest power plants in California as measured by output. AES Huntington Beach does not purchase natural gas through retail services, and thus is not included in the activity data provided.[6] GHG emissions from AES Huntington Beach are indirectly accounted for in the SCE emission factor used to calculate emissions from electricity use. Emissions from AES Huntington Beach are addressed by the statewide Cap and Trade program administered by the ARB, which requires covered entities to reduce emissions by approximately 2 percent to 3 percent annually.

The U.S. Community Protocol provided GHG emission factors for natural gas. Natural gas emission factors generally do not change over time, so the same factor was used for both years.

Transportation

On-road transportation activity is measured in vehicle miles traveled (VMT). VMT includes the full distance of trips that begin and end within city limits (internal-internal) and half the distance of trips between Huntington Beach and another location (internal-external). Trips that pass through Huntington Beach, but do not begin or end within the city (external-external), are not included.

In 2005, the total trip distance within the planning area was 1,481,723,500 VMT. Of this, internal-internal trips accounted for 256,199,950 VMT and internal-external trips contributed 1,225,523,550 VMT. VMT for 2012 was extrapolated using the average VMT growth rate from 2005 to 2020. Through this extrapolation, the planning area was estimated to generate 1,566,979,720 VMT, with internal-internal trips generating 268,811,640 VMT and internal-external trips generating 1,298,168,080 VMT. Table 6 provides 2005 and 2012 activity data and GHG emissions and a comparison of activity data and GHG emissions between 2005 and 2012.

The 2005 Huntington Beach Traffic Model provided figures for the VMT analysis. Figures for 2012 were extrapolated based on 2005 and 2035 traffic model data. The ARB supplied the GHG emission factor, based on the average distribution of vehicle types in Orange County, using the publicly available EMFAC modeling software.

GHG emissions from transportation increased by slightly less than 1 percent from 2005 to 2012, even though total VMT was expected to increase by approximately 6 percent. This is primarily due to an increase in vehicle fuel efficiency during this period. There was also a small shift in the distribution of vehicle types in Orange County between 2005 and 2012. In 2012, a greater share of VMT came from passenger cars and small trucks/SUVs, compared to less fuel-efficient heavy vehicles, than in 2005, based on countywide data from the EMFAC modeling software. While these data show a shift toward more fuel-efficient vehicles—including hybrids, plug-in hybrids, and electric vehicles—they do not describe how many vehicles are hybrids, plug-in hybrids, or electric vehicles compared to fuel-efficient conventional vehicles.

6 The amount of natural gas used by AES Huntington Beach is unknown. However, in 2012, the ARB reported that emissions from the facility totaled 572,170 MTCO2e, over 10 times the emissions from all community-wide nonresidential natural gas use.

TABLE 5
NATURAL GAS ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 Therms	2005 $MTCO_{2e}$	% of Therms	% of $MTCO_{2e}$	2012 Therms	2012 $MTCO_{2e}$	% of Therms	% of $MTCO_{2e}$	Therms % Change	$MTCO_{2e}$ % Change
Residential natural gas	31,156,530	165,740	77%	77%	30,363,590	161,520	75%	75%	-3%	-3%
Nonresidential natural gas	9,328,020	49,620	23%	23%	10,210,450	54,320	25%	25%	9%	9%
Total	**40,484,550**	**215,360**	**100%**	**100%**	**40,574,040**	**215,840**	**100%**	**100%**	**<1%**	**<1%**

Source: Activity data from SCG (2014); Percentage change data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

TABLE 6
TRANSPORTATION ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 VMT	2005 $MTCO_{2e}$	% of VMT	% of $MTCO_{2e}$	2012 VMT	2012 $MTCO_{2e}$	% of VMT	% of $MTCO_{2e}$	VMT % Change	$MTCO_{2e}$ % Change
Internal-internal	256,199,950	125,090	17%	17%	268,811,640	124,580	17%	17%	5%	<-1%
Internal-external	1,225,523,550	598,350	83%	83%	1,298,168,080	601,610	83%	83%	6%	1%
Total	**1,481,723,500**	**723,440**	**100%**	**100%**	**1,566,979,720**	**726,190**	**100%**	**100%**	**6%**	**<1%**

Source: Activity data from Austin-Foust Associates, Inc. (2004), compiled by Stantec (2014); Percentage change data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

Off-Road Equipment

The off-road equipment sector consists of equipment and vehicles that consume gasoline or diesel fuel but are not intended for on-road transportation. The activities included in this sector range from the use of small landscaping equipment (e.g., leaf blowers) to large construction and industrial equipment. Within the planning area, this sector includes two subsectors:

- **Construction:** equipment and vehicles used for construction, such as tractors, cranes, and excavators
- **Lawn and garden:** equipment used for landscaping purposes, including lawnmowers, chainsaws, and tillers

GHG emissions are calculated using the ARB's publicly available OFFROAD modeling software rather than activity data. OFFROAD provides emissions estimates for different equipment types at the countywide level based on equipment and vehicle registration numbers. Emissions for construction equipment were allocated based on the percentage of new houses in Orange County constructed in the planning area during each inventory year, using California Department of Finance estimates. Lawn and garden emissions were calculated using the percentage of Orange County households located in the planning area, also using Department of Finance estimates. Off-road emissions for 2005 and 2012, along with the corresponding change in emissions from 2005 to 2012 by subsector, are shown in Table 7.

The largest change in off-road emissions occurred in the construction equipment subsector. Significantly fewer houses were constructed in both Huntington Beach and Orange County in 2012 than in 2005, resulting in an 84-percent decline in construction-related GHG emissions.

TABLE 7
OFF-ROAD GHG EMISSIONS, 2005 AND 2012

Subsector	2005 $MTCO_2e$	Percentage of 2005 $MTCO_2e$	2012 $MTCO_2e$	Percentage of 2012 $MTCO_2e$	$MTCO_2e$ Percentage Change, 2005-2012
Construction	28,330	80%	4,590	40%	-84%
Lawn and garden	6,910	20%	6,990	60%	1%
Total	**35,240**	**100%**	**11,580**	**100%**	**-67%**

Source: GHG emissions from ARB (2007)

Note: Due to rounding, totals may not equal the sum of the individual parts.

Solid Waste Disposal

Residents, businesses, and visitors within the planning area disposed of 377,260 tons of solid waste in landfills in 2005, according to data maintained by Cal Recycle. This amount does not include materials that were recycled, composted, or recovered in other ways. Of the total solid waste disposed, 302,650 tons was municipal solid waste (materials thrown away directly in a landfill). The remaining 74,610 tons of solid waste disposal was considered alternative daily cover, material that is used at a landfill to help reduce odor, control litter, and protect public health in compliance with state and federal standards. Additionally, a small amount of solid waste (approximately 2 tons) was sent to a facility to be burned for energy.

In 2012, the total solid waste disposed of by residents, businesses, and visitors within the planning area was 217,170 tons, representing a 42 percent reduction in waste disposal from 2005. This total includes 161,510 tons of municipal solid waste, combined with 55,660 tons of alternative daily cover. A small amount (approximately 5 tons) was burned for energy. Table 8 summarizes 2005 and 2012 activity data and GHG emissions, as well as the change in activity data and GHG emissions from 2005 to 2012.

TABLE 8
SOLID WASTE ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 Tons	2005 $MTCO_{2e}$	% of Tons	% of $MTCO_{2e}$	2012 Tons	2012 $MTCO_{2e}$	% of Tons	% of $MTCO_{2e}$	Tons % Change	$MTCO_{2e}$ % Change
Municipal solid waste	302,650	55,700	80%	83%	161,510	30,030	74%	78%	-47%	-46%
Alternative daily cover	74,610	11,510	20%	17%	55,660	8,580	26%	22%	-25%	-25%
Waste to energy	2	2	<1%	<1%	5	4	<1%	<1%	122%	122%
Total	**377,260**	**67,210**	**100%**	**100%**	**217,170**	**38,620**	**100%**	**100%**	**-42%**	**-43%**

Source: Activity data from CalRecycle (2014); Percentage change data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

Emissions from solid waste were calculated using Version 1.3 of the publicly available ARB landfill emissions tool. This tool takes into account the composition of the waste using statewide waste characterization estimates and the climate where the landfill is located (which affects decomposition rates) and calculates the total GHG emissions produced by decomposition of the material. Most large landfills have systems to capture a portion of the methane gas generated by material decomposition and convert the captured gas into electricity. This analysis assumes that 75 percent of the methane gas was successfully captured, such that only 25 percent of the GHGs generated by the decomposition of solid waste is included in the community inventory.

There are multiple closed landfills in Huntington Beach, which have been capped, and are now the site of various community and private facilities, including Edison Community Park and the Sports Complex. Although these landfills are no longer operational, they continue to emit methane as the materials deposited in them decompose.

While methane control and monitoring systems are in place at several sites throughout Huntington Beach, the amount of methane collected or vented at each site is not required to be reported, and therefore emissions from these methane collection systems cannot be calculated or estimated with a high degree of accuracy.

The total tonnage of solid waste disposed of in landfills annually declined by approximately 42 percent from 2005 to 2012, resulting in a decrease in annual GHG emissions from solid waste disposal of approximately 43 percent. This decrease has been observed by most jurisdictions in California, due to an increase in recycling and waste reduction strategies to keep waste out of landfills.

Water and Wastewater

Water

The City of Huntington Beach provides water service to residents and businesses in the planning area. A majority of the city water (roughly two-thirds) comes from local groundwater, while the remaining portion is imported from the MWDOC. Water from the MWDOC comes from regional groundwater and surface water supplies, recycled water, and water obtained from the State Water Project and the Colorado River.

GHG emissions from water result from the electricity needed to extract, convey, treat, and distribute the supply. The amount of electricity needed to extract, transport, and distribute the water varies depending on the source. Table 9 shows the amount of energy (in kWh per MG) needed to extract, convey, and treat imported water based on values published by the California Energy Commission. The kWh per MG values listed in Table 9 are unique to Huntington Beach and are reported as the electricity use of the city water infrastructure.

TABLE 9
STATE AVERAGES OF EMBEDDED ENERGY IN WATER, BY ACTIVITY AND SOURCE

Activity	kWh per MG
Extraction	
Surface water	0
Groundwater	4[1]
Conveyance	
State Water Project	8,235[2]
Colorado River	6,140
Local sources	120
Treatment	
All sources	100

1. kWh per MG per foot of well depth
2. kWh per MG for the State Water Project varies by location. The figures used are for the Los Angeles region
Source: CEC 2006

In 2005, the city supplied 10,630 million gallons of water to customers (excluding customers in Sunset Beach, which has received water from the city since the 1960s), resulting in total electricity use of 23,253,970 kWh.[7] Of this total, 5,356,940 kWh was used to distribute water to customers through the city water infrastructure, while the other 17,897,030 kWh was used to process and deliver imported water to the city. The city supplied 9,710 MG of water to customers in 2012, requiring 21,830,830 kWh. Of this total, 4,894,040 kWh was used to distribute water to customers and 16,936,800 kWh was used to process and deliver imported water. Table 10 shows activity data and GHG emissions for water use for 2005 (not including Sunset Beach) and 2012, as well as the change in water use activity data and GHG emissions from 2005 to 2012.

Emissions increased from 2005 to 2012, while total water use and associated electricity use declined. This is due to the increase in carbon intensity of SCE's electricity as a result of the closure of SONGS, as described in greater detail in the Electricity section of this report.

Wastewater

Wastewater treatment service in the planning area is provided by the OCSD. The City of Huntington Beach operates infrastructure within the city limits to convey wastewater from properties to OCSD treatment plants. Wastewater activity includes the electricity needed to convey, treat, and discharge wastewater. This emissions category also includes "process" emissions, which result from the decomposition of material that is removed as part of the wastewater treatment process. No activity data are available for process emissions.

In 2005, uses within Huntington Beach (not including Sunset Beach) generated 5,800 MG of wastewater, requiring 8,671,310 kWh of electricity for conveyance and treatment. Of this total, 998,120 kWh was used by the city wastewater delivery infrastructure and 7,673,190 kWh was used by the OCSD to treat and discharge wastewater. In 2012, uses within Huntington Beach generated 5,310 MG of wastewater, requiring 7,922,950 kWh of electricity for conveyance and treatment. Of this total, 906,990 kWh was used by the city wastewater delivery infrastructure and 7,015,960 kWh was used by the OCSD to treat and discharge the wastewater. Table 11 shows wastewater-related activity data and GHG emissions for 2005 and 2012, as well as the change in activity data and GHG emissions from 2005 to 2012.

The city provided data on wastewater delivery and associated electricity use. Data describing the average electricity use for wastewater treatment and discharge processes are based on energy intensity estimates provided by the CEC. Annual GHG emissions estimates reported to the ARB by the OCSD were used to determine the Huntington Beach community's share of total OCSD process emissions, considering the population of the community as a percentage of the total population served by the OCSD. The 2005 verified emission factor for this electricity was supplied by SCE. As noted in the Electricity section of this report, SCE has not provided a verified emission factor for 2012; therefore, an estimated emission factor was calculated using data from the EPA and the CEC.

GHG emissions from electricity use associated with wastewater increased, while the amount of electricity used to treat wastewater declined. This is a result of the increase in carbon intensity of SCE's electricity, due to the closure of the SONGS facility in early 2012, as described in greater detail in the Electricity section of this report.

7 Although Sunset Beach has received water from Huntington Beach since the 1960s, it was not incorporated into the city until 2011 (Miller, 2011). Consistent with the guidance of the U.S. Community Protocol, water use in Sunset Beach is not part of the community total in 2005 but is included in 2012. In 2005, water use in Sunset Beach totaled approximately 65 MG, using 144,690 kWh and resulting in approximately 40 MTCO2e.

TABLE 10
WATER ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 MG	2005 kWh	2005 $MTCO_{2e}$	% of MG	% of kWh	% of $MTCO_{2e}$	2012 MG	2012 kWh	2012 $MTCO_{2e}$	% of MG	% of kWh	% of $MTCO_{2e}$	MG % Change	kWh % Change	$MTCO_{2e}$ % Change
Local water infrastructure	6,950	5,356,940	1,630	65%	23%	23%	6,020	4,894,040	1,670	62%	22%	22%	-13%	-9%	2%
Imported water	3,690	17,897,030	5,440	35%	77%	77%	3,690	16,936,800	5,760	38%	78%	78%	0%	-5%	6%
Total	**10,630**	**23,253,970**	**7,070**	**100%**	**100%**	**100%**	**9,710**	**21,830,840**	**7,430**	**100%**	**100%**	**100%**	**-9%**	**-6%**	**5%**

Source: Activity data from the City of Huntington Beach (Villasenor, 2014b) and CEC (2006); Percentage change data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

TABLE 11
WASTEWATER ACTIVITY DATA AND GHG EMISSIONS, 2005 AND 2012

Subsector	2005 kWh	2005 $MTCO_{2e}$	% of kWh	% of $MTCO_{2e}$	2012 kWh	2012 $MTCO_{2e}$	% of kWh	% of $MTCO_{2e}$	kWh % Change	$MTCO_{2e}$ % Change
City delivery infrastructure	998,120	300	12%	10%	906,990	310	11%	10%	-9%	3%
OCSD treatment and discharge	7,673,190	2,330	88%	80%	7,015,960	2,390	89%	80%	-9%	3%
Process emissions	—	300	—	10%	—	280	—	9%	—	-7%
Total	**8,671,310**	**2,930**	**100%**	**100%**	**7,922,950**	**2,980**	**100%**	**100%**	**-9%**	**2%**

Source: Activity data from the City of Huntington Beach (Villasenor 2014c), CEC (2006), ARB (2013b), OCSD (2005); Percentage change data compiled by Michael Baker International (2014)
Note: Due to rounding, totals may not equal the sum of the individual parts.

Oil Drilling

Oil was first discovered in Huntington Beach in 1920, and while local drilling reached a peak in the 1960s, oil extraction continues to occur in the community. GHG emissions from oil drilling primarily result from the fuel used to power the drilling equipment. Lower levels of GHGs also result from fugitive emissions (unintentional leaks in pipes and equipment) and vented emissions (intentional releases as part of regular operations and maintenance).

Oil drilling activity is measured in barrels of oil extracted. Each barrel of oil generates emissions from fuel use, fugitive leaks, and venting. Oil extraction data for the City of Huntington Beach and surrounding areas are provided in Table 12.[8]

TABLE 12
OIL EXTRACTION, CITY OF HUNTINGTON BEACH AND SURROUNDING AREAS, 2005 AND 2012

Subsector	2005 Barrels	2012 Barrels
City limits	338,260	337,390
Surrounding areas	184,510	184,030
City limits and surrounding areas	**522,770**	**521,430**

Source: Data from City of Huntington Beach (Villasenor 2014d), California Department of Conservation (2006, 2013), ARB (2011c)

Activity data were provided by the City of Huntington Beach and the California Department of Conservation. Emission factors for fuel use, fugitive leaks, and venting per barrel of oil were supplied by the ARB. A 2012 emission factor was not available at the time this inventory was prepared; therefore, a 2011 emission factor was used.

Tables 13, 14, and 15 identify 2005 and 2012 GHG emissions for oil drilling occurring within the city limits, surrounding areas, and the city limits and surrounding areas together, respectively. For the purposes of this inventory, only emissions from oil drilling in the city limits are included in the community total; emissions from oil drilling in the surrounding areas are presented as information items.

TABLE 13
OIL DRILLING GHG EMISSIONS, 2005 AND 2012, CITY LIMITS

Subsector	2005 $MTCO_2e$	Percentage of 2005 $MTCO_2e$	2012 $MTCO_2e$	Percentage of 2012 $MTCO_2e$	$MTCO_2e$ Percentage Change, 2005-2012
Fuel use	14,900	91%	14,860	90%	<-1%
Fugitive emissions	1,470	9%	1,460	9%	-1%
Vented emissions	240	1%	240	1%	0%
Total	**16,610**	**100%**	**16,560**	**100%**	**<-1%**

Source: Data from City of Huntington Beach (Villasenor 2014d), California Department of Conservation (2006, 2013), ARB (2011c)

Note: Due to rounding, totals may not equal the sum of the individual parts.

8 This figure includes oil produced in the Bolsa Chica wetlands and areas adjacent to the city, including the Seal Beach Naval Base. It does not include any off-shore production.

TABLE 14
OIL DRILLING GHG EMISSIONS, 2005 AND 2012, SURROUNDING AREAS

Subsector	2005 $MTCO_2e$	Percentage of 2005 $MTCO_2e$	2012 $MTCO_2e$	Percentage of 2012 $MTCO_2e$	$MTCO_2e$ Percentage Change, 2005-2012
Fuel use	8,120	91%	8,100	90%	<-1%
Fugitive emissions	800	9%	800	9%	0%
Vented emissions	130	1%	130	1%	0%
Total	**9,050**	**100%**	**9,030**	**100%**	**<-1%**

Source: Data from City of Huntington Beach (Villasenor 2014d), California Department of Conservation (2006, 2013), ARB (2011c)

Note: Due to rounding, totals may not equal the sum of the individual parts.

TABLE 15
OIL DRILLING GHG EMISSIONS, 2005 AND 2012, CITY LIMITS AND SURROUNDING AREAS

Subsector	2005 $MTCO_2e$	Percentage of 2005 $MTCO_2e$	2012 $MTCO_2e$	Percentage of 2012 $MTCO_2e$	$MTCO_2e$ Percentage Change, 2005-2012
Fuel use	23,020	90%	22,960	90%	<-1%
Fugitive emissions	2,270	9%	2,260	9%	<-1%
Vented emissions	380	1%	380	1%	0%
Total	**25,670**	**100%**	**25,600**	**100%**	**<-1%**

Source: Data from City of Huntington Beach (Villasenor 2014d), California Department of Conservation (2006, 2013), ARB (2011c)

Note: Due to rounding, totals may not equal the sum of the individual parts.

REDUCTION TARGET

An emissions reduction target represents the amount of GHG emissions a community plans to reduce by a forecast year. Reduction targets often are expressed as a percentage of emissions reduced relative to a baseline year (e.g., 15 percent below baseline levels by 2020). The State CEQA Guidelines outlining a Qualified GHG Reduction Strategy do not set a specific goal for GHG reduction; instead, communities are called upon to "establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable." AB 32 sets this level as equal to 1990 levels for the state, and the AB 32 Scoping Plan suggests that 15 percent below baseline levels by 2020 is a comparable level for local jurisdictions. Individual air districts can recommend a level for communities within their jurisdiction, but, to date, the SCAQMD has not officially done so.

A reduction target of 15 percent below baseline levels is the commonly accepted target, but jurisdictions may adopt other targets. A 15-percent reduction target also demonstrates a clear connection with the AB 32 Scoping Plan and helps ensure consistency with the Scoping Plan and State CEQA Guidelines Section 15183.5(b). However, as neither the State CEQA Guidelines nor the SCAQMD recommend a specific target, the city may use another target in the Greenhouse Gas Reduction Program, as long as it sets a level below which emissions would not be cumulatively considerable.

A reduction of 15 percent below baseline 2005 levels equates to a target emissions level of 1,234,260 $MTCO_2e$ by 2020.

REGULATORY FRAMEWORK

State Regulations

Executive Order S-3-05

In 2005, then-Governor Arnold Schwarzenegger signed EO S-3-05, declaring that California is vulnerable to the impacts of climate change through reductions in the Sierra Nevada snowpack (a major source of water for the state), reduced air quality, and rising sea levels. EO S-3-05 also sets the following GHG reduction goals for the state:

- Reduce emissions to 2000 levels by 2010
- Reduce emissions to 1990 levels by 2020
- Reduce emissions to 80 percent below 1990 levels by 2050

The California Global Warming Solutions Act of 2006 (AB 32)

The California Global Warming Solutions Act of 2006, also known as AB 32, codifies the goals set in EO S-3-05 and sets a target for the state to reduce its total GHG emissions to 1990 levels by 2020 through a series of market-based and regulatory mechanisms. These mechanisms are discussed in the AB 32 Scoping Plan, developed by the ARB and released in 2008. Actions in the Scoping Plan include producing 33 percent of the state's electricity from renewable sources by 2020, implementing clean car standards, and developing a cap-and-trade program for major stationary sources of GHGs. The Scoping Plan also identifies local governments as strategic partners to achieve the statewide reduction goal and establishes a GHG emissions reduction of 15 percent below existing levels as being comparable to a return to 1990 levels. Agencies throughout California have generally interpreted "existing emissions levels" as emissions levels between 2005 and 2008.

AB 32 requires the ARB to update the Scoping Plan at least once every five years. The first major update to the Scoping Plan was adopted by the ARB on May 22, 2014. The updated Scoping Plan summarizes the most recent science related to climate change, including anticipated impacts to California and the levels of GHG reduction necessary to likely avoid risking irreparable damage. It identifies the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to help meet the 2020 target established by AB 32. The Scoping Plan update also looks beyond 2020 toward the 2050 goal established in EO S-3-05, though not yet adopted as state law, and observes that "a mid-term statewide emission limit will ensure that the State stays on course to meet our long-term goal." The Scoping Plan update does not establish or propose any specific post-2020 goals, but identifies such goals adopted by other governments or recommended by various scientific and policy organizations.

2007 Amendments to the State CEQA Guidelines (SB 97)

SB 97, which was signed in 2007 and went into effect in 2010, requires that projects estimate the GHG emissions associated with project-related vehicle traffic, energy use, water use, and construction activities as part of the environmental review process under CEQA. Projects located in jurisdictions with a Qualified GHG Reduction Strategy can streamline their GHG evaluation under CEQA by showing compliance with the strategy. A Qualified GHG Reduction Strategy, such as the Greenhouse Gas Reduction Program informed by this Inventory and Forecast, must satisfy the following six requirements identified in State CEQA Guidelines Section 15183.5(b):

- Quantify GHG emissions, both existing and forecast over a set time period, from activities within a defined geographic area.
- Establish a level below which GHG emissions from activities covered by the plan are not cumulatively considerable, based on substantive evidence.
- Identify and analyze the GHG emissions as a result of specific actions or categories of actions anticipated within the defined geographic area.

- Identify specific measures or a group of measures, including performance standards, which would collectively achieve the specified emissions level if implemented on a project-by-project basis, as demonstrated by substantive evidence.
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require revisions to the plan if it is not achieving the specified levels.
- Be adopted in a public process following environmental review.

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

SB 375, signed in September of 2008, links regional transportation planning efforts, GHG reduction targets, and land use and housing allocations. It requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or an Alternative Planning Strategy as part of the land use and housing allocation in their Regional Transportation Plan (RTP). The ARB will work with the MPOs to set reduction targets for passenger cars and light trucks in the area of the MPO's jurisdiction, to be updated every four to eight years.

The MPO for the Huntington Beach area, SCAG, released its RTP/SCS in April 2012. The SCS is designed to reduce greenhouse gas emissions from passenger vehicles by 8 percent per capita by 2020, and by 13 percent per capita by 2035 compared to 2005, consistent with regional targets set by the ARB. One aspect of SB 375 that is unique to the SCAG region is that subregions within SCAG have the option of creating their own subregional SCS. Of SCAG's 15 subregions, two accepted this option, including the Orange County Council of Governments (OCCOG), of which Huntington Beach is a member agency. The underlying land use, socioeconomic, and transportation data provided in the OCCOG subregional SCS was incorporated into the regional SCS.

Executive Order B-30-15

In 2015, Governor Brown issued EO B-30-15, building on EO S-3-05 and the actions of AB 32. This executive order establishes an additional GHG reduction goal for the state of 40 percent below 1990 levels by 2020, comparable to a 49-percent reduction below baseline levels for local communities. It also directs state agencies to take a number of actions to reduce GHG emissions and to improve California's resiliency to the impacts of climate change.

Regional Regulations

Huntington Beach lies within the jurisdiction of the SCAQMD. Air districts have direct and indirect regulatory authority over sources of air pollution and GHGs within their territory, and can inform and guide how laws on air pollution and GHGs are applied. The districts play a critical role in providing support and guidance to jurisdictions, but they do not officially certify Qualified GHG Reduction Strategies. The SCAQMD has not yet officially adopted plan-level guidelines for GHG reduction, although the agency has proposed project-level thresholds, below which a project's GHG emissions would not be considered significant for CEQA purposes.

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Hazards and Hazardous Materials

This section describes the hazards and hazardous materials within the city of Huntington Beach planning area. Information in this section is based on the Natural and Environmental Hazards Technical Report prepared by Michael Baker International[1].

ENVIRONMENTAL SETTING

The term "hazardous materials" refers to both hazardous substances and hazardous wastes. A "hazardous material" is defined by federal regulations as "a substance or material that…is capable of posing an unreasonable risk to health, safety, and property when transported in commerce" (49 Code of Federal Regulations 171.8). In addition, California Health and Safety Code Section 25501 defines a hazardous material as 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 to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous wastes are defined in California Health and Safety Code Section 25141(b) as wastes that, "because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause or significantly contribute to an increase in mortality or an increase in serious illness [or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed."

Hazardous Sites

Government Code Section 65962.5 requires the California DTSC to compile and regularly update a list of hazardous waste sites known as the Cortese List. For those sites on the Cortese List, other state and local government agencies are required to provide additional information on hazardous material releases.

The State Water Resources Control Board (SWRCB) maintains the GeoTracker database, which allows interested parties to obtain information related to permitted underground storage tanks (USTs), leaking underground storage tanks (LUSTs), Department of Defense sites, landfills, and Spills-Leaks-Investigations-Cleanups (SLIC) sites. GeoTracker provides information in graphic form to easily identify the location of a site and also maintains information about specific sites, including the current status of the site, chemicals of concern on the site, potential media affected, regulatory activities, and any data submitted to the oversight agency, such as contaminant concentrations in monitoring wells.

Table 1 and Table 2 identify hazardous materials and waste sites in the planning area, with Table 1 focusing on LUST sites and Table 2 focusing on other open cleanup sites, including Cortese List sites. According to the GeoTracker database, five LUST sites in the planning area are under site assessment, one site is pending verification monitoring, 27 sites are under remediation or in interim remediation, and 17 sites have been remediated to the satisfaction of the respective oversight agency, making them eligible for closure[2]. In addition, 11 other open cleanup program sites exist in the planning area, as shown in Table 2. Three of those sites are under assessment and three are under remediation[3].

1 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
2 Ibid
3 Ibid

One site (Ascon Landfill) in the planning area is included on the DTSC's Hazardous Waste and Substances Site List (Cortese List).

No sites in the planning area are identified in the Superfund database[4].

The northern portion of the planning area, as well as the Gothard Street corridor, contains many industrial facilities with considerable quantities of hazardous chemicals, including oil industries. The extent of a hazardous material spill may vary from significant, causing injuries and evacuation, to minor, requiring minimal cleanup. Depending on the origin, size, and duration of the release, an oil spill can have serious effects on air and water quality, public health, plant and animal habitat, and biological resources. Spill cleanup and remediation activities may cost millions of dollars, and effects can last for years. These environmental effects contribute to short- and long-term economic impacts in areas affected by oil spills[5].

According to the Cal OES Hazardous Materials Spill/Release Reporting database (2011), between January 2001 and December 2013, 676 spills were documented in the planning area. Based on these data, approximately 4.3 spills per month occur within the planning area (on average), equaling approximately 52 spills per year. Of these spills, the majority—approximately 46 percent—were sewage-related and approximately 22 percent involved petroleum products.

Schools

Because children are more susceptible to adverse health effects from hazardous materials and emissions, the State CEQA Guidelines require that the locations of schools relative to the sources of hazardous materials and emissions are considered. Older schools constructed before these state regulations were established could place children within one-quarter mile of existing sources of hazardous materials and emissions. Refer to the *Public Services Technical Background Report* for additional information regarding schools located within the planning area.

Aircraft/Airport Hazards

A major air crash that occurs in a heavily populated area like the city of Huntington Beach can result in considerable loss of property and life. The city is served primarily by three major airports outside of the planning area: John Wayne Airport in Santa Ana (approximately nine miles southeast of the planning area), Long Beach Airport (approximately 19 miles northwest of the planning area), and Los Angeles International Airport (approximately 38 miles northwest of the planning area). In addition, the Joint Forces Training Center – Los Alamitos (four miles) and Bob Hope Airport (52 miles) are located north of the planning area, and LA/Ontario Airport (48 miles) is located northeast of the planning area.

Eight heliports are located within the planning area. These facilities are regulated by the Caltrans Division of Aeronautics. Aside from facilities owned and operated by the city of Huntington Beach, all other heliport facilities in the planning area are privately owned and operated.

4 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.
5 Ibid

TABLE 1
HUNTINGTON BEACH HAZARDOUS MATERIALS/WASTE SITES – LEAKING UNDERGROUND STORAGE TANKS

Leaking Underground Storage Tanks		
Site Name	**Status**	**Fuel(s)**
Huntington Harbour Car Wash	Open – Assessment & Interim Remedial Action	Gasoline
Shell Oil	Open – Assessment & Interim Remedial Action	Gasoline
Arco #1812	Open – Eligible for Closure	Gasoline
Arco #1888	Open – Eligible for Closure	Gasoline
Beach Warner Car Wash	Open – Eligible for Closure	Gasoline
G & M Oil #34	Open – Eligible for Closure	Gasoline
Huntington Beach Arco	Open – Eligible for Closure	Gasoline
Mobil #18-G31	Open – Eligible for Closure	Gasoline, Waste Oil/Motor/Hydraulic/ Lubricating
Mobil #18-G3w	Open – Eligible for Closure	Gasoline
Mobil #18-Kb5	Open – Eligible for Closure	Gasoline
Sharda AM/PM	Open – Eligible for Closure	Gasoline
Shell Oil	Open – Eligible for Closure	Gasoline
Thrifty Oil #380	Open – Eligible for Closure	Gasoline
Tosco – 76 #5280	Open – Eligible for Closure	Gasoline
Unocal #5336	Open – Eligible for Closure	Gasoline
Unocal #5376	Open – Eligible for Closure	Gasoline
Unocal Cop #5169	Open – Eligible for Closure	Gasoline
Venus Laboratories	Open – Eligible for Closure	Chlorinated Hydrocarbons
Winall Station #19	Open – Eligible for Closure	Gasoline
Arco #1887	Open – Remediation	Gasoline
Arco #3053	Open – Remediation	Gasoline
Arco #6060	Open – Remediation	Gasoline
Arco #6191	Open – Remediation	Gasoline
Chevron #9-8474	Open – Remediation	Gasoline
Chevron #9-8721	Open – Remediation	Gasoline
Exxon #7-3915	Open – Remediation	Gasoline
Exxon #7-7987	Open – Remediation	Gasoline
G & M Oil #04	Open – Remediation	Benzene, Diesel, Gasoline, MTBE/ TBA/Other Fuel Oxygenates
G & M Oil #35	Open – Remediation	Gasoline
Mobil #18-D9r	Open – Remediation	Gasoline, Waste Oil/Motor/Hydraulic/ Lubricating
Mobil #18-G4r	Open – Remediation	Gasoline
Mobil #18-G6g	Open – Remediation	Gasoline
Mobil #18-G6r	Open – Remediation	Gasoline
Mobil #18-Kbv	Open – Remediation	Gasoline
Saad Service Center	Open – Remediation	Gasoline
Shell Oil	Open – Remediation	Gasoline
Shell Oil	Open – Remediation	Gasoline
Texaco	Open – Remediation	Gasoline

TABLE 1
HUNTINGTON BEACH HAZARDOUS MATERIALS/WASTE SITES – LEAKING UNDERGROUND STORAGE TANKS

Leaking Underground Storage Tanks		
Site Name	**Status**	**Fuel(s)**
Thrifty Oil #385	Open – Remediation	Gasoline
Tosco-76 #5078	Open – Remediation	Gasoline
Tosco-76 #5285	Open – Remediation	Gasoline
Unocal #5123	Open – Remediation	Gasoline
Unocal #5194 (aka 76/Tosco #5663)	Open – Remediation	N/A
World Oil #68	Open – Remediation	Gasoline
Chevron #9-2165	Open – Site Assessment	Gasoline
Huntington Beach Police Department	Open – Site Assessment	Gasoline
Huntington Center Car Wash	Open – Site Assessment	Gasoline
J. C. Penney	Open – Site Assessment	Gasoline
Marina High School	Open – Site Assessment	Gasoline
Chevron #21-1313	Open – Verification Monitoring	Gasoline

Source: Data compiled by Michael Baker International, 2014

TABLE 2
HUNTINGTON BEACH HAZARDOUS MATERIALS/WASTE SITES – OTHER OPEN CLEANUP SITES

Other Open Cleanup Sites [including Cortese List Sites]		
Site Name	**Status**	**Location**
Landfill, Cannery Street	Open – Inactive	NW corner of Magnolia & Hamilton, 21377 Magnolia
Landfill, Ascon	Open – Referred	SW corner of Magnolia St and Hamilton Ave, 21641 Magnolia
Boeing (former McDonnell Douglas Astronautics)	Open – Remediation	5301 Bolsa Ave
Sher Lane Retail Center Dry Cleaner	Open – Remediation	7672–7746 Edinger Avenue
Weiser Lock – Ves	Open – Remediation	5555 McFadden Ave
Edindale Cleaners	Open – Site Assessment	15958 Springdale St
Golden West Laundry and Valet Services, Inc.	Open – Site Assessment	17862 Jamestown Lane
Sentry Metals	Open - Site Assessment	16072 Gothard Street
Centrilift	Open – Verification Monitoring	5421 Argosy Avenue
Landfill, Gothard Street – Inactive	Open – Verification Monitoring	18131 Gothard Street
Landfill, Huntington Beach	Open – Verification Monitoring	18131 Gothard Street
Cortese List Site		
Site Name	List	Address
Ascon Landfill	Cortese	21641 Magnolia Street

Source: Data compiled by Michael Baker International, 2014

Transportation of Hazardous Materials

When a hazardous material is spilled on the state highway system, it must be cleaned up according to the appropriate regulatory agency requirements[6]. A majority of all hazardous materials would be transported via the truck routes designated in the planning area. For east-west travel, a majority of the transport would occur on the following roadways: Bolsa Avenue, McFadden Avenue (between Graham Street and Springdale Street), Edinger Avenue, Warner Avenue, Talbert Avenue (between Gothard Street and Newland Street), Garfield Avenue, Adams Avenue, Atlanta Avenue (between Beach Boulevard and Newland Street), and Hamilton Avenue. For north-south travel, a majority of the transport would occur on the following roadways: Brookhurst Street, Magnolia Street, Newland Street (between Pacific Coast Highway and Atlanta Avenue), Beach Boulevard, Main Street (between Gothard Street and Beach Boulevard), Gothard Street (between Main Street and Edinger Avenue), Goldenwest Street, Springdale Street, Graham Street (between Edinger Avenue and Bolsa Avenue), and Bolsa Chica Street.

Wildland Fires

Public Resources Code Sections 4201–4204 and Government Code 51175–51189 require identification of fire hazard severity zones within the state of California. Fire hazard severity zones are modeled based on vegetation, topography, weather, fuel load type, and ember production and movement within the area of question. Fire hazard severity zones are defined as moderate, high, and very high fire hazard severity by Cal Fire. Fire prevention areas considered to be under state jurisdiction are referred to as "state responsibility areas," while areas under local jurisdiction are called "local responsibility areas." The planning area does not include any designated fire hazard severity zones, as defined by Cal Fire or state and local responsibility areas[7].

Urban Fire

Common causes of urban fires include incendiary, short circuit, or ground fault; unattended cooking; and combustibles located too close to heat. A variety of fire protection challenges exist within the planning area due to developed residential areas, large industrial complexes, high-rise buildings, and the petrochemical industry. These potentially problematic areas include the older residential Downtown area, Huntington Beach Hospital, high-density coastal and residential areas, industrial complexes, the Bella Terra Shopping Center, several high-rise buildings, and coastal hotels.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act of 1975 regulates safe transportation of hazardous materials. The U.S. Department of Transportation (USDOT) regulates transportation of hazardous materials on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and state regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and Caltrans. Together, federal and state agencies determine driver training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Resource Conservation and Recovery Act

At the federal level, the principal agency regulating the generation, transport, treatment, storage, and disposal of hazardous substances is the EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). RCRA established an all-encompassing federal regulatory program for hazardous

6 California Department of Transportation (Caltrans). 2006. Maintenance Manual Volume 1, July 2006, Chapter D5. http://www.dot.ca.gov/hq/maint/manual/Ch_D5.pdf.
7 Michael Baker International. 2014. Draft Natural and Environmental Hazards Technical Report for the City of Huntington Beach General Plan Update. September 2014.

substances that is administered by the EPA. RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibited the use of certain techniques for the disposal of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes requirements for hazardous materials planning to help protect local communities in the event of accidental release of hazardous substances. The EPA has delegated many of the RCRA requirements to DTSC.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as the Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. Cleanup actions can be conducted only at sites listed on the EPA's National Priorities List (NPL). The NPL is the list of national priorities among the known or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

Regulation of Polychlorinated Biphenyls and Lead-Based Paint

The Toxic Substances Control Act of 1976 (Title 15 of the U.S. Code, Section 2605) banned the manufacture, processing, distribution, and use of polychlorinated biphenyls (PCBs) in enclosed systems. PCBs are considered hazardous materials because of their toxicity. They have been shown to cause cancer in animals, along with effects on the immune, reproductive, nervous, and endocrine systems, and studies have shown evidence of similar effects in humans.

The EPA Region 9 PCB Program regulates remediation of PCBs in several states, including California. Title 40 of the Code of Federal Regulations, Section 761.30(a)(1)(vi)(A) states that all owners of electrical transformers containing PCBs must register their transformers with the EPA. Specified electrical equipment manufactured between July 1, 1978, and July 1, 1998, that does not contain PCBs must be marked by the manufacturer with the statement "No PCBs" (Section 761.40[g]). Transformers and other items manufactured before July 1, 1978, containing PCBs, must be marked as such.

The Residential Lead-Based Paint Hazard Reduction Act of 1992 amended the Toxic Substances Control Act to include Title IV, Lead Exposure Reduction. The EPA regulates renovation activities that could create lead-based paint hazards in target housing and child-occupied facilities, and has established standards for lead-based paint hazards and lead dust cleanup levels in most pre-1978 housing and child-occupied facilities.

State Plans, Policies, Regulations, and Laws

Hazardous Materials Release Response Plans and Inventories

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 requires hazardous materials business plans to be prepared and inventories of hazardous materials to be disclosed. A business plan includes an inventory of the hazardous materials handled, facility floor plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee safety and emergency response training (California Health and Safety Code, Division 20, Chapter 6.95, Article 1). Statewide, the DTSC has primary regulatory responsibility for managing hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the State of California. Local agencies, including the Orange County Environmental Health Department, administer these laws and regulations.

Sections 12101 through 12103 of the California Health and Safety Code require that permits be obtained by those manufacturing, transporting, possessing, or using explosives and endorsed by the jurisdiction(s) in which the transportation or use would occur.

Hazardous Waste Control Act

The Hazardous Waste Control Act is codified in California Code of Regulations Title 26, which describes requirements for the proper management of hazardous wastes. The act created the state's hazardous waste management program, which is similar to but more stringent than the federal RCRA program. The program includes hazardous waste criteria for identification and classification; generation and transportation; design and permitting of recycling, treatment, storage, and disposal facilities; treatment standards; operation of facilities and staff training; and closure of facilities and liability requirements.

The Hazardous Waste Control Act and Title 26 regulations list more than 800 potentially hazardous materials and establish criteria for identifying, packaging, and disposing of such wastes. To comply with these regulations, the generator of hazardous waste material must complete a manifest that accompanies the material from the point of generation to transportation to the ultimate disposal location, and is required to file copies of the manifest with the DTSC.

Emergency Services Act

Under the Emergency Services Act (California Government Code Section 8850 et seq.), the state developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Quick response to incidents involving hazardous materials or hazardous waste is a key part of the plan. Cal OES administers the plan and coordinates the responses of other agencies, including the California Environmental Protection Agency (Cal EPA), CHP, CDFW, Santa Ana RWQCB, air quality management districts, and county disaster response offices.

Government Code Section 65962.5 (Cortese List)

The provisions of Government Code Section 65962.5 are commonly referred to as the Cortese List. The Cortese List is a planning document used by state and local agencies to provide information about hazardous materials release sites. Government Code Section 65962.5 requires Cal EPA to develop an updated Cortese List annually. The DTSC is responsible for a portion of the information contained in the Cortese List. Other state and local government agencies are required to provide additional hazardous materials release information for the list.

Underground Storage Tank Program

The California Department of Public Health and the SWRCB maintain lists of hazardous UST sites for remediation. Sites are listed based on unauthorized release of toxic substances. Leak prevention, cleanup, enforcement, and tank testing certification are elements of the UST program.

Unified Program

Cal EPA grants oversight and permitting responsibility to qualifying local agencies for certain state programs pertaining to hazardous waste and hazardous materials. This is achieved through the Unified Program, created by state legislation in 1993 to consolidate, coordinate, and make consistent the administrative requirements, permits, inspections, and enforcement activities for the following emergency and management programs:

- Hazardous materials release response plans and inventories (business plans);
- California Accidental Release Prevention Program;
- UST Program;
- Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure plans;
- Hazardous Waste Generator and On-Site Hazardous Waste Treatment (tiered permitting) Programs; and

- California Uniform Fire Code: Hazardous material management plans and hazardous material inventory statements.

Cleanup of Contaminated Sites

The State of California has a number of different regulatory structures governing cleanup of contaminated sites. The DTSC regulates many of these programs, including RCRA corrective actions, state Superfund sites, brownfields programs, and voluntary cleanups. The SWRCB (through RWQCBs and some local agencies) regulates releases with the potential to affect water resources under programs such as the LUST program and the SLIC program. Regulatory authority for these programs may be delegated by the federal government (as with RCRA corrective actions directed by the DTSC) or found in the California Health and Safety Code. These regulations vary in their specifics but require the reporting, investigation, and remediation of sites where releases of hazardous materials have occurred, followed by appropriate disposal of any hazardous materials. These programs govern a range of pollutants (e.g., solvents, petroleum fuels, heavy metals, and pesticides) in surface water, groundwater, soil, sediment, and air.

School Site Selection and Approval Criteria and Guide

State CEQA Guidelines Section 15186, School Facilities, requires that school projects, as well as projects proposed to be located near schools, examine potential health impacts resulting from exposure to hazardous materials, wastes, and substances. In particular, State CEQA Guidelines require EIRs to assess whether a project would emit hazardous air emissions or involve the handling of extremely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school (also see Public Resources Code Section 21151).

The California Department of Education has developed the *School Site Selection and Approval Guide* to help school districts select appropriate locations for educational institutions. The guide contains 12 screening and ranking criteria, including safety, location, topography, cost, utilities, and public acceptance.

Local Plans, Policies, Regulations, and Laws

City of Huntington Beach Local Hazard Mitigation Plan

The 2012 Local Hazard Mitigation Plan is a FEMA-approved document that identifies the natural and human-caused hazards of concern within the planning area and the potential actions identified by the city of Huntington Beach to mitigate these hazards. This document complies with the Disaster Mitigation Act of 2000, which requires an update every five years to ensure jurisdictions remain eligible for FEMA mitigation grant opportunities.

City of Huntington Beach Emergency Operations Plan

The city of Huntington Beach maintains an All Hazards Emergency Operations Plan (EOP) that guides the city through the mitigation, preparedness, response, and recovery phases of emergency management. The plan's purpose is to establish policies and procedures that will assure the most effective utilization of all resources in the city to minimize potential loss of life and protect the environment and property. The city adopted its current EOP in 2004 and began updating the document in 2013. The current EOP revision has been approved by Cal OES.

City of Huntington Beach Emergency Response Organization

The activities identified in the EOP are carried out by the city Emergency Response Organization (ERO), which is made up of assigned representatives from city departments. The city's ERO is formed per city Municipal Code Ordinance Chapter 8.60 and maintains a readiness condition 24 hours per day, seven days per week.

In substantial emergency situations, the city also may choose to activate its Emergency Operations Center (EOC), which is responsible for directing, coordinating, and supporting the various city departments and other agencies in their emergency response activities. The EOC is a stand-alone facility, located in the Civic Center, with resources necessary to facilitate an effective emergency response. When the ERO is activated,

representatives from city departments report to the EOC and fill their assigned roles. The EOC allows for face-to-face coordination among personnel who must create policy, set priorities, inform the public, and support first responders.

City of Huntington Beach Municipal Code

Chapter 8.60 of the Huntington Beach Municipal Code created the Emergency Management and Homeland Security (EMHS) office. The EMHS office is responsible for coordinating the emergency preparedness activities of the city. The office serves the interests of the City Council and the public in all emergency management and homeland security matters. A major activity of the EMHS office is to direct the development and approval of the EOP for the city.

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Hydrology and Water Quality

This section describes the hydrology and water quality conditions within the city of Huntington Beach. The hydrology and water quality information in this section is based on the Infrastructure and Public Facilities Technical Report prepared by Michael Baker International[1], the Natural and Environmental Hazards Technical Report prepared by Michael Baker International[2], and the Citywide Urban Runoff Management Plan (CURMP) prepared by the City of Huntington Beach[3], along with other city resources.

ENVIRONMENTAL SETTING

The planning area ranges from just below sea level to more than 100 feet above mean sea level (AMSL) with surface waters flowing toward and ultimately discharging to the Pacific Ocean. The most prominent topographical features within the city are the Huntington Mesa and the Bolsa Chica Mesa. The Bolsa Chica Mesa is located near the coast at the western end of the planning area, north of the East Garden Grove-Wintersburg Channel and south and east of Huntington Harbour. The maximum elevation of the Bolsa Chica Mesa is approximately 65 feet AMSL. The Huntington Mesa extends northeasterly inland from the coast through the central portion of the planning area. Elevations on the Huntington Mesa exceed 100 feet AMSL. The area surrounding the mesas within the planning area has surface elevations ranging from below sea level to more than 25 feet AMSL.

Hydrologic Setting

Regional Hydrology

The planning area is located within the Santa Ana River Basin (SARB), which comprises a nearly 3,000-square-mile area located within four counties (Los Angeles, Orange, Riverside, and San Bernardino counties)[4]. The Santa Ana River is located approximately 75 miles northeast from the planning area in the San Bernardino Mountains before crossing into Orange County and ultimately emptying into the Pacific Ocean. The SARB is a group of interconnected inland basins and open coastal basins drained by surface streams flowing generally southwesterly to the Pacific Ocean. The SARB generally can be divided into an upper basin and a lower basin by the Prado Dam, a flood control dam located at the upper end of the Lower Santa Ana River Canyon. The dam is located on the Santa Ana River in Riverside County, approximately two miles west of the city of Corona. The planning area is located within the lower basin, which generally is considered as Orange County. The Santa Ana Canyon, which separates Chino Hills from the Santa Ana Mountains, is the major drainage of Orange County. The lower Santa Ana River has been channelized and modified so that, in most years, flows do not reach the Pacific Ocean but, instead, are used to recharge groundwater. Figure 1 shows the watersheds applicable to the planning area within the SARB watershed.

1 Michael Baker International. 2014a. Infrastructure and Public Facilities Technical Report. August.
2 Michael Baker International. 2014b. Natural and Environmental Hazards Technical Report. September.
3 City of Huntington Beach. 2015. Citywide Urban Runoff Management Plan (CURMP). May.
4 Santa Ana Watershed Association (SAWA). 2015. The Santa Ana River Watershed website. Accessed November 14, available at http://sawatershed.org/?q=SARwatershed.

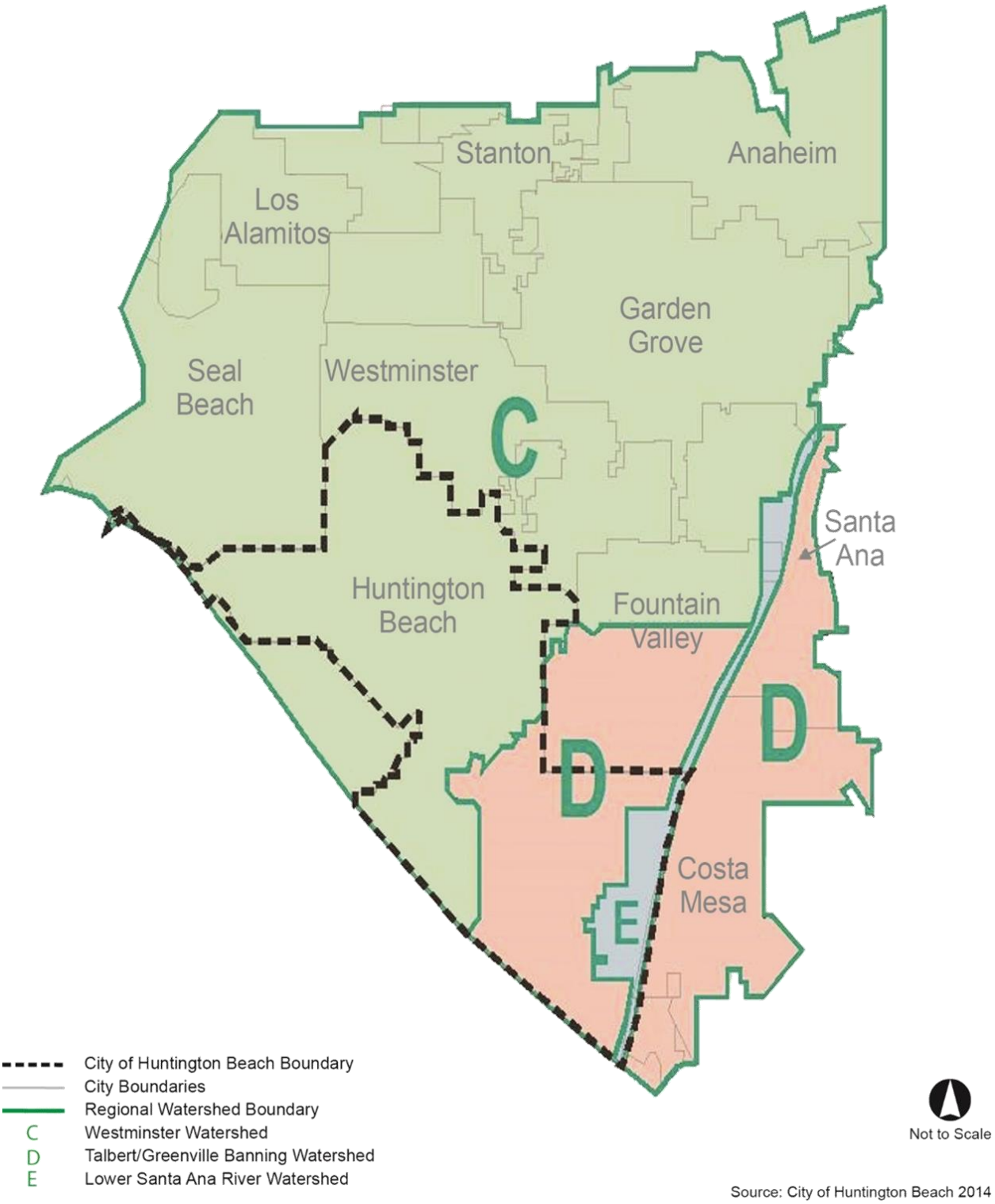


FIGURE 1
REGIONAL WATERSHED MAP

Local Hydrology

The planning area is located primarily within two watersheds of the SARB, with a small portion in a third watershed. The Westminster and Talbert watersheds are the two watersheds that are most prevalent. The Westminster watershed covers 74.1 square miles in the southwestern corner of Orange County and includes portions of the cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Los Alamitos, Santa Ana, Seal Beach, Stanton, Westminster, and Huntington Beach[5]. Three main tributaries drain the Westminster watershed. The Los Alamitos Channel drains into the San Gabriel River while the Bolsa Chica Channel and Westminster Channel empty into Huntington Harbour and then to Anaheim Bay. The East Garden Grove-Wintersburg Channel and Slater Channel drain past the Bolsa Chica Wetlands and then into Huntington Harbour.

The Talbert/Greenville Banning watershed covers 21.4 square miles and straddles the mouth of the Santa Ana River. The Talbert/Greenville Banning watershed includes portions of the cities of Costa Mesa, Fountain Valley, Newport Beach, Santa Ana, and Huntington Beach. Two main tributaries drain the Talbert/Greenville Banning watershed: on the western side of the watershed, the Talbert and Huntington Beach channels drain through the Talbert Marsh before emptying into the Pacific Ocean; and on the eastern side of the watershed, the Greenville-Banning Channel empties into the Santa Ana River.

Drainage

Regional Drainage Facilities

The Orange County Flood Control District (OCFCD) is responsible for the design, construction, operation, and maintenance of regional flood control facilities. The county flood channels are maintained annually, and maintenance includes debris and vegetation removal. The existing storm drainage channels were designed originally to accommodate 25-year flood events or less. However, when the channels were constructed, they were built to accommodate 65 percent of the 25-year flood event. The channels were built with restrictive channel bottoms, which reduce the amount of water the channel can carry, but which slow the flow rate of runoff water while still enabling the system to remove runoff water. The county now uses 100-year flood event standards to design new storm drain construction and drainage improvements, and portions of the channels have been improved to accommodate up to a 100-year storm event.

Local Drainage Facilities

The city is responsible for its own subregional and local drainage facilities. Drainage from the planning area is conveyed through streets and gutters to city storm drain systems consisting of underground pipes, pump stations, and open channels, which ultimately convey runoff into OCFCD facilities. The city owns and operates 15 storm drainage channel pumping stations that generally are located near the principal Orange County drainage channels. Runoff water is collected through the city's drainage facilities at each pump station and then transferred to the nearest OCFCD channel, which ultimately conveys to the Pacific Ocean. The nearest channel may include the Santa Ana River, Bolsa Chica Wetlands, or other City and County channels. City storm drains also outlet to the beaches and Pacific Ocean at numerous locations. Dry weather flows at some storm drain pump stations are diverted to the City's sanitary sewer system for treatment at OCSD Plant No. 2. The city channels, originally designed to accommodate up to 65 percent of the 25-year flood events, were typically constructed at ground level or at grade; however, the at-grade channels accelerate flooding potential because the amount of water that may be pumped into an at-grade channel is less than that which can be pumped into a below-grade channel.

5 Chieh, James, et al. 2010. Hydrologic/Hydraulic Modeling of Westminster Watershed, Orange County, California. U.S. Army Corps of Engineers. July.

Surface Water Quality

Stormwater discharges from the urbanized areas in the planning area, as well as from Orange County, generally consist of surface runoff from residential, commercial, and industrial developments. In addition, there are stormwater discharges from agricultural land uses in the non-urbanized area of Orange County (outside the city), including farming and livestock operations. Discharges from various areas within the planning area drain directly or indirectly into urban streams, city lakes, bays, wetlands, estuaries, and the Pacific Ocean. The city owns, operates, and maintains a storm drainage system for the purpose of conveying stormwater runoff to reduce or eliminate flooding under peak storm flow conditions. The storm drainage system begins with the streets and roads, and includes inlets, storm drains, open channels, pump stations, detention basins, and other appurtenances. While the primary purpose of the storm drain system is to reduce or eliminate flood hazards, the system carries both dry- and wet-weather urban runoff and the pollutants associated with runoff from urban land uses and activities.

Additionally, the planning area includes several major channels owned and maintained by Orange County. These channels receive runoff from areas within the planning area, as well as substantial drainage areas in other upstream jurisdictions. It is estimated that runoff from the planning area makes up about 35 percent to 40 percent of the total dry- and wet-weather flows in the channels.

This discussion of water quality is within the context of urban runoff because the planning area is a highly urbanized landscape. Both dry- and wet-weather urban runoff discharges into storm drains and, in some cases, flows directly to creeks andrivers, lakes, beaches, and the ocean. Untreated polluted runoff can have harmful effects on drinking water, recreational water, and wildlife.

Urban Runoff Quality

Urban runoff pollutants include a wide array of environmental, chemical, and biological compounds from both point and nonpoint sources. In the urban environment, stormwater characteristics depend on site characteristics, such as land use, perviousness, pollution prevention, Best Management Practices (BMPs), rain events (duration, amount of rainfall, intensity, and time between events), operations and maintenance practices (e.g., street sweeping), soil type and particle sizes, multiple chemical conditions, the amount of vehicular traffic, and atmospheric deposition. The EPA estimates that short-term runoff from construction sites without adequate erosion and runoff control measures can contribute more sediment to receiving waters than that which is deposited by natural processes over a period of several decades. For the purposes of discussing water quality issues, urban runoff has been separated into three categories:

- ***Dry-weather urban runoff*** occurs throughout the year when there is no precipitation-generated runoff. Typical sources include landscape irrigation runoff; driveway and sidewalk washing; non-commercial vehicle washing; groundwater seepage; fire flow; potable water line operations and maintenance discharges; and permitted or illegal non-stormwater discharges. Irrigation runoff and washing processes generally contribute the greatest to urban runoff during the dry season (usually from April to September). Dry-weather runoff is a major water quality concern as a significant source of bacteria and other constituents that can be introduced into the drainage system from urban activities, as well as illicit discharges, dumping, or spills. Drainage system capacity and condition typically are not a concern for conveying dry-weather flows.
- ***Small storm runoff*** is typically the source of a high percentage of both overall wet-weather runoff volume and pollutant loads on an annual basis. Storm events used as targets for water quality management strategies typically are less than the volume generated from a one-year frequency storm event, or 10 percent of the peak flow rate of a 50-year peak storm event. Storms for which water quality measures are designed are not those that produce significant flooding potential or cause drainage system capacity deficiencies.
- ***Large storm peak runoff*** is of greatest concern for drainage system capacity analysis. It is not typically considered in water quality management except where natural or unlined channels have the potential for erosion under peak flows or increasing flows resulting from development; or where flood flows can cause the release of pollutants into the drainage system, such as from surcharging sanitary sewer facilities.

The CURMP has projected the annual dry-weather runoff for Huntington Beach at 2,800 acre-feet (af)[6]. The plan estimates that the average annual wet-weather runoff is about 8,000 af. Based on these estimates, dry-weather runoff, which often is considered to be an inconsequential nuisance flow, can contribute more than one-quarter of the total annual runoff. It should be noted that there are currently eleven permits with OCSD to divert dry weather runoff for the Santa Ana River, Talbert channel, Huntington Beach channel, and the East Garden Grove Wintersburg channel to minimize any impact of dry weather runoff on coastal water quality.

Wet- and dry-weather runoff typically contain similar pollutants of concern. However, with the exception of the first-flush concentrations following a long, dry period between rainfall events, the concentrations of pollutants found in wet-weather flows typically are lower than those found in dry-weather flows because the larger wet-weather flows dilute the amount of pollutants in runoff waters. Storm events may dislodge or carry pollutants over different surfaces than the lower dry-weather flows. Table 1 lists typical pollutants found in stormwater runoff.

TABLE 1
MAJOR TYPES OF POLLUTANTS IN RUNOFF

Pollutant	Description
Bacteria	Sources of fecal contamination to surface waters include wastewater treatment plants, on-site septic systems, domestic and wild animal manure, and urban runoff.
Pesticides and petroleum hydrocarbons	These compounds can potentially be found in dry- and wet-weather runoff as a result of normal use (e.g., vehicle fueling, landscaping) and/or illegal dumping and discharge. Elevated levels of oil and grease and petroleum hydrocarbons can be found in wet-weather runoff, particularly from streets, roads, and other paved surfaces.
Metals	Metals such as copper, lead, zinc, arsenic, chromium, and cadmium can potentially be found in dry-weather runoff but typically at levels much lower than in wet-weather runoff. These metals may be toxic to or bioaccumulate in some aquatic species. Sources of metals in stormwater may include automobiles, paints, preservatives, motor oil, and various urban activities including atmospheric deposition from industrial plants and other operations.
Nutrients	Nitrogen and phosphorus are present in dry-weather runoff that originates, primarily from irrigation nuisance flows, on-site septic system leakage, and deposits of animal waste or other organic debris. During wet-weather conditions, nutrients can be mobilized in runoff from landscaping, leaks from sanitary sewers and septic systems, and runoff of atmospheric deposits, animal waste, and organic debris deposited on impervious surfaces. Nutrient loads to surface waters can lead to heavy algae growth, eutrophication, and low dissolved oxygen levels.
Trash and debris	Significant loads of trash, debris, and coarse solids can be found in wet-weather urban runoff. Plant material can be a substantial component of coarse solids.
Suspended solids	Erosion and sediment transport contribute to suspended solids in runoff waters. Sediment is associated with effects on surface water quality including increased turbidity, effects on aquatic and benthic habitat, and reduction in capacity of impoundments. In addition, a number of other pollutants are often attached to and are carried by sediment particles.

6 City of Huntington Beach. 2015. Citywide Urban Runoff Management Plan (CURMP). May.

Table 2 lists the impaired water bodies within the planning area. As shown in Table 2, Huntington Harbour is listed as the water body within the planning area that contains the greatest number of listed impairments. While all the major water bodies within the planning area contain pollutants listed on the 2010 California Section 303(d) list (see Regulatory Framework section), none of the pollutants are listed as high priority in terms of total maximum daily loads.

TABLE 2
IMPAIRED WATER BODIES WITHIN THE PLANNING AREA

Water Body					Pollutants/ Stressor	Source	Priority[2]
EGGWC	Bolsa Chica Channel	Anaheim Bay	Huntington Harbour	Huntington State Beach			
					Enterococci	Unknown	Low
	X				Indicator Bacteria	Unknown	Low
			X		Chlordane	Unknown	Low
			X		Copper	Unknown	Low
			X[1]		Lead	Unknown	Low
		X	X[1]		Nickel	Unknown	Low
			X[1]		Pathogens	Urban Runoff/ Storm Sewers	Low
		X			Dieldrin	Unknown	Low
		X	X[1]	X	PCBs	Unknown	Low
X	X				Ammonia	Urban Runoff/Storm Sewers/Surface Runoff/Unknown	Low
	X				Ammonia/pH	Unknown	Low
		X	X		Sediment Toxicity	Unknown	Low

X = Listed on the 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segment
1 = Listing made by US Environmental Protection Agency
2 = Priority determined by "estimated TMDL completion data" listed in the State Water Resources Control Board's 2010 Integrated Report on Water Quality. All pollutants and water bodies on this list have an estimated completion date of 2019 or later, indicating "low" priority.

Groundwater

Orange County Groundwater Basin

The Orange County Groundwater Basin underlies the northern half of Orange County, beneath broad lowlands known as the Tustin and Downey plains. It covers an area of approximately 350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the southwest, and terminates at the Orange County line to the northwest, where the entire aquifer system is contiguous with the Central Basin of Los Angeles County. Groundwater flow is unrestricted across the county line. The Newport-Inglewood fault zone forms the southwestern boundary of all but the shallow aquifers in the basin. The aquifers comprising the basin extend more than 2,000 feet deep, and form a complex series of interconnected sand and gravel deposits. The major surface water drainages overlying this groundwater basin are the San Gabriel and Santa Ana Rivers, as well as the San Diego and Santiago Creeks, all of which have headwaters outside the groundwater basin.

Historical groundwater flow was generally toward the ocean in the southwest, but pumping has greatly altered the hydraulic gradient and caused water levels to drop below sea level inland of the Newport-Inglewood fault zone. The current hydraulic gradient is primarily from recharge areas toward withdrawal areas. Salt-water intrusion has migrated inland along the coastal regions and some water supplies have been contaminated in this area. A salt-water intrusion barrier in the Alamitos and Talbert Gaps has been successful in eliminating the majority of intrusion. Overall, groundwater storage capacity in the Basin is estimated at 38,000,000 af.

The Orange County Groundwater Basin is the only major non-adjudicated groundwater basin in Southern California. To address overdraft of the basin, the Orange County Water District (OCWD) has developed a groundwater management plan that incentivizes sustainable groundwater production and recharge practices[7].

The basin is recharged primarily from local rainfall (greater in wet years), base flow and storm flows from the Santa Ana River (much of which is actually recycled wastewater from treatment plants in Riverside and San Bernardino counties), imported water percolated into the basin, and recycled water from OCWD's GWRS facility percolated into the basin and injected into the seawater intrusion barriers OCWD considers the Orange County groundwater basin to be in an overdrafted condition. OCWD's Groundwater Management Plan summarizes the accumulated overdraft and water level elevations within the basin. OCWD estimates that the accumulated overdraft in July 2014 was approximately 400,000 af.

OCWD manages the groundwater basin and conducts a comprehensive water quality monitoring program. OCWD collects more than 13,500 groundwater samples each year from more than 800 wells. The water quality data collected from these wells are used to assess ambient conditions of the basin, monitor the effects of extraction, monitor the effectiveness of the seawater intrusion barriers, evaluate impacts from historic and current land use, address poor water quality areas, and also provide early warning of emerging contaminants of concern.

Santa Ana River Groundwater Basin

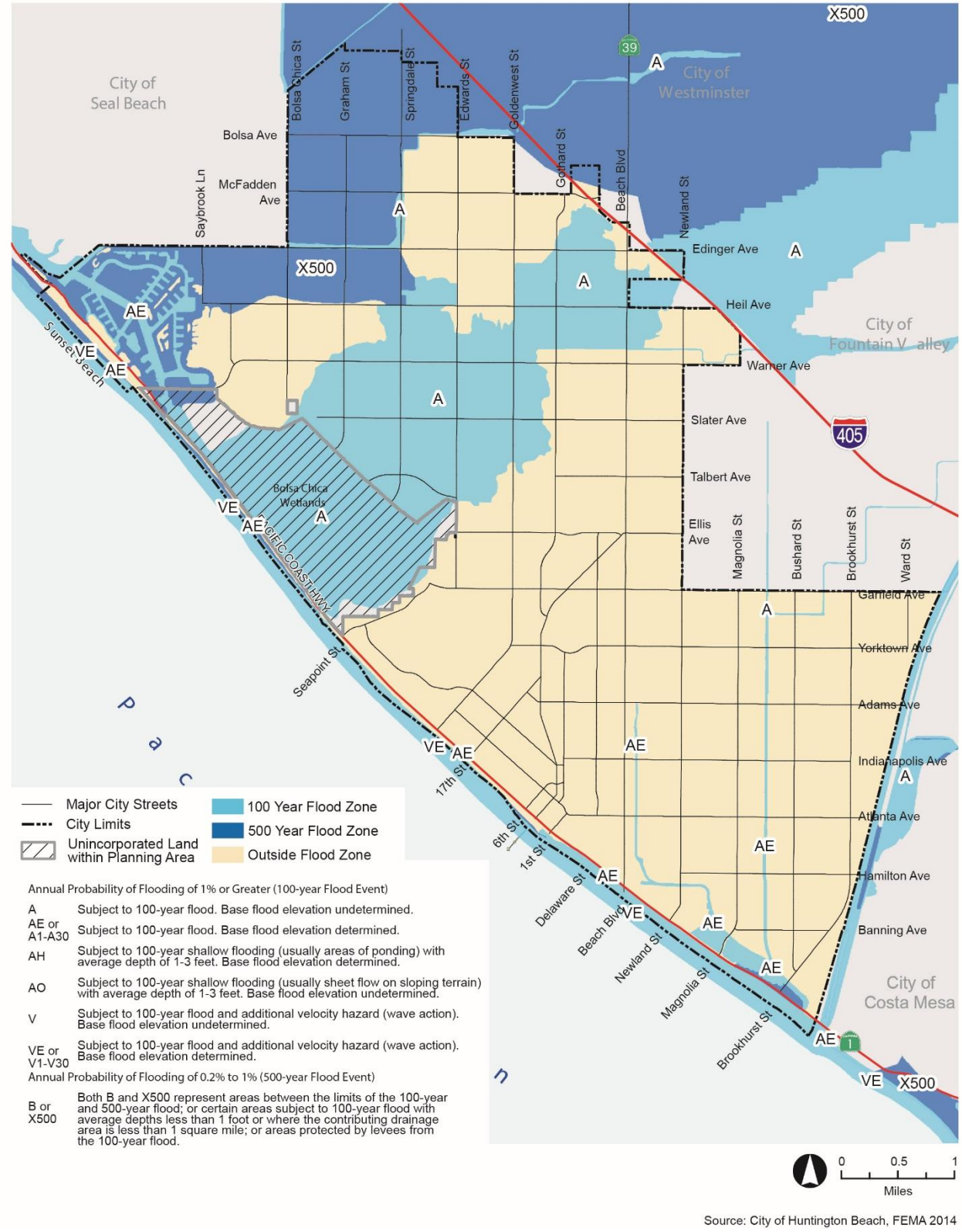
The planning area currently receives approximately 62 percent of its water supply from groundwater wells within the Santa Ana River groundwater basin and 38 percent from water imported by the MWDOC. Imported water is delivered from northern California via the State Water Project and from the Colorado River. These percentages are established through OCWD's allowable basin pumping percentage, which is set by OCWD on an annual basis. The City of Huntington Beach pumps groundwater from 10 operating wells that vary in depth from 200 feet to 1,000 feet. The production ranges from 350 gallons per minute to 3,500 gallons per minute.

Flooding

Flooding within the planning area can be caused by a variety of natural events and typically is a result of heavy rains and coastal storms. It also can result from high tides (tidal flooding) or tsunamis. Additionally, flood events can result from infrastructure failure, such as a water main break. Areas of elevated risks of flooding are divided into 100-year flood zones and 500-year flood zones. A 100-year flood zone has a 1 percent chance each year of being inundated by a major flood, while a 500-year flood zone has a 0.2 percent chance of inundation each year.

As shown in Figure 2, approximately 5.31 square miles of the planning area are located within the 100-year floodplain, which has a 1 percent annual chance of flood inundation[8]. Additionally, approximately 9.02 square miles of the planning area, or approximately 33 percent of total land area, is within the 500-year floodplain, which has 0.2 percent annual chance of flood inundation.

7 Michael Baker International. 2014a. Infrastructure and Public Facilities Technical Report. August.
8 Ibid



Source: City of Huntington Beach, FEMA 2014

FIGURE 2
DESIGNATED FLOODPLAINS WITHIN PLANNING AREA

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Clean Water Act

The CWA established the basic structure for regulating discharges of pollutants into waters of the U.S. The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. Relevant parts of the CWA include Section 303, Section 401, Section 402, and Section 404.

Clean Water Act Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. In California, preparation and management of the Section 303(d) list is administered by the RWQCBs.

Clean Water Act Section 404

Section 404 of the CWA establishes a program to regulate the discharge of dredge and fill material into waters of the U.S., including wetlands. Responsibility for administering and enforcing Section 404 is shared by the USACE and the EPA.

Federal Water Pollution Control Act/National Pollutant Discharge Elimination System

The CWA was designed to restore and maintain the chemical, physical, and biological integrity of the waters of the U.S. The CWA also directs states to establish water quality standards for all waters of the U.S. and to review and update such standards on a triennial basis. The EPA has delegated responsibility for implementation of portions of the federal CWA in California to the SWRCBs and to the RWQCBs. This includes water quality control planning and programs such as the National Pollutant Discharge Elimination System (NPDES), which seeks to protect water quality through the issuance of permits regulating the discharge of pollutants into waters of the U.S. Section 303 of the CWA requires states to adopt water quality standards for all intrastate waters of the U.S.

Safe Drinking Water Act

Under the Safe Drinking Water Act (Public Law 93-523), passed in 1974, the EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by the EPA primary and secondary maximum contaminant levels that are applicable to treated water supplies delivered to the distribution system.

Federal Emergency Management Agency and Flood Plain Management

FEMA is responsible for determining flood elevations and floodplain boundaries based on USACE studies and approved agency studies. FEMA also is responsible for distributing the Flood Insurance Rate Maps, which are used in the National Flood Insurance Program (NFIP). These maps identify the location of special flood hazard areas (SFHAs), including the 100-year flood zone.

FEMA allows nonresidential development in SFHAs; however, construction activities are restricted depending upon the potential for flooding within each area. Federal regulations governing development in an SFHA are set forth in 44 CFR 60. They enable FEMA to require municipalities that participate in the NFIP to adopt certain flood hazard reduction standards for construction and development in 100-year flood plains. Section 60.3(c)(2) of the NFIP regulations requires that the lowest occupied floor of a residential

structure be elevated to, or above, the 100-year flood elevation (the base flood elevation). Section 60.3(c)(3) adds that nonresidential or commercial structures can either be elevated or dry flood-proofed to, or above, the 100-year flood elevation. In addition, the Flood Disaster Protection Act of 1973 and the National Flood Insurance Reform Act of 1994 mandate the purchase of flood insurance as a condition of federal or federally related financial assistance for acquisition and/or construction of buildings in SFHAs.

State Plans, Policies, Regulations, and Laws

State Water Resources Control Board

Created by the California State Legislature in 1967, the SWRCB holds authority over water resources allocation and water quality protection within the state. As of July 1, 2014, the EPA has delegated to the SWRCB the responsibility for administering California's drinking water program. The SWRCB is accountable to the EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by the EPA.

Section 401 of the Clean Water Act

Section 401 of the CWA requires that an applicant for any federal permit (such as a Section 404 permit from the USACE) that proposes an activity which may result in a discharge to "waters of the State" obtain certification from the SWRCB, acting through the RWQCB, that the federal permit action meets state water quality objectives. Section 401 grants the State of California, through the RWQCB, the right to ensure its interests are protected on any federally permitted activity occurring in or adjacent to waters of the State. Therefore, if a proposed project requires a 404 permit and has the potential to impact waters of the State, the RWQCB will regulate the project and associated activities through a Water Quality Certification determination. The USACE will not issue a Section 404 permit until the RWQCB has been notified and the applicant has obtained a Section 401 certification.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, enacted in 1969, authorizes the SWRCB to adopt, review, and revise policies for all waters of the State (including both surface and groundwaters), and directs the RWQCBs to develop region-specific basin plans. Section 13170 of the California Water Code also authorizes the SWRCB to adopt water quality control plans (WQCPs) on its own initiative. The purpose of these plans is to designate beneficial uses of the region's surface and groundwaters, designate water quality objectives for the reasonable protection of those uses, and establish an implementation plan to achieve the objectives.

NPDES General Permit for Discharges of Stormwater Associated with Construction Activity

Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES General Permit for Storm Water Dischanrges Associated with Construction and Land Use Disturbance Activities (Construction General Permit). To apply for coverage under the Construction General Permit, a project applicant must submit a Notice of Intent for coverage under the Construction General Permit to the RWQCB and the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) prior to initiating construction activities. Implementation of the SWPPP continues through the completion of the project when an applicant must submit a Notice of Termination to the RWQCB notifying the agency that construction is completed. The disturbance to areas greater than one acre associated with construction and land disturbance for the project would require coverage under a Construction General Permit.

California Water Code, Groundwater Management Act

California Water Code, Division 6, Part 2.75, Chapters 1-5, Sections 10750 through 10755.4 establish the Groundwater Management Act, which was enacted in 1992 as AB 3030. The intent of the Groundwater Management Act is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions and to provide a methodology for developing a Groundwater Management Plan.

Sustainable Groundwater Management Act

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, comprised of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act. The act provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention only if necessary to protect the resource (ACWA 2015)[9]. The act requires the formation of local groundwater sustainability agencies that must assess conditions in their local water basins and adopt locally based management plans. The act provides a 20-year timeline for the groundwater sustainability agencies to implement the plans to achieve long-term groundwater sustainability. Further, the act protects existing surface water and groundwater rights and does not interfere with current drought response measures.

Regional and Local Plans, Policies, Regulations, and Ordinances

Santa Ana Regional Water Quality Control Board

The planning area is located within the jurisdiction of the Santa Ana RWQCB (Region 8). As authorized by the Porter-Cologne Act, the RWQCB's primary function is to protect the quality of the waters within its jurisdiction, including the planning area, for all beneficial uses. State law defines beneficial uses of California's waters that may be protected against quality degradation to include, but not be limited to: domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

The RWQCB implements water quality protection measures by formulating and adopting WQCPs (referred to as basin plans, as discussed below) for specific groundwater and surface water basins, and by prescribing and enforcing requirements on all agricultural, domestic, and industrial waste discharges.

Santa Ana River Basin Water Quality Control Plan

The Santa Ana RWQCB has jurisdiction over the Santa Ana River Basin. The Santa Ana RWQCB is required by law to develop, adopt, and implement a WQCP for the entire region. The principal elements of the WQCP are a statement of beneficial water uses that the Santa Ana RWQCB will protect; water quality objectives needed to protect the designated beneficial water uses; and strategies and time schedules for achieving water quality objectives. The water quality objectives are achieved primarily through the establishment and enforcement of waste discharge requirements. Both beneficial uses and water quality objectives comprise the relevant water quality standards. The Santa Ana River Basin WQCP specifically: (1) designates beneficial uses for surface waters and groundwaters; (2) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy; and (3) describes implementation programs to protect all waters in the region. In cases where the Basin Plan does not contain a criterion for a particular pollutant, other criteria are used to establish a water quality objective. These may be applied from SWRCB documents (e.g., the Inland Surface Waters Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the Clean Water Act (e.g., California Toxics Rule).

The Santa Ana RWQCB has set water quality objectives for all surface waters in the region. Chemical constituents are regulated depending upon the beneficial use of the water body. Water quality objectives also are set for groundwater and enclosed bays and estuaries.

Orange County Drainage Area Management Plan

The purpose of the Orange County Drainage Area Management Plan (DAMP) was to satisfy NPDES permit conditions for creating and implementing an urban runoff management program to reduce pollutant discharges to the maximum extent practicable for protection of receiving waterbody water quality and support of designated beneficial uses. The DAMP contains guidance on both structural and nonstructural BMPs for meeting these goals.

9 http://www.acwa.com/content/groundwater/groundwater-sustainability

City of Huntington Beach Local Implementation Plan

The current specific water pollution control program elements are documented in the DAMP and corresponding Huntington Beach Urban Stormwater Runoff NPDES Permit Local Implementation Plan (LIP) of 2011. The city has developed the LIP using the DAMP as its basis. The LIP provides a written account of activities that the city has undertaken, or is undertaking, to meet the requirements of the Fourth Term NPDES Permit and a means of displaying a meaningful improvement in water quality. As with the DAMP, the Huntington Beach LIP proposes a wide range of continuing and enhanced BMPs and control techniques that will be implemented and reported on as part of the Fourth Term Permit reports.

The LIP also has incorporated the model construction program described in the DAMP. The construction program includes requirements, guidelines and methods that construction site owners, developers, contractors and other responsible parties must use for pollution prevention to protect water quality from construction discharges. New projects, as they are initiated, are added to the city's inventory of construction projects. Once compiled, construction projects are prioritized into risk levels I, II, or III based on threat to water quality. Regardless of size or priority, all construction projects are required to implement BMPs to prevent runoff and discharges into the storm drain system or water bodies. At a minimum, all construction projects must include erosion and sediment controls, as well as waste and materials management controls. The LIP designates the construction-specific BMPs that the city has determined acceptable for use within city jurisdiction.

Additionally, development is required to comply with the NPDES discharge requirements for the County of Orange, Orange County Flood Control District and the Incorporated cities of Orange County within the Santa Ana Region Areawide Urban Stormwater Runoff (MS4).

Urban Water Management Plan

The 2010 city Urban Water Management Plan provides information on water supply reliability and water use efficiency measures. The city Urban Water Management Plan is intended to serve as a general, flexible, and open-ended document that periodically can be updated to reflect changes in the Orange County water supply trends, and conservation and water use efficiency policies. The Urban Water Management Plan, along with the city Water Master Plan and other city planning documents, is used by city staff to guide the city water use and management efforts through the years 2011 to 2035. The Urban Water Management Plan was updated in 2015 and adopted in 2016, extending the water use and management efforts to 2040.

City of Huntington Beach Citywide Urban Runoff Management Plan

The CURMP provides a broad framework for managing the quantity and quality of all urban runoff that reaches receiving waters from the land surfaces and through the storm drain system within the city. The Water Quality Element of the CURMP focuses primarily on managing runoff quality, while the Drainage Element addresses flood hazards and inconveniences. The CURMP identifies potential common solutions that can address both water quality and quantity concerns.

Water Quality Element of the CURMP

The Water Quality Element of the CURMP provides a basis for implementing a comprehensive program for improving water quality through a combination of methods to reduce the level of urban runoff and pollutants emanating from private as well as public property and thus enhancing the quality of water discharged into the municipal storm drain system within the city. The Water Quality Element provides guidance on preparing a project-specific Water Quality Management Plan (WQMP), which describes how a project will achieve reducing urban runoff and pollutants being discharged from a project site.

Water Quality Management Plan

During the project review, approval, and permitting process, the city requires all new development and significant redevelopment to address the quantity and quality of stormwater runoff from the completed development. A project-specific WQMP describing how the project will address runoff is required for all projects listed under the NPDES "Priority Project Category." The WQMP describes how the project will meet the following requirements:

- Incorporate and implement all applicable Source Control BMPs
- Consider the implementation of Site Design BMPs (e.g., pervious pavement, bioretention), and document those BMPs included and those not included; and
- Either implement Treatment Control BMPs or participate in or contribute to an acceptable regional or watershed management program.

The city has general/standard conditions of approval to protect receiving water quality from short- and long-term impacts of new development and significant redevelopment. Prior to issuance of any grading or building permit for projects that disturb soil of one or more acres, the Project Applicant shall demonstrate, by providing a copy of the Notice of Intent submitted to the SWRCB and a copy of the subsequent issuance of a Waste Discharge Identification number, that coverage has been obtained under the Construction General Permit. Projects subject to this requirement also will prepare, submit, and implement a SWPPP, including erosion control measures. This also includes the requirement that the Project Applicant demonstrate that all structural and non-structural BMPs described in the WQMP have been installed and implemented in accordance with approved plans and specifications prior to close-out of a grading or building permit and/or issuance of a Certificate of Use or Occupancy.

Drainage Element of the CURMP

The Drainage Element of the CURMP incorporates a city-based Master Plan of Drainage, which is a comprehensive drainage study that identifies and creates an inventory of existing storm drain facilities; identifies those areas where system elements do not meet the latest goals established by the city; ranks the severity of the difference between existing capacity and the capacity needed to achieve those goals; prepares planning-level cost options for system upgrades; and recommends system improvements to initiate corrections as funding becomes available. The city then initiates individual drainage projects within its budgetary, political, and discretionary constraints. Hydrologic and hydraulic modeling has determined that several areas within the city drainage system are undersized for the current storm flows and conveyance standards and are subject to potential flooding.

City of Huntington Beach Municipal Code

To comply with NPDES permit requirements, the city of Huntington Beach has codified requirements in its municipal code. The following sections of the city municipal code would be applicable to the proposed project:

- Chapter 14.25 (Stormwater and Urban Runoff Management)
- Chapter 14.48 (Drainage)
- Chapter 14.52 (Water Efficient Landscape Requirement)
- Chapter 17.05 (Grading and Excavation Code)

City of Huntington Beach Zoning Code

The Huntington Beach Zoning Code Chapter 222 provides methods for reducing flood hazards (Section 222.08) and provides development standards for construction (Section 222.14) and development within the 100-year floodplain. Portions of the planning area are located within the 100-year floodplain and, therefore, are subject to these zoning codes.

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Land Use and Planning

This section describes the existing land uses within the planning area and the city of Huntington Beach. The land use survey information in this section is based on the Existing Land Use Technical Report prepared by Michael Baker International[1]. However, the information updates the Existing Land Use Technical Report information to reflect more precise data compiled by the project team and City's GIS staff.

ENVIRONMENTAL SETTING

The planning area that comprises the General Plan Update is located with the northwestern portion of Orange County along the Pacific Ocean. The planning area is bound by the Pacific Ocean to the southwest, the city of Seal Beach to the northwest, the city of Westminster to the north, the city of Fountain Valley to the northeast, and the city of Costa Mesa to the east. The planning area boundaries are irregularly shaped, with a border that extends along the coast for approximately nine and a half miles. The planning area addresses the parcels within the city's limits and Sphere of Influence (SOI), including the Bolsa Chica Ecological Reserve and the Goodell property, both of which are under the jurisdiction of Orange County. The planning area encompasses 29.6 square miles (18,971.9 acres) on the western edge of Orange County, located approximately 37 miles southeast of downtown Los Angeles. Lands within the current city limits, which include the Huntington Beach Municipal Pier, comprise approximately 27.3 square miles (approximately 17,475 acres) or approximately 92 percent of the planning area. The city's SOI comprises approximately 2.3 square miles (approximately 1,490 acres) or about 8 percent of the planning area.

Existing Land Uses

The existing land uses within the planning area include residential, commercial, industrial, mixed-use, open space, park, beach, and public uses. Given the unique environmental and regulatory setting, existing land uses in the portion of the planning area located in the coastal zone are described separately in a section titled Existing Land Uses in Coastal Zone. However, the coastal zone land uses are included in the planning area-wide land use totals presented in this section. Figure 1 shows the planning area of the Huntington Beach General Plan, as well as the existing land uses in the planning area at the time of the land use survey in 2014. Figure 2 shows the coastal zone as identified by the CCC.

Residential

Residential is the most dominant land use designation within the planning area and comprises 8,066 acres, or approximately 43 percent, of the total acreage of the planning area. A total of 78,175 residential dwelling units were identified in the 2014 land use survey. A number of residential and mixed-use projects were in various stages of construction and permitting at the time of the 2014 land use survey. These projects are anticipated to add an additional 2,946 residential units to the planning area when construction is completed. Of the 2,946 residential units, 1,669 of these housing units are part of the planned mixed-use projects. These units would be counted toward the new growth anticipated by the General Plan Update.

1 Michael Baker International. 2014. Existing Land Use Technical Report for the Huntington Beach General Plan Update. August 2014.

As shown in Table 1, low-density residential areas, which consist mostly of single-family housing at a maximum of seven dwelling units per acre (du/ac), account for approximately 68 percent of the total percentage of residential acreage within the planning area. Medium-density residential areas comprise 8 percent of the total residential acreage, while medium-high density residential areas account for another 21 percent. Lastly, high-density residential areas account for 2 percent of the total percentage of residential acreage. However, the majority of the city's mixed-use designated acreage, which comprises approximately 3 percent of the planning area, allows residential uses in the high-density category.

TABLE 1
EXISTING RESIDENTIAL LAND USES (2014)

Use Type	Density Range (du/ac)	Dwelling Units	Acreage	Percent of Residential Acreage	Percent of Total Acreage
Low Density	0-7	35,034	5,653	70%	30%
Medium Density	7.01-15	6,364	1,185	15%	6%
Medium-High Density	15.01-25	31,739	1,048	13%	5.5%
High Density	25.01+	5,038	181	2%	1%
Total	—	78,175	8,066	100%	43%

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of the individual parts

Medium, medium-high, and high-density residential uses are located primarily along blocks between Gothard Street and Beach Boulevard adjacent to Warner Avenue and Brookhurst Street and adjacent to and within the Downtown area. There also is a pocket of medium-high and high density residential use located on blocks between Bolsa Chica Street and Algonquin Street in the western portion of the planning area. Medium and medium-high density areas include a mix of duplexes, townhouses, and smaller-scale apartment buildings, often intermixed with commercial uses. High-density areas generally contain larger, multi-family housing developments with two- to four-story buildings, frequently as part of a larger planned use development containing a mix of commercial, retail, and office uses.

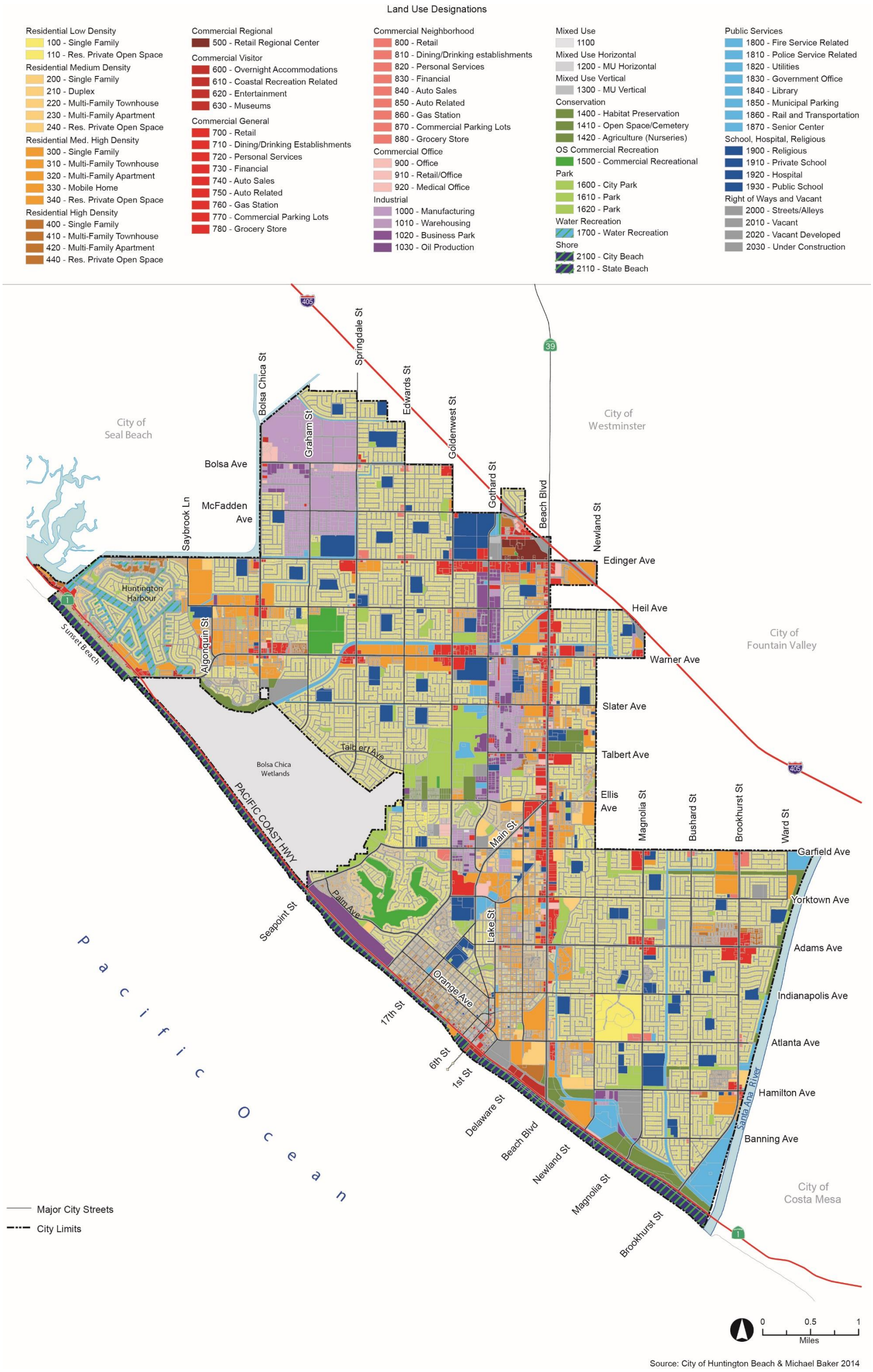
Commercial

Commercial uses in the planning area consist of regional retail centers, general commercial uses, neighborhood commercial uses, and offices. As shown in Table 2, commercial uses comprise 995 acres, or approximately 5 percent of the planning area's total acreage, most of which is characterized as general commercial. It should be noted that most of the existing development within the mixed-use land use designation is general or regional commercial. As such, the data in Table 2 indicate a greater acreage of existing commercial uses when compared to commercially designated acreage on the City's General Plan land use map.

TABLE 2
COMMERCIAL AND OFFICE LAND USES

Use Type	Acreage	Percent of Commercial	Percent of Total
General Commercial	691	69%	4%
Office	124	13%	1%
Commercial Residential	100	10%	1%
Neighborhood Commercial	80	8%	1%
Total	**995**	**100%**	**7%**

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of the individual parts



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 1
EXISTING LAND USES

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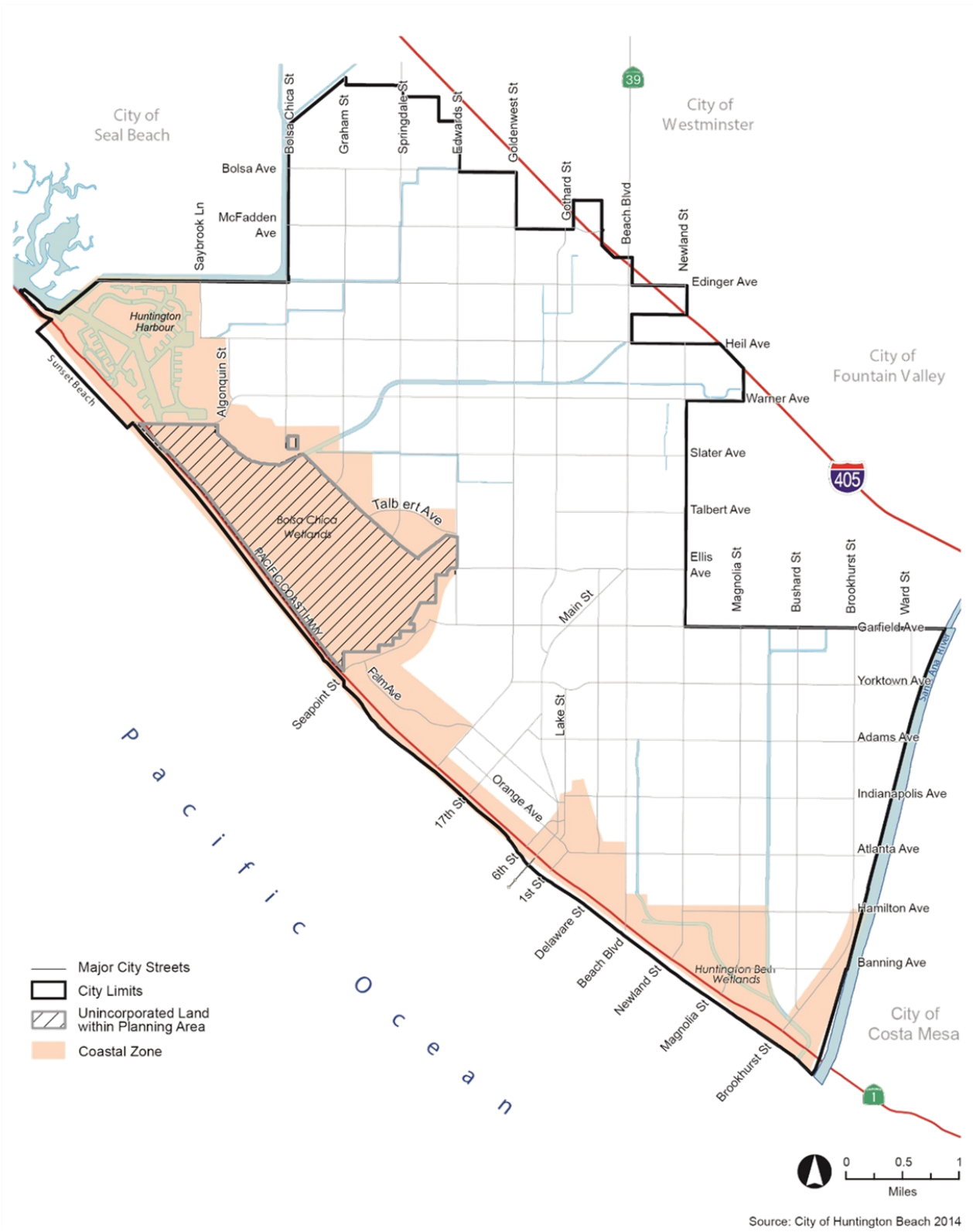


FIGURE 2
EXISTING COASTAL ZONE

Existing commercial uses are predominantly located in regional shopping centers such as Bella Terra, in Downtown Huntington Beach, and along the blocks adjacent to both sides of Beach Boulevard, Adams Avenue, Edinger Avenue, and Warner Avenue. Smaller-scale commercial uses are located along Pacific Coast Highway in the Sunset Beach area and also are present at most arterial road intersections. The primary regional retail center in Huntington Beach is Bella Terra, located near the intersection of Beach Boulevard and Edinger Avenue. This center contains numerous specialty retail stores, restaurants, and small office uses. Most visitor-oriented commercial uses, including hotels, dining, and entertainment facilities, are concentrated along Beach Boulevard, the Pacific Coast Highway, and the Five Points intersection at Ellis Avenue, Main Street, and Beach Boulevard.

Mixed-Use Development

A number of areas within Huntington Beach are designated for mixed-use development, which consists of residential units that are horizontally or vertically integrated with commercial uses on the same lot. Mixed-use development is found mostly within commercial areas, such as Downtown, and within new projects under construction or recently completed in the Beach and Edinger Corridors Specific Plan, along Beach Boulevard and Edinger Avenue, and the Bella Terra Specific Plan area. Areas identified as existing mixed-use development in the 2014 land use survey accounted for 16 acres. However, most of the mixed-use development in the planning area at the time of the survey was under construction or in plan check and not counted as existing in the survey.

Industrial

As shown in Table 3, industrial uses account for 1,157 acres, or approximately 7 percent of the total acreage of the planning area. Industrial uses are located primarily in the northwestern portion of the planning area (including within and adjacent to the Boeing campus), along the Gothard Street corridor, in the Holly-Seacliff area surrounding the intersection of Stewart Lane and Garfield Avenue, throughout the Downtown area, and along Pacific Coast Highway (near and including oil production facilities and the AES power plant).

TABLE 3
INDUSTRIAL LAND USES

Use Type	Acreage	Percent of Industrial	Percent of Total
Manufacturing	783	68%	5%
Business Park	184	16%	1%
Oil Production	135	12%	1%
Warehousing	55	5%	<1%
Total	**1,157**	**100%**	**7%**

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of the individual parts

The nature of industrial uses within the planning area differs by location. Some of the industrial uses along Gothard Street and in the Holly-Seacliff area are related to oil extraction from the Huntington Beach Oil Field. Small parcels of oil-related industrial also are scattered throughout the Downtown grid. Industrial parcels characterized in the 2014 land use survey with uses related to oil production account for approximately 12 percent of all industrial land, and about 1 percent of Huntington Beach's land area. Much of the remaining industrial use along the Gothard Street corridor is characterized as warehouse use, consisting largely of vehicle and equipment storage. The other predominant concentration of industrial use is located in northwestern Huntington Beach, generally north of Edinger Avenue and west of Springdale Street. Industries in this area consist primarily of manufacturing and research and development related to the aerospace industry. The Boeing Company operates major facilities in this area and many of the surrounding uses are dependent or related to these primary uses. Some industrial uses are related to the Seal Beach Naval Weapons Station, located to the northwest of Huntington Beach in the city of Seal Beach.

Open Space Land Use

As shown in Table 4, the planning area includes 3,274 acres of open space, which is approximately 17 percent of the planning area's total acreage. The open space land use type consists of parks, beaches, water and commercial recreation uses, habitat conservation areas, and open space uses located throughout the planning area.

TABLE 4
OPEN SPACE LAND USES

Use Type	Acreage	Percent of Open Space	Percent of Total
Parks	701	21%	4%
Beaches	434	13%	2%
Water Recreational	239	7%	1%
Commercial Recreational	238	7%	1%
Habitat Conservation	1,662	50%	9%
Total	**3,274**	**100%**	**17%**

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of the individual parts

As identified in Table 4, Habitat Conservation areas make up the largest land area among these uses, accounting for 1,662 acres, which is approximately 50 percent of the total open space acreage. However, this area includes the Bolsa Chica Wetlands area, which is considered part of the planning area, but is not incorporated as part of the City. Of the park acreage, Central Park accounts for the largest area of parkland within the city limits. Water recreation and commercial recreation uses make up the third and fourth largest open space use at 239 acres and 238 acres, respectively. They are each approximately 7 percent of the total open space acreage. Water recreation uses include all of Huntington Harbour and Sunset Channel. Commercial recreation uses include the public Meadowlark Golf Club and SeaCliff Country Club.

Public Uses

The "Public Uses" category encompasses government facilities and utility-related uses; semi-public uses such as public and private schools, hospitals, and religious institutions; and public rights-of-way such as streets and alleys. As shown in Table 5, these public uses comprise 5,296 acres, or approximately 28 percent of the total acreage of the planning area.

TABLE 5
PUBLIC USES

Use Type	Acreage	Percent of Public	Percent of Total
Rights of Way	3,682	70%	19%
Public	836	16%	4%
Semi-Public	779	15%	4%
Total	**5,296**	**100%**	**28%**

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of the individual parts

Vacant

Currently vacant land in Huntington Beach consists of 142 acres or approximately 1 percent of the planning area's total acreage. Vacant parcels are distributed throughout the planning area with the largest vacant areas located on the north side of the AES power plant, near the intersection of Goldenwest Street and

Garfield Avenue in the Holly-Seacliff area. Many smaller vacant parcels are located within the Beach Boulevard, Warner Avenue, and Gothard Street corridors.

Existing Land Uses in Coastal Zone

Approximately 4,865 acres, or approximately 26 percent of total acreage of the planning area, are located within the coastal zone identified by the CCC, as shown in Figure 2. The Bolsa Chica wetlands and the Goodell property also are located within the coastal zone. The coastal zone areas have special considerations, as city plans and regulations in these areas are subject to review by the CCC, and development in the coastal zone must be consistent with the LCP for the city and developed in a manner that maximizes protection of environmental, visual, cultural, and recreational coastal resources. In consideration of this particular environmental and regulatory setting, land uses within the coastal zone are discussed separately in this section. Table 6 lists the various land uses within the coastal zone.

TABLE 6
COASTAL ZONE LAND USE DISTRIBUTION (2014)

Use Type	Acreage	Percent of Coastal Zone
Residential	1,136	34%
Commercial	91	3%
Industrial	116	3%
Mixed-Use	10	<1%
Open Space/Park	560	17%
Public	870	26%
Beach/Pier	423	13%
Under Construction	98	3%
Vacant	70	2%
Total	**3,375**	**100%**

Source: Data compiled by Michael Baker 2014
Note: Due to rounding, totals may not equal the sum of individual parts

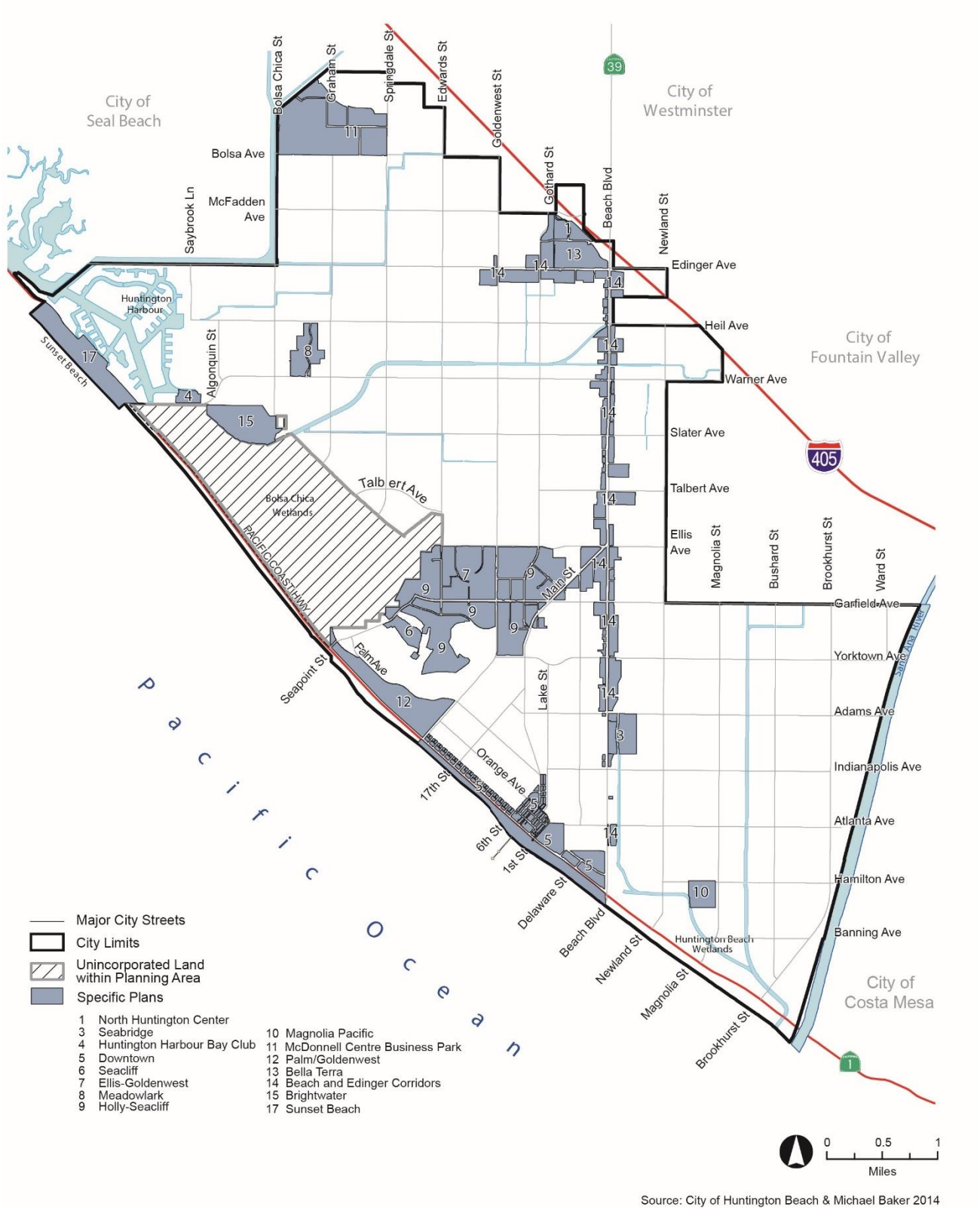
Vacant

Currently, vacant land in the coastal zone consists of the 6.2-acre Goodell property, located to the northeast of the Bolsa Chica Ecological Reserve within the County of Orange, and scattered vacant lots within the downtown area and along Pacific Coast Highway. Vacant land accounts for less than 1 percent of the total land uses in the coastal zone.

Specific Plans

The city of Huntington Beach has 15 adopted specific plans, as listed below and shown in Figure 3:

1) North Huntington Center
2) Seabridge
3) Huntington Harbor Bay Club
4) Downtown
5) Seacliff
6) Ellis-Goldenwest
7) Meadowlark
8) Holly-Seacliff
9) Magnolia Pacific
10) McDonnell Centre Business Park
11) Palm/Goldenwest
12) Bella Terra
13) Beach and Edinger Corridors
14) Brightwater
15) Sunset Beach



Source: City of Huntington Beach & Michael Baker 2014

FIGURE 3
ADOPTED SPECIFIC PLANS

The Brightwater Specific Plan, which includes the Brightwater subdivision annexation area, was adopted by the City Council in 2007, but it is not incorporated into the City's certified Local Coastal Program and is not certified by the California Coastal Commission. The Sunset Beach Specific Plan, which includes the Sunset Beach community annexation area, was adopted by the City Council in 2015; the corresponding LCP Amendment is currently pending at the CCC.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, regulations, or laws related to land use apply to the planning area.

State Plans, Policies, Regulations, and Laws

California Planning Law and General Plan Guidelines

California planning law requires cities and counties to prepare and adopt a "comprehensive, long-range general plan" to guide development (Government Code Section 65300). To successfully guide long-range development, general plans require a complex set of analyses, comprehensive public outreach and input, and public policy covering a broad range of topics. State law also specifies the content of general plans. Current law requires preparation of the following seven mandated elements:

1) Land Use
2) Circulation
3) Housing
4) Conservation
5) Open Space
6) Noise
7) Safety

A general plan must contain development policies, diagrams, and text that describe objectives, principles, standards, and plan proposals. According to the Governor's Office of Planning and Research (OPR) *General Plan Guidelines* (last updated in 2003, currently undergoing a comprehensive update), topics from different elements may be combined but all must be addressed within the general plan[2].

California Coastal Act

The California Coastal Act (CCA) of 1976 (Coastal Act; Public Resources Code Section 30000) and the CCC, which is the state's coastal protection and planning agency, were established by voter initiative to plan for and regulate new development and create strong policies to protect public access to and along the shoreline. To ensure maximum public access to the coast and public recreation areas, the CCA directs each local government lying within the coastal zone to prepare an LCP consistent with Section 30501 of the CCA in consultation with the CCC and with public participation.

Until an LCP has been adopted by the local jurisdiction and certified compliant with the CCA, the CCC retains permitting authority within the local jurisdiction. Regardless of state or local jurisdiction, a coastal development permit is required for development in the coastal zone that results in changes to the density or intensity of the use of land, changes in water use, and/or impacts to coastal access. The components of the CCA most relevant to land use and development within the coastal zone in the planning area include:

- **Chapter 3: Coastal Resources Planning and Management Policies,** which provides goals and objectives associated with California's coastal resources and associated public access, recreation, marine environment, land resources, development, and industrial development.
- **Chapter 6: Implementation,** which establishes the process and procedure for the development and certification of LCPs within the coastal zone.

2 Office of Planning and Research (OPR). 2003. General Plan Guidelines. October.

- **Chapter 7: Development Controls,** which creates general provisions and procedures for development within the coastal zone to best achieve the goals and objectives identified in Chapter 3.

Regional and Local Plans, Policies, Regulations and Laws

Southern California Association of Governments Regional Comprehensive Plan

SCAG is responsible for most regional planning in Southern California. SCAG represents a six-county region that includes Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties and 189 cities. Huntington Beach is part of the OCCOG, which is a sub-region of the SCAG planning area.

SCAG prepared the *2008 Regional Comprehensive Plan* (RCP) to address regional issues, goals, objectives, and policies related to growth and infrastructure challenges in the Southern California region. The RCP is a plan to address issues such as housing, traffic/transportation, air quality, and water and serves as an advisory document to local agencies for their use in preparing local plans that deal with issues of regional significance. The RCP is based on the growth management framework of the Compass Blueprint, but further promotes environmental policies to support the RTP and SCS[3].

Southern California Association of Governments Regional Transportation Plan/Sustainable Communities Strategies

The *20162–2040 Regional Transportation Plan/Sustainable Communities Strategy: Towards a Sustainable Future* provides a comprehensive outline of the regional vision for transportation investments in Southern California through 2035. The RTP was adopted in 2016 and is updated every four years to address regional transportation needs. Only transportation projects included in the RTP become eligible for federal and state funding and federal environmental clearance. To fulfill its commitments as a metropolitan planning organization under SB 375, SCAG adopted SCS as part of the 2016–2040 RTP designed to reduce greenhouse gas emissions from passenger vehicles by 8 percent per capita by 2020 and by 13 percent per capita by 2035 compared to 2005, consistent with regional targets set by the California Air Resources Board. The SCS focuses the majority of new regional housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development.

One aspect of SB 375 that is unique to the SCAG region is that sub-regions within SCAG have the option of creating their own sub-regional SCS. Of SCAG's 15 sub-regions, two accepted this option, including OCCOG. The underlying land use, socioeconomic, and transportation data provided in the OCCOG sub-regional SCS were incorporated into the regional SCS. In Huntington Beach, the Beach Boulevard and Edinger Avenue transportation corridors are identified as SCS high-quality transit areas in 2035. The SCS identifies several greenhouse gas emissions reduction actions and strategies for the state, SCAG, and local jurisdictions. The SCS recommends that local jurisdictions: (1) update zoning codes to accelerate adoption of SCS land use strategies; (2) prioritize transportation investments to support compact infill development that includes a mix of land uses and housing options; (3) develop infrastructure plans and educational programs that promote active transportation options; (4) emphasize active transportation projects as part of complying with the Complete Streets Act (AB 1358); and (5) increase the efficiency of existing transportation systems[4].

On April 7, 2016, SCAG's Regional Council adopted the *2016-2040 Regional Transportation Plan/Sustainable Communities Strategy*. This updated plan outlines transportation system improvements through 2040.

3 Southern California Association of Governments (SCAG). 2008. 2008 Regional Comprehensive Plan. Accessed January 19, 2016, available http://libraryarchives.metro.net/DPGTL/scag/2008_regional_comprehensive_plan_Complete.pdf
4 SCAG. 2012. 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy: Towards a Sustainable Future. April.

Southern California Association of Governments Compass Growth Visioning Program

The SCAG Compass Growth Visioning Program (CGVP) began in 2002 with the purpose to maintain the region's prosperity, continue to expand its economy, house its residents affordably, and protect its environmental setting as a whole. In the short term, SCAG's growth visioning process has found common ground in a preferred vision for growth and has incorporated it into immediate housing allocation and transportation planning decisions. In the long term, the Growth Vision provides a framework that will help local jurisdictions address growth management cooperatively and will help coordinate regional land use and transportation planning. The Growth Vision Report presents the comprehensive Growth Vision for SCAG and details the evolution of the draft vision, from the study of emerging growth trends to the effects of different growth patterns on transportation systems, land consumption, and other factors.

Orange County Local Agency Formation Commission

Responsibilities of the Orange County Local Agency Formation Commission include annexations and detachments of land to cities or special districts, the formation and dissolution of governmental agencies (including cities and special districts), and the establishment of spheres of influence, which identify the probable future boundaries of governmental agencies. Review and approval by the Orange County Local Agency Formation Commission would be required for any annexations of land or for changes in utility or special district service areas.

Huntington Beach Municipal Code

The Huntington Beach Municipal Code (Huntington Beach Municipal Code Title 20 – Title 25) is the primary implementation tool for the General Plan Land Use Element. The Zoning and Subdivision Ordinance consists of two parts: the official Zoning Map dividing the planning area within the city boundaries into zones consistent with General Plan land use designations, and text establishing development standards for each zone, including permitted uses, density and intensity of uses, building height, performance standards, and other regulations.

Huntington Beach Specific Plans

A specific plan is a tool for the systematic implementation of the general plan. It links implementing policies of the general plan to the individual development proposals in a defined area. Specific plans are intended to specify the types of uses to be permitted, development standards (e.g., setbacks, heights, landscape, architecture), and circulation and infrastructure improvements that are broadly defined by the general plan. Specific plans are often used to ensure that multiple property owners and developers adhere to a single common development plan and to provide flexibility in development standards beyond those contained in the zoning ordinance as a means of achieving superior design.

Huntington Beach Local Coastal Program

The CCA directs each local government located partially or wholly within the coastal zone to prepare a LCP for its portion of the coastal zone. An LCP typically consists of a coastal land use plan and policies for development and conservation within the coastal zone, and an implementation program consisting of ordinances, maps, and implementing actions for the land use plan and policies. The city of Huntington Beach fulfills the coastal land use plan requirements with its adopted Coastal Element, which is part of the General Plan. The city Zoning Code and specific plans fulfill the implementation program requirement. The LCP was last comprehensively updated in 2001, and will be updated again following completion of the General Plan Update.

Noise

This technical background report describes existing environmental noise conditions within the planning area. Information contained in this report was compiled from various federal and state sources, field measurements within the city, and modeling of local traffic data.

ENVIRONMENTAL SETTING

Fundamentals of Sound and Environmental Noise

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing to virtually continuous noise from traffic on a major highway. Table 1 illustrates representative noise levels for the urban environment. Criteria have been established to help protect the public health and safety and prevent disruption of certain activities. The criteria are based on known impacts of noise:

- Speech interference is one of the primary concerns in environmental noise analysis. Normal conversational speech is in the range of 60 to 65 dBA, and any noise in this range or louder may interfere with speech.

- Sleep interference is a major noise concern related to community noise. Sleep disturbance studies have identified interior noise levels that have the potential to cause sleep disturbance. Sleep disturbance does not necessarily mean awakening from sleep, but can refer to altering the pattern and stages of sleep.

- Hearing loss is not a concern in community noise. The potential for noise-induced hearing loss is more commonly associated with occupational noise exposure in heavy industry to noisy work environments. Noise levels in neighborhoods, even in noisy airport environs, are not sufficiently loud to cause hearing loss.

- Physiological responses are those measurable effects of noise on people that are realized as physiological changes (e.g., pulse rate, blood pressure). While such effects can be induced and observed, the extent to which these physiological responses cause harm or are signs of harm is not known.

- Annoyance is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability.

TABLE 1
REPRESENTATIVE NOISE LEVELS[1]

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock concert
Jet fly-over at 100 feet	—105—	
	—100—	
Gas lawnmower at 3 feet	—95—	
	—90—	
	—85—	Food blender at 3 feet
Diesel truck going 50 mph at 50 feet	—80—	Garbage disposal at 3 feet
Noisy urban area at daytime	—75—	
Gas lawnmower at 100 feet	—70—	Vacuum cleaner at 10 feet
Commercial area	—65—	Normal speech at 3 feet
Heavy traffic at 300 feet	—60—	
	—55—	Large business office
Quiet urban area during daytime	—50—	Dishwasher in next room
	—45—	
Quiet urban area during nighttime	—40—	Theater, large conference room (background)
	—35—	
	—30—	Library
Quiet rural area during nighttime	—25—	Bedroom at night, concert hall (background)
	—20—	
	—15—	Broadcast/recording studio
	—10—	
	—5—	
Lowest threshold of human hearing	—0—	Lowest threshold of human hearing

Noise Descriptors

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise as well as the time of day when the noise occurs. Those scales that are applicable to this analysis include:

- L_{eq}, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time; thus, the Leq 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. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- L_{dn}, the Day-Night Average Level, is a 24-hour average Leq with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime.

1 California Department of Transportation (Caltrans). 2009. Technical Noise Supplement: A Technical Supplement to the Traffic Noise Analysis Protocol.

The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.

- Community Noise Equivalent Level (CNEL) is a 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. and an additional 5 dBA weighting during the hours of 7:00 p.m. to 10:00 p.m. to account for noise sensitivity in the evening and nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.7 dBA CNEL.

- L_{min}, the minimum instantaneous noise level experienced during a given period of time.

- L_{max}, the maximum instantaneous noise level experienced during a given period of time.

- L_n, the A-weighted noise levels that are exceeded 1 percent, 10 percent, 50 percent, and 90 percent ($L0_1$, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.

Human Reaction to Noise

People react to sound in a variety of ways. For example, rock music may be pleasant to some people, while for others it may be annoying, constitute a health hazard, or disrupt activities. Human tolerance to noise depends on a variety of acoustical characteristics of the source and environmental characteristics. 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. Examples of low daytime levels are isolated natural settings that can provide noise levels as low as 20 dBA and quiet suburban residential streets that can provide noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). Some people may consider louder environments adverse, but most individuals will tolerate higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Human perception is complicated by the fact that it has no simple correlation with acoustical energy. Two noise sources do not sound twice as loud as one noise source. When evaluating changes in 24-hour community noise levels, a 3 dBA increase is barely perceptible to most people. While a 5 dBA increase is readily noticeable, a 10 dBA increase would be perceived as a doubling of loudness.

Noise levels from a particular source decline as distance to the receptor increases. Other factors such as the weather and reflecting or shielding also help intensify or reduce the noise level at any given location. Sound from a small localized source (approximating a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates, or drops off, at a rate of 6 dBA for each doubling of the distance. However, highway traffic noise is not a single, stationary point source. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over a time interval. This results in cylindrical spreading rather than spherical spreading. Because the change in surface area of a cylinder increases by two times for each doubling of the radius instead of the four times associated with spheres, the change in sound level is 3 dBA for each doubling of distance. Noise levels also may be reduced by intervening structures—generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. As noted by the California Department of Transportation (Caltrans), the manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 dBA with closed windows, while the exterior-to-interior reduction of newer homes is generally 30 dBA or more due to the use of double-pane windows.

Existing Noise Conditions

Land uses within the planning area include a range of residential, commercial, institutional, industrial, recreational, and open space. In general, the greatest source of noise throughout Huntington Beach is vehicle roadway noise generated along arterial roadways such as Beach Boulevard, Bolsa Chica Street, Goldenwest Street, Adams Avenue, Brookhurst Street, Gothard Street, and Pacific Coast Highway, as well

as minor arterial roads along residential areas, and various stationary sources such as commercial heating, ventilation, and air conditioning (HVAC) units and petroleum extraction activities. Additionally, the city experiences occasional aircraft overflight from commercial airlines from both Long Beach and John Wayne airports and from helicopters.

Transportation Noise Sources

On-Road Vehicle Noise

Noise levels along roadways are affected by several traffic characteristics, including average daily traffic (ADT) volumes. Other factors that affect roadway noise levels include the vehicle mix of trucks versus automobiles, road conditions, vehicle speed, and the gradient of the roadway. The major north–south roadways in Huntington Beach are Beach Boulevard, Goldenwest Street, Bolsa Chica Street, and Brookhurst Street. The major east–west roadways are Bolsa Avenue, Edinger Avenue, Warner Avenue, Adams Avenue, and Pacific Coast Highway. In general, these roadways abut commercial or residential land uses with some sound-reducing measures (e.g., sound walls, setbacks from roadways) incorporated into site design[2].

Rail Service Noise

The Union Pacific Railroad right-of-way runs east of Gothard Street, extending from the northern city limits to a terminus just north of Garfield Avenue. It provides freight service for the industrial corridor located along Gothard Street and is generally not located adjacent to noise-sensitive land uses. Rail service is extremely limited, with approximately one to two trains per day traveling through the planning area[3].

Aircraft Noise

No airport is located within the planning area, and no major flight corridors overlie Huntington Beach. Long Beach Airport is located approximately 12.5 miles to the northwest of the planning area, and John Wayne Airport is located approximately 3.5 miles to the southeast. These represent the closest commercial airports to the planning area[4,5]. While the planning area is not located within the noise contours for either airport, flights approaching Long Beach Airport regularly pass over the intersection of Bolsa Chica Boulevard and Edinger Avenue at an altitude ranging between 1,600 feet and 2,100 feet. Individual commercial aircraft flying at these altitudes can result in noise levels of approximately 72 dBA on the ground. The control of aircraft flying over the city and the noise they make are under the jurisdiction of the Federal Aviation Administration. As such, the city has no authority over their operations.

Stationary Noise Sources

Construction Noise

Construction activities are a regular and ongoing source of noise throughout the planning area. The noise levels generated by construction activities are generally isolated to the immediate vicinity of a construction site and occur during daytime hours in accordance with city regulations. Construction activities are temporary in nature, occurring for relatively short-term periods of a few weeks to a few months, after which the noise sources are removed from the construction area. According to the EPA, construction noise levels can reach as high as 107 dBA for pile-driving activities. Table 2 illustrates noise levels for common construction equipment and activities at a distance of 50 feet[6].

2 Harris Miller & Hanson Inc. 2006. Transit Noise and Vibration Impact Assessment, Final Report.
3 Stantec. 2014. Draft Existing Conditions Technical Report Traffic Study.
4 Los Angeles County Airport Land Use Commission (LACALUC). 2003. Airport Influence Area. Accessed July 7, 2004. http://planning.lacounty.gov/assets/upl/project/aluc_airport-el-monte.pdf.
5 Orange County Airport Land Use Commission (OCALUC). 2008. Airport Environs Land Use Plan for John Wayne Airport. Accessed July 7, 2014. http://www.ocair.com/commissions/aluc/docs/JWA_AELUP-April-17-2008.pdf
6 U.S. Environmental Protection Agency (EPA). 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.

TABLE 2
NOISE RANGES OF TYPICAL CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level in dBA L_{eq} at 50 Feet
Front Loader	73–86
Truck	82–95
Crane (movable)	75–88
Crane (derrick)	86–89
Vibrator	68–82
Saw	72–82
Pneumatic Impact Equipment	83–88
Pile Driving (peaks)	95–107
Jackhammer	81–98
Pump	68–72
Generator	71–83
Compressor	75–87
Concrete Mixer	75–88
Concrete Pump	81–85
Backhoe	73–95
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

Source: EPA 1971

Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table

Commercial and Industrial Noise

Commercial uses in the planning area consist of regional retail centers, general commercial uses, neighborhood commercial uses, and offices. Existing commercial uses are predominantly located in regional shopping centers such as Bella Terra, in the Downtown area, and along the blocks adjacent to both sides of Beach Boulevard, Gothard Street, Edinger Avenue, and Warner Avenue. The primary noise sources associated with commercial uses are commercial HVAC systems. Large HVAC systems associated with commercial buildings typically result in noise levels that average between 50 and 65 dBA L_{eq} at 50 feet from the equipment[7]. Other noise sources include medium-duty truck noise associated with the delivery of goods, as well as human activity.

Industrial uses are located primarily in the northwestern portion of the planning area (including and adjacent to the Boeing campus), along the Gothard Street corridor, in the Holly-Seacliff area surrounding the intersection of Stewart Lane and Garfield Avenue, and along Pacific Coast Highway (near and including oil production facilities and the AES power plant). Aside from oil extraction uses, most of the industrial uses in the planning area consist of warehousing, including vehicle and equipment storage along the Gothard Street corridor. The other predominant concentration of industrial use is located in northwestern Huntington Beach, generally north of Edinger Avenue and west of Springdale Street. Industries in this area consist primarily of manufacturing and research and development related to the aerospace industry. Similar to

7 Air-Conditioning, Heating, and Refrigeration Institute (AHRI). 1997. Application of Sound Rating Levels of Outdoor Unitary Equipment.

commercial uses, the primary exterior noise sources associated with these uses are related to HVAC systems and medium-duty commercial trucks.

Oil Extraction Noise

Huntington Beach has been an active area for oil extraction since the 1920s, and large-scale oil and gas production continues today. Oil wells in Huntington Beach are scattered throughout much of the planning area. Most are concentrated along the coastal areas and mesas. The USGS[8] estimates that approximately 117 million barrels of oil could potentially be recovered out of the Huntington Beach oil field. Noise sources associated with oil extraction activities are related to heavy-duty vehicle use, including noise associated with site preparation, and would be similar to those identified in Table 2.

Special Event Noise

Many of the parks within the planning area have facilities for organized sports including baseball, soccer, and basketball. Noise from these activities can have a negative impact on neighboring residential land uses, particularly at parks where lighted fields allow activities into the evening hours. Additionally, the city regularly hosts special events on a local, regional, and international level. Local events include farmers markets and Surf City Nights and evening music events in public parks, drawing crowds from a few dozen people to up to 2,800 for a summer evening Surf City Night event[9]. Regional and international events include sporting events such as the Huntington Beach Association of Volleyball Professionals Finals, the BB Jazz Festival at Central Park, and the Association of Surfing Professionals U.S. Open of Surfing.

These events often use amplification devices, such as public address systems, and include amplified music. According to the 2013 city Draft Focused Environmental Impact Report for the Surf City Nights Project, average noise levels for the Surf City Nights events range between 56.5 dBA and 64.5 dBA due to the use of amplified music and crowd noise. For larger professional events, such as the U.S. Open of Surfing, crowd noise could exceed 93 dBA at 50 feet.

Noise Study

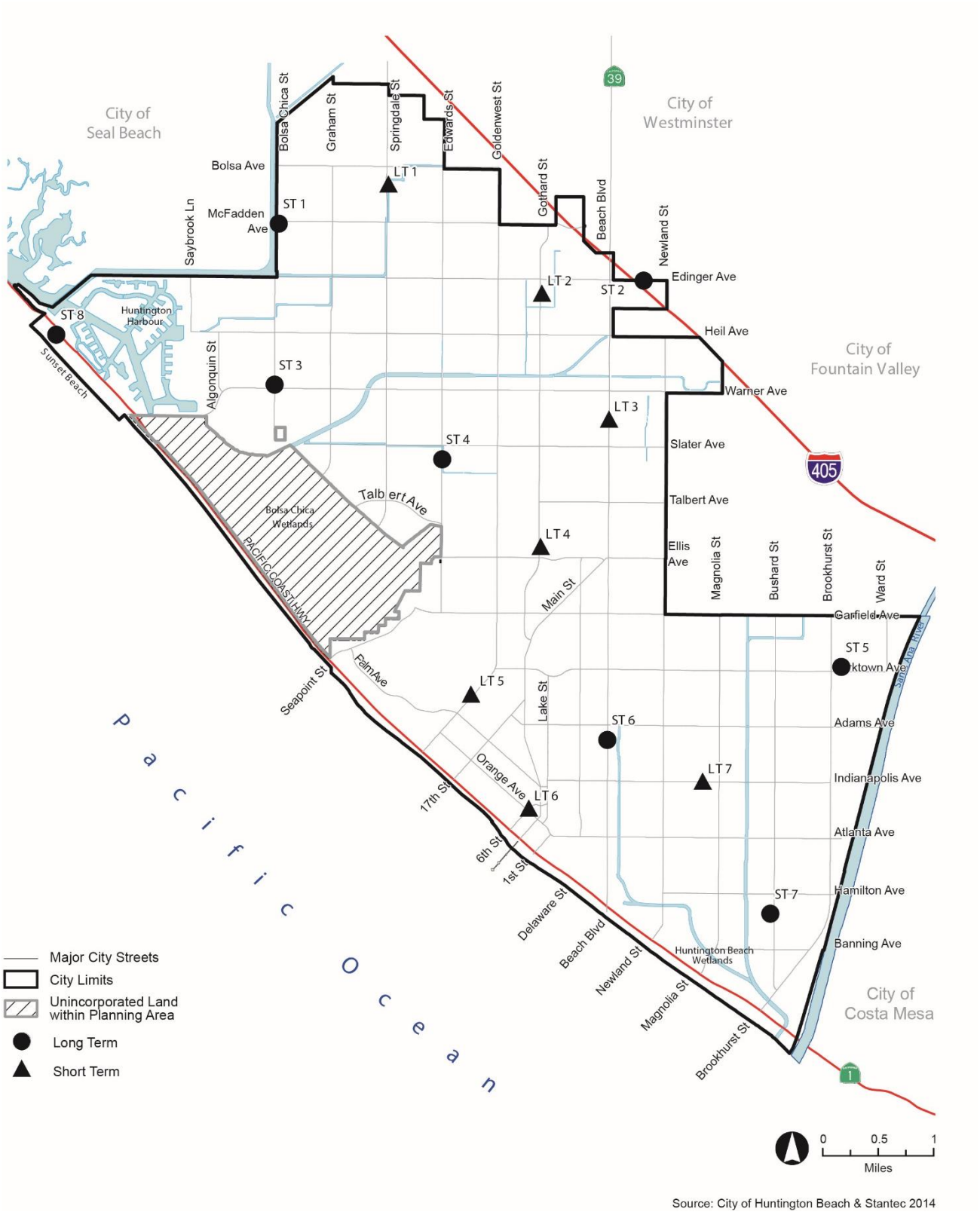
To accurately determine the existing noise environment within the planning area, a series of long- and short-term noise measurements were conducted over the course of a three-week period in June and July 2014. The measurements were taken with a Larson-Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute (ANSI) standards for general environmental noise measurement instrumentation. Prior to each measurement period, the SoundExpert LxT sound level meter was calibrated according to manufacturer's specifications with a Larson Davis CAL200 Class I Calibrator. The locations of long- and short-term measurements are shown in Figure 1. The data sheets associated with the noise measurements are provided as Appendix K, Volume III.

Ambient Noise Study

Long-Term Measurement Results

Long-term 24-hour ambient noise measurements were taken at seven different locations throughout the planning area. The locations were chosen in consultation with city staff. They were identified as unique noise generators within the planning area, due to a high volume of traffic, large number of truck trips, or commercial activities occurring in the vicinity. The measurements were taken Tuesday through Friday to accurately record peak traffic noise throughout the planning area. To obtain the measurements, the microphone was positioned approximately six feet above the ground on available street signs and utility poles, approximately three feet to six feet from the curb line of the roadway, and approximately three feet to five feet from the property line of the nearest residential or commercial use. Due to the location of these street signs and utility poles, it was impossible to use a uniform distance from the roadway for all locations.

8 U.S. Geological Survey (USGS). 2013. Remaining Recoverable Petroleum in Ten Giant Oil Fields of the Los Angeles Basin, Southern California. Fact Sheet 2012-3120. Revised February 2013.
9 Huntington Beach, City of. 2013. Draft Focused Environmental Impact Report for the Surf City Nights Project.



Source: City of Huntington Beach & Stantec 2014

FIGURE 1
MONITORING STATION LOCATIONS

As shown in Figure 2, monitoring was conducted in residential, commercial, and industrial areas of the planning area. Table 3 summarizes the L_{eq} measurements by location for each 24-hour period of the survey, as well as the L_{max} and L_{min} for each hour of the 24-hour recording. Because the noise measurements were taken over a 24-hour period, it is not possible to determine the source of noise that generated the L_{max} for each location; however, when spikes in noise were captured by the monitoring equipment, it can be assumed that typical urban noise generators were the cause. Examples of typical urban noise generators capable of producing the L_{max} values include standard gardening and landscaping equipment such as lawnmowers and leaf-blowers; police, ambulance, and fire sirens; motorcycles; heavy trucks; and typical home maintenance equipment such as handsaws.

As shown in Table 3, the average 24-hour noise levels ranged between 58.2 dBA L_{eq} and 74.6 dBA L_{eq}, with L_{dn} noise levels ranging between 65.1 dBA and 81.7 dBA. Noise levels in the residential areas, such as locations LT-5 and LT-6, were substantially lower than those measured in the commercial areas, as is typical. Commercial and industrial areas in the planning area regularly exceed 68 dBA.

TABLE 3
LONG-TERM NOISE SURVEY RESULTS

		Most Recent Update					
Measurement Locations	Date	24-Hour Leq	Lmin	Lmax	Daytime[1] Leq	Nighttime[2] Leq	Ldn
LT-1 (Springdale Street/ Thor Drive)	June 10, 2014	68.5	34.0	93.4	69.6	63.8	71.5
LT-2 (Gothard Street/ Murdy Avenue)	June 11, 2014	70.3	96.6	31.2	71.6	63.9	72.5
LT-3 (Beach Boulevard, north of Slater Avenue)	June 12, 2014	74.1	101.5	35.9	75.2	69.9	77.4
LT-4 (Goldenwest Street, north of Ellis Avenue)	June 17, 2014	74.6	100.5	30.7	73.6	76.0	81.7
LT-5 (Deep Harbor Lane/Quiet Bay Lane)	June 18, 2014	58.2	87.0	27.5	57.6	59.4	65.1
LT-6 (6th Street/ Orange Avenue)	June 19, 2014	61.4	94.0	34.0	60.1	63.0	68.6
LT-7 (Indianapolis Street/ Ives Lane)	June 25, 2014	69.6	100.3	34.5	70.8	63.6	72.0

[1] *Daytime is between 7:00 a.m. to 10:00 p.m.*
[2] *Nighttime is between 10:00 p.m. to 7:00 a.m.*

Short-Term Measurement Results

Short-term noise measurements were taken at eight different locations on July 8, 2014, each for a duration of 20 minutes. The locations were chosen in consultation with city staff. They generally represent residential areas within the planning area where ambient noise levels are anticipated to be lower than those along major transportation corridors and within commercial areas. The microphone was positioned at a height of 5 feet, 6 inches from local grade elevation during the short-term measurements. Table 4 shows the average noise levels recorded during the measurements, as well as the primary source of the noise. The measured noise levels ranged from 52.4 dBA L_{eq} to 68.6 dBA L_{eq}. As with the long-term measurements, noise levels were lower in residential areas and higher along busier arterials and in commercial areas.

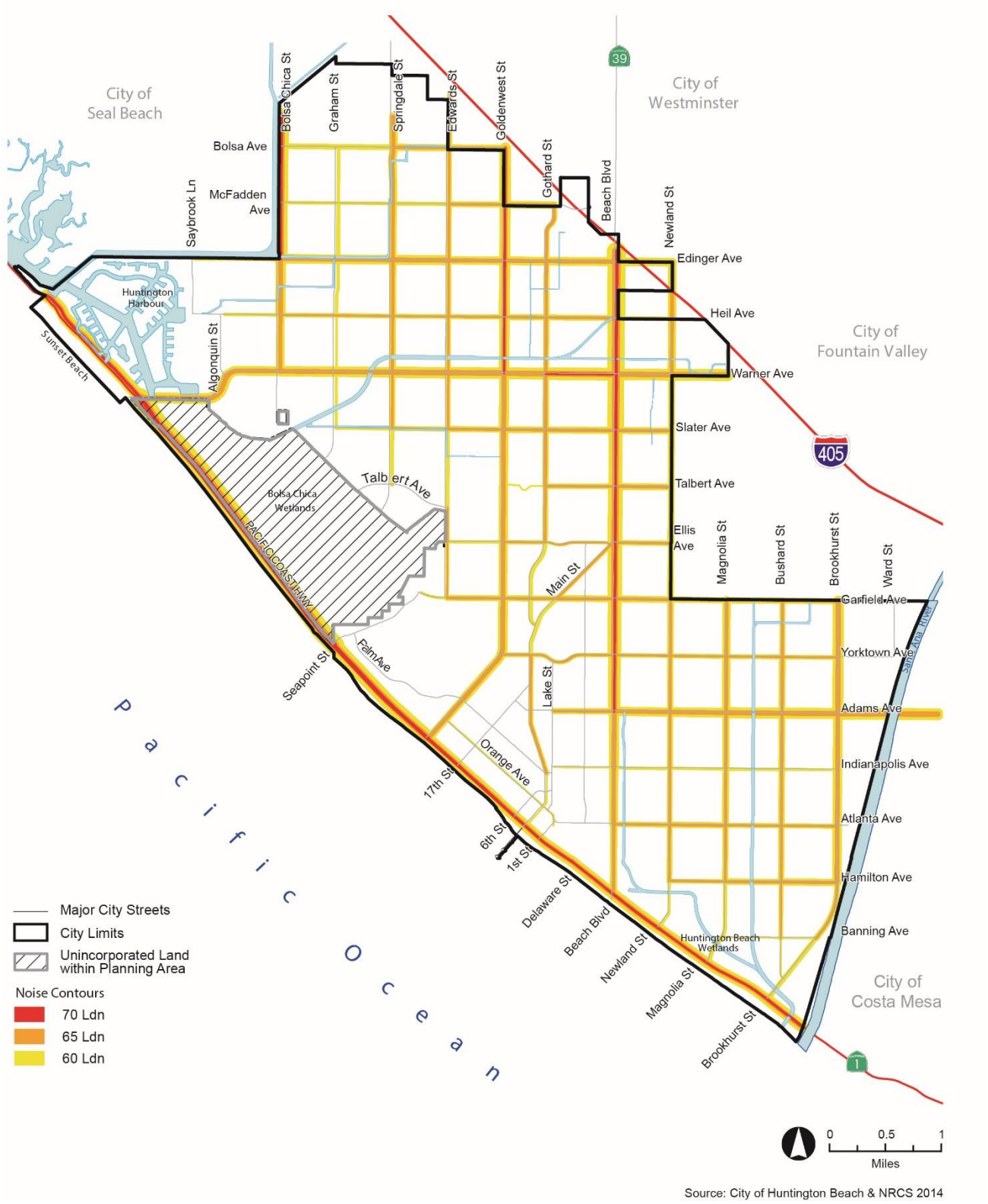


FIGURE 2
NOISE CONTOURS

TABLE 4
SHORT-TERM NOISE SURVEY RESULTS

	Measurement Locations	Data/Run Time		Noise Level Statistics		
				L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST-1	15432 Andaman Way	July 8, 2014 9:28 a.m.	Traffic on McFadden Street, lawnmower	52.4	41.7	67.0
ST-2	8400 Edinger Avenue	July 8, 2014 10:06 a.m.	Traffic on Edinger Avenue	68.2	50.3	80.4
ST-3	17021 Sims Lane	July 8, 2014 10:55 a.m.	Traffic on Warner Avenue, garbage truck activity	64.8	43.3	90.4
ST-4	17701 Edwards Street	July 8, 2014 11:36 a.m.	Traffic on Edwards Street, skateboard	59.1	44.1	71.6
ST-5	Yorktown Avenue/Mauna Lane	July 8, 2014 12.19 p.m.	Traffic on Yorktown Avenue	68.6	47.5	94.4
ST-6	Memphis Avenue, east of Lakeside Lane	July 8, 2014 1:34 p.m.	Traffic on Beach Boulevard	65.1	43.4	90.2
ST-7	9521 Landfall Drive	July 8, 2014 2:14 p.m.	Traffic on Bushard Street, dog barking	57.7	41.3	82.0
ST-8	20th Street/N. Pacific Avenue	July 8, 2014 3:08 p.m.	Traffic on PCH, parking lot, and HVAC from adjacent restaurant	60.0	50.7	78.3

Noise Sensitive Receptors

Sensitive land uses have associated human activities that may be subject to stress or significant interference from noise, including residences, schools, childcare facilities, religious institutions, hospitals, libraries, parks and recreational facilities, healthcare facilities, convalescent centers, and retirement homes. Various federal, state, and local standards address the compatibility of land uses with noise levels. These standards place special emphasis on land uses considered to be sensitive to high noise levels.

The planning area contains many of these different land uses, including residences, healthcare facilities, retirement homes, convalescent centers, parks and recreational facilities, public and private schools, religious institutions, and childcare facilities. As demonstrated in Figure 1 and Tables 3 and 4, sensitive uses located adjacent to Beach Boulevard, Goldenwest Street, Warner Avenue, Edinger Avenue, and Pacific Coast Highway regularly experience noise levels of up to 70 dBA L_{dn}. Sensitive uses located along arterials such as Brookhurst Street, Bushard Street, Springdale Street, Yorktown Avenue, and Heil Avenue experience noise levels up to 65 dBA L_{dn}.

Existing Roadway Noise Levels

Existing 24-hour noise levels have been calculated for various highways and roadways throughout the planning area using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108). The model calculates the average noise level at specific locations based on traffic volumes, average speeds represented by the posted speed limit, roadway geometry, and environmental conditions. Average vehicle noise rates (energy rates) utilized in the FHWA Model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data show that California automobile noise is 0.8 to 1.0 dBA higher than national levels and medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels.

Noise levels were modeled for roadways with the highest traffic volumes in the planning area, using data from the traffic study prepared for the project. Resulting noise contours are illustrated in Figure 2. Calculated noise levels are presented in Table 5, along with distances to various noise level contours. Calculation data and results are provided in Appendix K, Volume III.

TABLE 5
EXISTING ROADWAY NOISE LEVELS

Location	Reference L_{dn} at 100 Feet	Distance to Noise Contour		
		70 L_{dn}	65 L_{dn}	60 L_{dn}
Bolsa Avenue				
Bolsa Chica Street to Springdale Street	61.9	—	133	287
Springdale Street to Edwards Street	63.4	—	78	168
Edwards Street to Goldenwest Street	61.3	—	75	161
McFadden Avenue				
Bolsa Chica Street to Springdale Street	58.6	—	—	81
Springdale Street to Edwards Street	59.6	—	—	95
Edwards Street to Goldenwest Street	62.2	—	65	139
Goldenwest Street to Gothard Street	63.7	—	82	177
Edinger Avenue				
Saybrook Lane to Bolsa Chica Street	61.5	—	58	126
Bolsa Chica Street to Springdale Street	65.3	—	104	225
Springdale Street to Edwards Street	65.6	—	109	235
Edwards Street to Goldenwest Street	64.4	—	91	196
Goldenwest Street to Gothard Street	64.7	—	95	204
Gothard Street to Beach Boulevard	64.7	—	95	204
Beach Boulevard to Newland Street	64.8	—	97	209
Heil Avenue				
Algonquin Street to Bolsa Chica Street	58.6	—	—	81
Bolsa Chica Street to Springdale Street	60.6	—	51	110
Springdale Street to Edwards Street	60.6	—	51	110
Edwards Street to Goldenwest Street	61.0	—	54	116
Goldenwest Street to Gothard Street	62.5	—	68	146
Gothard Street to Beach Boulevard	62.2	—	65	139
Beach Boulevard to Newland Street	58.9	—	39	85
Warner Avenue				
PCH to Algonquin Street	66.2	—	120	258
Algonquin Street to Bolsa Chica Street	65.4	—	106	229
Bolsa Chica Street to Springdale Street	65.9	—	114	246
Springdale Street to Edwards Street	66.4	—	124	267
Edwards Street to Goldenwest Street	66.6	—	129	277
Goldenwest Street to Gothard Street	66.6	—	129	277
Gothard Street to Beach Boulevard	67.1	64	138	297
Beach Boulevard to Newland Street	66.5	—	126	272
Newland Street to Brookhurst Street	66.8	—	131	282
Slater Avenue				
Graham Street to Springdale Street	59.2	—	—	89
Springdale Street to Edwards Street	61.2	—	56	120
Edwards Street to Goldenwest Street	62.2	—	65	141
Goldenwest Street to Gothard Street	63.1	—	74	160
Gothard Street to Beach Boulevard	63.3	—	77	166
Beach Boulevard to Newland Street	63.1	—	74	160
Talbert Avenue				
Goldenwest Street to Gothard Street	54.1	—	—	41
Gothard Street to Beach Boulevard	61.9	—	62	134

Location	Reference L_{dn} at 100 Feet	Distance to Noise Contour		
		70 L_{dn}	65 L_{dn}	60 L_{dn}
Beach Boulevard to Newland Street	63.3	—	77	166
Ellis Avenue				
Edwards Street to Goldenwest Street	58.5	—	—	79
Goldenwest Street to Gothard Street	60.2	—	48	104
Gothard Street to Beach Boulevard	58.4	—	36	79
Beach Boulevard to Newland Street	61.5	—	59	127
Garfield Avenue				
PCH to Edwards Street	57.4	—	—	67
Edwards Street to Goldenwest Street	62.3	—	66	142
Goldenwest Street to Gothard Street	62.3	—	66	142
Gothard Street to Main Street	61.9	—	63	135
Main Street to Beach Boulevard	62.8	—	72	155
Beach Boulevard to Newland Street	63.1	—	75	161
Newland Street to Brookhurst Street	62.3	—	66	142
Yorktown Avenue				
Goldenwest Street to Main Street	60.5	—	50	108
Main Street to Beach Boulevard	60.2	—	48	104
Beach Boulevard to Newland Street	60.3	—	49	105
Newland Street to Brookhurst Street	60.6	—	51	110
Adams Avenue				
Lake Street to Beach Boulevard	62.4	—	67	144
Beach Boulevard to Newland Street	65.1	—	101	217
Newland Street to Magnolia Street	65.4	—	106	229
Magnolia Street to Bushard Street	66.3	—	121	262
Bushard Street to Brookhurst Street	66.3	—	121	262
Brookhurst Street to city limits	66.6	—	129	277
Indianapolis Avenue				
Lake Street to Beach Boulevard	54.1	—	—	40
Beach Boulevard to Newland Street	57.9	—	—	73
Newland Street to Magnolia Street	57.9	—	—	73
Magnolia Street to Bushard Street	58.5	—	—	80
Bushard Street to Brookhurst Street	57.3	—	—	66
Atlanta Avenue				
Beach Boulevard to Newland Street	61.6	—	60	129
Newland Street to Magnolia Street	62.6	—	69	148
Magnolia Street to Bushard Street	61.2	—	56	121
Bushard Street to Brookhurst Street	61.2	—	56	121
Hamilton Avenue				
Newland Street to Magnolia Street	60.8	—	52	112
Magnolia Street to Bushard Street	62.5	—	68	147
Bushard Street to Brookhurst Street	63.6	—	80	172
Banning Avenue				
Magnolia Street to Bushard Street	52.9	—	—	33
Bushard Street to Brookhurst Street	52.9	—	—	33
Orange Avenue				
Goldenwest Street to 17th Street	54.1	—	—	40
17th Street to 14th Street	54.1	—	—	40
14th Street to 6th Street	54.1	—	—	40

Location	Reference L_{dn} at 100 Feet	Distance to Noise Contour		
		70 L_{dn}	65 L_{dn}	60 L_{dn}
6th Street to Main Street	54.1	—	—	40
Main Street to 3rd Street	54.1	—	—	40
3rd Street to 1st Street	55.6	—	—	51
Pacific Coast Highway				
Anderson Drive to Warner Avenue	67.1	64	138	297
Warner Avenue to Seapoint Street	69.7	95	205	442
Seapoint Street to Goldenwest Street	68.1	75	161	347
Goldenwest Street to 17th Street	66.2	56	121	261
17th Street to 14th Street	66.0	54	116	251
14th Street to 6th Street	66.2	56	121	261
6th Street to Main Street	66.2	56	121	261
Main Street to 2nd Street	66.2	56	121	261
2nd Street to 1st Street	66.1	55	119	256
1st Street to Huntington Street	66.1	55	119	256
Huntington Street to Beach Boulevard	66.1	55	119	256
Beach Boulevard to Newland Street	66.5	58	126	271
Newland Street to Magnolia Street	66.0	54	116	251
Magnolia Street to Brookhurst Street	65.9	53	114	246
Brookhurst Street to city limits	66.5	58	126	271
Bolsa Chica Street				
Skylab Road to Bolsa Avenue	68.4	78	169	364
Bolsa Avenue to McFadden Avenue	68.0	73	158	340
McFadden Avenue to Edinger Avenue	67.5	68	147	316
Edinger Avenue to Heil Avenue	65.7	—	111	240
Heil Avenue to Warner Avenue	64.5	—	93	200
Graham Street				
Bolsa Avenue to McFadden Avenue	58.6	—	—	81
McFadden Avenue to Edinger Avenue	59.8	—	—	97
Edinger Avenue to Heil Avenue	58.5	—	—	79
Heil Avenue to Warner Avenue	56.6	—	—	59
Warner Avenue to Slater Avenue	57.9	—	—	72
Springdale Street				
Skylab Road to Bolsa Avenue	64.8	—	97	208
Bolsa Avenue to McFadden Avenue	64.4	—	92	197
McFadden Avenue to Edinger Avenue	63.8	—	83	180
Edinger Avenue to Heil Avenue	63.6	—	81	174
Heil Avenue to Warner Avenue	63.1	—	75	161
Warner Avenue to Slater Avenue	62.3	—	66	142
Slater Avenue to Talbert Avenue	59.6	—	—	94
Edwards Street				
Industry Way to Bolsa Avenue	61.5	—	59	127
Bolsa Avenue to McFadden Avenue	61.5	—	59	127
McFadden Avenue to Edinger Avenue	61.5	—	59	127
Edinger Avenue to Heil Avenue	61.3	—	56	121
Heil Avenue to Warner Avenue	61.0	—	54	116
Warner Avenue to Slater Avenue	61.0	—	54	116
Slater Avenue to Talbert Avenue	59.5	—	—	93
Talbert Avenue to Ellis Avenue	59.9	—	46	99

Location	Reference L_{dn} at 100 Feet	Distance to Noise Contour		
		70 L_{dn}	65 L_{dn}	60 L_{dn}
Ellis Avenue to Garfield Avenue	58.9	—	39	84
Goldenwest Street				
Bolsa Avenue to McFadden Avenue	66.6	59	128	276
McFadden Avenue to Edinger Avenue	66.2	56	121	261
Edinger Avenue to Heil Avenue	66.2	56	121	261
Heil Avenue to Warner Avenue	65.9	53	114	246
Warner Avenue to Slater Avenue	65.6	—	109	235
Slater Avenue to Talbert Avenue	65.0	—	99	214
Talbert Avenue to Ellis Avenue	65.1	—	102	219
Ellis Avenue to Garfield Avenue	64.8	—	97	208
Garfield Avenue to Yorktown Avenue	65.6	—	109	234
Yorktown Avenue to Palm Avenue	64.9	—	98	212
Palm Avenue to PCH	63.9	—	84	181
Gothard Street				
McFadden Avenue to Edinger Avenue	61.6	—	59	128
Edinger Avenue to Heil Avenue	62.1	—	64	138
Heil Avenue to Warner Avenue	62.4	—	67	144
Warner Avenue to Slater Avenue	62.8	—	71	153
Slater Avenue to Talbert Avenue	62.4	—	67	144
Talbert Avenue to Ellis Avenue	61.6	—	59	128
Ellis Avenue to Garfield Avenue	60.0	—	—	100
Garfield Avenue to Main Street	60.0	—	—	100
Beach Boulevard				
Center Avenue to Edinger Avenue	69.9	98	212	456
Edinger Avenue to Heil Avenue	69.4	91	197	424
Heil Avenue to Warner Avenue	69.1	88	189	407
Warner Avenue to Slater Avenue	68.9	84	181	390
Slater Avenue to Talbert Avenue	67.7	70	152	326
Talbert Avenue to Ellis Avenue	68.2	75	162	350
Ellis Avenue to Garfield Avenue	68.0	73	158	341
Garfield Avenue to Yorktown Avenue	67.7	70	152	326
Yorktown Avenue to Adams Avenue	67.1	64	138	297
Adams Avenue to Indianapolis Avenue	65.7	—	111	240
Indianapolis Avenue to Atlanta Avenue	64.9	—	98	212
Atlanta Avenue to PCH	63.6	—	81	175
Newland Street				
Edinger Avenue to Heil Avenue	64.7	—	96	207
Heil Avenue to Warner Avenue	64.4	—	91	196
Warner Avenue to Slater Avenue	63.3	—	77	166
Slater Avenue to Talbert Avenue	63.3	—	77	166
Talbert Avenue to Ellis Avenue	63.1	—	74	160
Ellis Avenue to Garfield Avenue	62.8	—	71	154
Garfield Avenue to Yorktown Avenue	62.8	—	71	154
Yorktown Avenue to Adams Avenue	62.5	—	68	147
Adams Avenue to Indianapolis Avenue	62.2	—	65	141
Indianapolis Avenue to Atlanta Avenue	61.9	—	62	134
Atlanta Avenue to Hamilton Avenue	61.9	—	62	134
Hamilton Avenue to PCH	58.0	—	—	74

Location	Reference L_{dn} at 100 Feet	Distance to Noise Contour		
		70 L_{dn}	65 L_{dn}	60 L_{dn}
Magnolia Street				
Garfield Avenue to Yorktown Avenue	64.4	—	91	196
Yorktown Avenue to Adams Avenue	64.4	—	91	196
Adams Avenue to Indianapolis Avenue	63.6	—	80	172
Indianapolis Avenue to Atlanta Avenue	63.3	—	77	166
Atlanta Avenue to Hamilton Avenue	62.5	—	68	147
Hamilton Avenue to Banning Avenue	59.8	—	—	97
Banning Avenue to PCH	60.3	—	—	105
Bushard Street				
Garfield Avenue to Yorktown Avenue	62.2	—	65	141
Yorktown Avenue to Adams Avenue	63.1	—	74	160
Adams Avenue to Indianapolis Avenue	63.1	—	74	160
Indianapolis Avenue to Atlanta Avenue	62.8	—	71	154
Atlanta Avenue to Hamilton Avenue	62.5	—	68	147
Hamilton Avenue to Banning Avenue	60.8	—	52	112
Banning Avenue to PCH	55.6	—	—	51
Brookhurst Street				
Garfield Avenue to Yorktown Avenue	66.3	—	123	264
Yorktown Avenue to Adams Avenue	66.2	—	120	259
Adams Avenue to Indianapolis Avenue	65.3	—	105	227
Indianapolis Avenue to Atlanta Avenue	65.2	—	103	221
Atlanta Avenue to Hamilton Avenue	65.2	—	103	221
Hamilton Avenue to Banning Avenue	62.2	—	65	139
Banning Avenue to PCH	61.0	—	—	116
Main Street				
Ellis Avenue to Garfield Avenue	59.9	—	46	99
Garfield Avenue to Yorktown Avenue	59.3	—	—	90
Yorktown Avenue to Palm Avenue	60.9	—	53	114
Palm Avenue to PCH	55.1	—	—	47

REGULATORY FRAMEWORK

Federal Policies and Laws

No federal noise requirements or regulations apply directly to local actions of Orange County or the city of Huntington Beach; however, several federal regulations influence the audible landscape, especially for projects where federal funding is involved. The Federal Highway Administration (FHWA) requires abatement of highway traffic noise for highway projects through rules in the Code of Federal Regulations (23 CFR Part 772), as does the Federal Transit Administration and the Federal Railroad Administration. Each recommends thorough noise and vibration assessments through comprehensive guidelines for any mass transit or high-speed railroad projects that would pass by residential areas[10]. For housing constructed with assistance from the U.S. Department of Housing and Urban Development (HUD), minimum noise insulation standards must be achieved (24 CFR Part 51, Subpart B).

10 U.S. Department of Transportation, Federal Railroad Administration (FRA). 2005. High-Speed Ground Transportation Noise and Vibration Impact Assessment.

State Plans, Policies, and Laws

Department of Health Services

The Office of Noise Control in the California Department of Health Care Services has established guidelines to provide a community with a noise environment that it deems to be generally acceptable. Specifically, ranges of noise exposure levels have been developed for different land uses to serve as the primary tool a city uses to assess the compatibility between land uses and outdoor noise. These noise standards are shown in Table 6. A noise level standard of 60 dBA L_{dn} is used for the exterior living areas of new single-family, duplex, and mobile home residential land uses, with a noise level standard of 45 to 65 dBA L_{dn} for the exterior of all new multi-family residential uses. Where a land use is denoted as "normally acceptable" for the given L_{dn} noise environment, the highest noise level in that range should be considered the maximum desirable for conventional construction that does not incorporate any special acoustic treatment. The acceptability of noise environments classified as "conditionally acceptable" or "normally unacceptable" will depend on the anticipated amount of time that will normally be spent outside the structure and the acoustic treatment to be incorporated in the structure's design.

TABLE 6
LAND USE COMPATIBILITY WITH COMMUNITY NOISE ENVIRONMENTS[11]

	Most Recent Update			
Land Use Category	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	75–85
Residential – Multiple-Family	50–65	60–70	70–75	75–85
Transient Lodging – Motels, Hotels	50–65	60–70	70–80	80–85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	80–85
Auditoriums, Concert Halls, Amphitheaters	NA	50–70	NA	65–85
Sports Arenas, Outdoor Spectator Sports	NA	50–75	NA	70–85
Playgrounds, Neighborhood Parks	50–70	NA	67.5–77.5	72.5–85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–70	60–70	NA	80–85
Office Buildings, Business Commercial and Professional	50–70	67.5–77.5	75–85	NA
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	75–85	NA

CNEL = community noise equivalent level; NA = not applicable

NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

NORMALLY UNACCEPTABLE: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.

CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

11 Office of Planning and Research. 2003. General Plan Guidelines.

Regional and Local Plans

City of Huntington Beach Municipal Code

The city also has adopted a Noise Ordinance (Chapter 8.40 of the Huntington Beach Municipal Code), which identifies exterior and interior noise standards, specific noise restrictions, exemptions, and variances for sources of noise in the city. The noise level standards in the city Noise Ordinance are more stringent than state Office of Noise Control guidelines for residential and commercial noise levels. The Noise Ordinance applies to all noise sources, with the exception of any vehicle that is operated on any public highway, street, or right-of-way, or to the operation of any off-highway vehicle, to the extent that it is regulated in the California Vehicle Code, and all other sources of noise that are specifically exempted. As such, the Municipal Code provides standards against intrusive noises such as loud gatherings, unauthorized construction-generated noise, and other intrusive noises.

Exterior noise standards established in the city Noise Ordinance, Section 8.40.050, are identified in Table 7, along with the exterior noise levels that are prohibited as established by Section 8.40.060. Section 8.40.070 establishes the city interior noise standards, and Section 8.40.080 establishes the prohibited interior noise limits as identified in Table 8. For both exterior and interior noise levels, if the ambient noise level is greater than the identified noise standards, the noise standard becomes the ambient noise level without the offending noise.

In accordance with Section 8.40.090(d), construction noise activities are exempt from the Noise Ordinance, provided that the applicant has been granted a permit from the city and that the construction activities do not occur between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and Saturdays, or at any time on Sundays or federal holidays. Additionally, Section 8.40.100 prohibits noise levels at the exterior of schools, hospitals, and churches from exceeding the standards set forth in Section 8.40.50 or from interfering with the activities at these institutions.

TABLE 7
CITY OF HUNTINGTON BEACH NOISE ORDINANCE EXTERIOR NOISE STANDARDS[12]

Noise Zone	Noise Zone Land Uses	Noise Level	Time Period
1	All Residential Properties	55 dBA 50 dBA	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.
2	All Professional Office and Public Institutional Properties	55 dBA	Anytime
3	All Commercial Properties Except Professional Office	60 dBA	Anytime
4	All Industrial Properties	70 dBA	Anytime

Exterior Noise Levels Prohibited:

It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured on any residential, public institutional, professional, commercial or industrial property, either within or without the city, to exceed the applicable noise standards:

(a) For a cumulative period or more than 30 minutes in any hour;

(b) Plus 5 dBA for a cumulative period of more than 15 minutes in any hour;

(c) Plus 10 dBA for a cumulative period of more than 5 minutes in any hour;

(d) Plus 15 dBA for a cumulative period of more than 1 minute in any hour; or

(e) Plus 20 dBA for any period of time.

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

12 Huntington Beach, City of. 1996. General Plan – Noise Element.

TABLE 8
CITY OF HUNTINGTON BEACH NOISE ORDINANCE INTERIOR NOISE STANDARDS[13]

Noise Zone	Noise Zone Land Uses	Noise Level	Time Period
1	All Residential Properties	55 dBA 45 dBA	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.
2, 3, 4	All Professional Office, Public Institutional, Commercial, and Industrial Properties	55 dBA	Anytime

Interior Noise Levels Prohibited:

It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured within any other structure on any residential, public institutional, professional, commercial or industrial property to exceed:

(a) The noise standard for a cumulative period or more than 5 minutes in any hour;

(b) The noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour; or

(c) The noise standard plus 10 dBA for any period of time.

In the event the ambient noise level exceeds any of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

13 Huntington Beach, City of. 1996. General Plan – Noise Element.

Population, Housing, and Employment

This section describes the population, housing, and employment trends within the planning area. The information in this section is based on the Economic Development Trends and Conditions Report prepared by Stanley R. Hoffman Associates, Inc.[1].

ENVIRONMENTAL SETTING

Population Growth

The population of the planning area was 189,594 in 2000. As shown in Table 1, the planning area experienced a population increase of approximately 3,480 persons from 2000 to 2012 to reach a total population of 193,074 in 2012, representing a 1.8 percent increase from 2000[2]. More than 90 percent of this growth occurred after 2010. The SCAG 2035 forecast indicates that the planning area is heading toward a long-term period of modest population growth[3] (the 2040 forecast is available as part of the updated 2016 Regional Transportation Plan). It is estimated that the planning area's population will expand to approximately 205,500 persons by 2035, which is a 6.4 percent increase from 2012.

Orange County's population was 2,846,289 in 2002. It also experienced an increase in population from 2000 to 2012, reaching a total population of 3,021,840 in 2012. This represent a 6.2 percent increase from 2000. Orange County also is projected to have a long-term period of population growth that will expand the county's population to approximately 3,421,000 in 2035, which is a 6.2 percent increase from 2012.

TABLE 1
CITY OF HUNTINGTON BEACH AND ORANGE COUNTY DEMOGRAPHIC AND ECONOMIC TRENDS

Category	2000	2008	2010	2012	2020	2035	Change 2000-2012	% Change 2000-2012
City of Huntington Beach								
Total Population	189,594	189,700	189,992	193,074	199,800	205,500	3,480	1.8%
Total Households	73,657	74,300	74,285	73,787	75,800	79,200	130	0.2%
Total Housing Units	75,793	—	78,778	78,732	—	—	2,939	3.9%
Persons per Household	2.56	—	2.55	2.60	—	—	0.04	1.6%
Vacancy Rates	2.8%	—	5.7%	6.3%	—	—	—	—
Total Employment	79,471	82,900	75,769	76,635	80,100	80,600	-2,836	-3.6%
Jobs/Housing Ratio	1.08	1.12	1.02	1.04	1.06	1.02	—	—
Orange County								
Total Population	2,846,289*	2,989,000	3,010,232*	3,021,840*	3,266,000	3,421,000	175,551	6.2%
Total Households	935,287*	987,000	992,781*	-	1,049,000	1,125,000	57,494	6.1%
Total Employment	1,411,901*	1,624,000	—	1,594,609*	1,626,000	1,779,000	182,708	12.9%
Jobs/Housing Ratio	—	1.65	—	—	1.55	1.58	—	—

Source: Stanley R. Hoffman Associates, Inc. Economic Development Trends and Conditions Report for the City of Huntington Beach General Plan Update 2014. Southern California Association of Governments (SCAG) Adopted 2012 Regional Transportation Plan (RTP).

**U.S. Census Bureau 2000-2010.*

1 Stanley R. Hoffman Associates, Inc. 2014. Economic Development Trends and Conditions City of Huntington Beach General Plan Update. May.
2 Ibid
3 Southern California Association of Governments (SCAG). 2012 Regional Transportation Plan (RTP).

Employment

As shown in Table 1, the planning area had an estimated total of 76,635 jobs in 2012, a 3.6 percent decrease from 2000 (Table 1). In contrast, Orange County's employment rates increased 12.9 percent from 2000 to 2012[4]. The planning area's economy ranges from tourism and business-oriented hotels and motels; to restaurant and retail-oriented businesses; industrial manufacturing and warehouse/distribution firms; technology services; automotive sales, health care, local schools, a community college, and governmental institutions. Table 2 lists the planning area's top ten employers and the number of full-time persons employed by each employer.

TABLE 2
CITY OF HUNTINGTON BEACH TOP 10 EMPLOYERS

Employer	Industry	Full-time Employees
Boeing	Aerospace	4,609
Quicksilver	Apparel	1,230
Cambro Manufacturing	Manufacturing	951
Hyatt Regency Huntington Beach	Hotel	641
C&D Aerospace	Aerospace	555
Huntington Beach Hospital	Health Care	503
Republic Services	Waste Management	408
Huntington Beach Health Care	Health Care	381
Waterfront Hilton Beach Resort	Hotel	343
Cleveland Golf/Srixon	Manufacturing	280
Total		9,901

Source: Stanley R. Hoffman Associates, Inc. Economic Development Trends and Conditions Report for the City of Huntington Beach General Plan Update 2014.

Housing

Ninety percent of the population growth from 2000 to 2012 occurred after 2010. This growth, however, was accompanied by an increase of only about 130 households over the same period, an increase of only 0.2 percent[5]. In turn, the average persons per household increased from 2.56 to 2.60 from 2000 to 2012. In contrast, Orange County had an increase of 6.1 percent in households from 2000 to 2012.

The balance between housing supply and demand can be described using a "vacancy rate." If the demand for housing units is greater than the available supply, then the vacancy rate is low and the price of housing will most likely increase at a higher rate than in an area where supply and demand are more in balance. According to the California Department of Housing and Community Development (HCD), a housing vacancy rate of 5 percent is considered normal[6]. Vacancy rates below 5 percent indicate a housing shortage in a community. The housing vacancy rate of the planning area increased from an estimated 2.8 percent in 2000 to 5.7 percent in 2010, and to 6.3 percent in 2012. This implies that much of the growth in housing units (2,939) occurred toward the later part of this period and was not fully occupied by 2012.

4 U.S. Census Bureau. 2000 and 2010 Census: Orange County Demographics Profile. Accessed November 13, 2014 at http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml
5 Stanley R. Hoffman Associates, Inc. 2014. Economic Development Trends and Conditions City of Huntington Beach General Plan Update. May.
6 California Department of Housing and Community Development. 2014b. California Housing Production Needs. Accessed August 7, 2014 at http://www.hcd.ca.gov/hpd/hrc/rtr/chp2r.htm

Jobs/Housing Ratio

The jobs/housing ratio is an area's (e.g., city, county, region) total jobs divided by total housing units, and is often used to describe how an area balances economic development with housing construction. A jobs/housing ratio of 1.0 indicates one job exists for every housing unit in an area. Depending on the ratio, an area can be characterized as housing-rich, jobs-rich, or balanced. Balanced areas have adequate housing available to support workers across all industries; that is, employees can live in the communities in which they work. Housing-rich areas are net exporters of employees, which contributes to the need for commuting to areas where there are more jobs available. On the other hand, jobs-rich areas are net importers of employees from other areas because they have more jobs than resident workers. The planning area had a job/housing ratio of 1.08, 1.02, and 1.04 in 2000, 2010, and 2012, respectively, meaning there was about one job for every housing unit in the planning area, therefore making the planning area a relatively balanced area. In Orange County, since the numbers of households are projected to grow faster than employment in the years 2020 to 2035, the countywide job/housing ratio is projected to decline slightly from 1.65 in 2008 to 1.58 in 2035.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, or laws related to population, housing, and employment apply to the planning area.

State Plans and Regulations

Housing and Community Development Department Building Blocks

Unlike other general plan elements, housing elements are subject to detailed statutory requirements and mandatory review by the HCD. To assist cities and counties in California in preparing adequate housing elements, HCD provides "Building Blocks for Effective Housing Elements." The Building Blocks provide detailed information about specific statutory requirements; information and resources to complete effective analyses of housing needs, resources and constraints; sample/model analyses and programs; and links to resources (including demographic data, current research, funding and policy strategies, public and private industry and advocacy organizations)[7].

California Relocation Law

The California Relocation Law, California Public Resource Code Section 7260 (b), requires the fair and equitable treatment of persons displaced as a direct result of programs or projects undertaken by a public entity. The law requires agencies to prepare a relocation plan, provide relocation payments, and identify substitute housing opportunities for any resident that is to be displaced by a public project.

Regional and Local Plans, Regulations, and Ordinances

Regional Housing Needs Allocation

A Regional Housing Needs Allocation (RHNA) is mandated by the State of California (California Government Code Section 65584) for regions to address housing issues and needs based on future growth projections for the area. The RHNA is developed by SCAG and allocates to cities and counties their "fair share" of the region's projected housing needs based on household income groupings over the planning period for the housing elements of each jurisdiction. The most recently completed RHNA planning period is 2006 to 2014. The fifth cycle RHNA Allocation Plan, which covers the planning period from 2013 to 2021, was adopted by the Regional Council on October 4, 2012. Cities and counties must develop and adopt their housing elements to address how they will meet their allocations.

7 California Department of Housing and Community Development. 2014a. Building Blocks for Effective Housing Elements. Accessed August 7, 2014. Available at http://www.hcd.ca.gov/hpd/housing_element2/index.php

The 2014-2021 Housing Element, adopted in 2013, identified a majority of the City's lower income RHNA sites within the Beach and Edinger Corridors Specific Plan (BECSP). The BECSP is a form based code that allows mixed use (commercial/residential) development along two major arterials with no limitations on density or floor area ratio. The BECSP and associated EIR identified a residential unit capacity of 4,500 units. In May 2015, the City adopted an amendment to the BECSP, which, among other items, lowered the residential development cap from 4,500 units to 2,100 units within the specific plan area. The growth anticipated by the proposed General Plan Update includes the reduced number of units adopted for the BECSP in 2015, with a minor amount of units added to account for potential future capacity increases and to provide a conservative estimate.

Huntington Beach Zoning and Subdivision Ordinance

The city's Affordable Housing regulations (Title 23, Chapter 230, Section 230.26) implement the goals and policies of the city Housing Element. The provisions of Section 230.26 require all housing projects with three or more units to provide a minimum of 10 percent affordable units. The units must be deed restricted as affordable for households with very low, low, or moderate incomes. The section also allows projects proposing 30 or fewer units to pay a fee in lieu of providing the units on- or off-site. These regulations are used by the city to meet its commitment to providing housing that is affordable to all economic sectors, and to meet its regional fair-share requirements for construction of affordable housing.

Public Services

This section describes the public services that are provided within the city of Huntington Beach. The public services information in this section is based on the Fire Services Technical Report prepared by Matrix Consulting Group[1], Police Services Technical Report prepared Matrix Consulting Group[2], and the Infrastructure and Public Facilities Technical Report prepared by Michael Baker International[3].

ENVIRONMENTAL SETTING

Fire Protection Services

Fire protection services in the planning area are provided by the Huntington Beach Fire Department (HBFD). The HBFD provides response to fires, medical emergencies, hazardous materials incidents, natural and man-made disasters, automatic and mutual aid assistance to neighboring departments, and related emergencies in an effort to reduce loss of life and property. In addition, the HBFD inspects businesses and properties, assists with code enforcement, and conducts public education programs. The HBFD also prepares revenue projections derived from fire department services, which include three oil wells located on city property and a privately operated oil lease, from which the city yields royalties. The HBFD manages a joint agency fire training center and the city EOC.

There are four functional areas in the HBFD: Operations Division, Prevention Division, Administration Division, and Marine Safety Division.

The HBFD currently operates out of eight fire stations located within the city limits. The Fire Administration offices are located in the City Hall complex at 2000 Main Street. The HBFD has automatic aid agreements in place with the Orange County Fire Authority, Fountain Valley Fire Department, Costa Mesa Fire Department, and Newport Beach Fire Department, providing automatic aid assistance to neighboring communities when required.

The current daily staffing of fire and Emergency Medical Services (EMS) operations takes a total of 51 shift personnel. For all vacancies on emergency operations, overtime personnel are called in or held over to fill the vacancy, resulting in a constant daily staffing of 51 shift personnel, which is the minimum required staffing level for the city. For the fire suppression force, the Battalion Chief, Engine Company, and Truck Company personnel are all sworn members of the HBFD. Ambulance Operators are all non-sworn, limited-term, contract personnel.

The HBFD is an all-hazard response agency, responding to calls for service from its eight stations. It also serves as the EMS transport agency for the planning area. The HBFD responded to a total of 15,416 unique "in jurisdiction" calls for service during 2013, which is just slightly below the number of in-jurisdiction calls responded to in 2012. Approximately 84 percent of the calls responded to were medical-related calls. This incident response information is used as a basis for further analysis to determine the effectiveness of HBFD to place units on scene at emergency calls for service. The data indicate that HBFD typically responds to approximately 42 calls for service per day. It is important to note that specific types of emergency calls require more than one piece of equipment to respond to provide the appropriate level of service required to mitigate the incident. The HBFD responded to 1,014 out-of-jurisdiction calls in 2013. These calls are in addition to the 15,416 in-jurisdiction calls.

The call processing time (call received until units notified) averages 51 seconds for fire calls and 38 seconds for EMS calls; turnout time (time from call received to units en route to location) averages 1 minute 32 seconds for fire calls and 1 minute 25 seconds for EMS calls; and travel time (en route to arrival) averages

1 Matrix Consulting Group. 2017. Fire Services Technical Report. February.
2 Matrix Consulting Group. 2014. Police Services Technical Report. September.
3 Michael Baker International. 2014. Infrastructure and Public Facilities Technical Report. August.

3 minutes 10 seconds for fire calls and 3 minutes 54 seconds for EMS calls. When the performance standard is held to the 90th percentile, indicating how well the agency performs 90 percent of the time, the following points are noted:

- Call processing time for fire calls is 1 minute 22 seconds.
- Call processing time for EMS calls 1 minute 4 seconds.
- Turnout time for fire calls is 2 minutes and 5 seconds.
- Turnout time for EMS calls is 2 minutes 10 seconds.
- Travel time is 4 minutes 37 seconds for fire calls.
- Travel time is 5 minutes 41 seconds for EMS calls.
- Total response time is 7 minutes 3 seconds for fire calls.
- Total response time is 7 minutes 55 seconds for EMS calls.

The hour between 4:00 p.m. and 5:00 p.m. is the busiest hour of the day and the hour between 5:00 a.m. and 6:00 a.m. is the slowest hour of the day. The busiest day of the week for the HBFD is Saturday (15.7 percent of calls), and the slowest day is Wednesday (13.6 percent of calls).

The Fire Prevention Division has a goal to inspect occupancies on an annual basis and Certified Unified Program Agency occupancies every three years. Fire Companies and the Fire Prevention Division staff conduct these inspections. Table 1 illustrates the inspections conducted in 2013. The Fire Prevention Division also conducts new construction and tenant improvement inspections. There were a total of 3,707 field inspections and 2,203 plan checks performed by the Fire Prevention Division in 2013. The Fire Prevention Division also has a Fire Investigator section consisting of seven Fire Investigators that determine the origin and cause of fires and conduct criminal investigations in cooperation with the Huntington Beach Police Department.

TABLE 1
FIRE INSPECTIONS – 2013

Inspection Type	Inspector	Number of Occupancies	Number Inspected	% Inspected
Occupancy	Fire Companies	6,068	6,064	99%
Schools	Fire Prevention	57	57	100%
Oil Wells	Fire Prevention	207	207	100%
CUPA	Fire Prevention	429	249	58%
Fire Permit	Fire Prevention	661	385	58%

CUPA = Certified Unified Program Agency

Source: Matrix Consulting Group 2014a

The Marine Safety Division provides lifeguard, emergency medical, wildlife, rescue, and law enforcement services on the city's Huntington Beach and Sunset Beach. The Marine Safety Division conducted 4,157 rescue activities in 2013. Rescuing swimmers accounted for the majority of the incidents, accounting for 72 percent of the rescue activity. Rescues are defined as anyone physically assisted from a hazardous condition, such as a rip current, by a lifeguard. The Marine Safety Division conducted 146,757 preventative actions in 2013. Preventative actions involve lifeguard staff contacting, warning, and advising swimmers, surfers, and others of hazardous conditions before the assistance of Marine Safety staff is needed. Open wounds were the most common minor medical aid request, accounting for 493 (71 percent) of the 694 incidents. Stingray encounters were the most common cause of major medical aid being required, accounting for 655 (64 percent) of the 1,017 major medical aid calls. Warnings were the most common law enforcement action taken by Marine Safety staff. These include contacts seeking voluntary compliance for violations of the Huntington Beach Municipal Code for illegal fires, alcohol consumption, dogs out of permitted areas, speeding bicycles on the beach service road, and fishing violations on the pier.

Police Protection Services

The Huntington Beach Police Department (HBPD) provides police protection services within the planning area. To provide law enforcement services in Huntington Beach, the chief is assisted by a management team consisting of three captains and an executive officer (a lieutenant) who are directly supervised by the chief. The management team has responsibility for major work units of the Uniform Division, Investigation Division, and Administrative Operations Division.

Uniform Division

The Uniform Division is composed of three work units: the Patrol Bureau, the Traffic/Aero Bureau, and the Special Enforcement Bureau.

The Patrol Bureau is the largest of the division's work units. The funded Patrol staffing level during 2013 was 84 officers, but the department only had an average staffing level of 76 officers for most of the year. Positions were vacant because of a lack of hiring due to budgetary restrictions and officers off on various types of leave (disability leave, sick leave, military deployment, etc.) resulting in an actual staffing level below 76 officers during some periods. HBPD patrol and traffic officers responded to 53,829 unique community-generated calls for service, approximately 147 per day in 2013. The busiest days of the week are Friday through Sunday, with more than 150 calls daily. Of the total number of calls, 18,902 calls (35 percent) occurred during the day (8:00 a.m. to 4:00 p.m.), 24,038 calls (45 percent) occurred during the afternoon/evening hours (4:00 p.m. to midnight) and 10,889 calls (20 percent) occurred during the nighttime hours (midnight to 8:00 a.m.). Patrol officers also are used to transport prisoners from the HBPD jail to the Orange County Jail several times a day. There were a total of 618 transports during the year taking an average of 118.7 minutes each. Patrol officers initiated 34,772 incidents, an average of 95 events per day. Most frequently, these events were security checks, but they also included traffic stops (vehicle or pedestrian), warrant service, investigative follow-up, and administrative tasks.

The Traffic/Aero Bureau has 48 staff across three units who are responsible for a variety of tasks. The Air Support Unit pilots and maintains HBPD helicopters to provide air support for the HBPD. The Air Support Unit also provides daily helicopter patrol over the cities of Newport Beach and Costa Mesa. The Traffic Enforcement Unit of the Traffic/Aero Bureau reviews the quality control of traffic accident reports, conducts follow-ups of hit-and-run accidents, maintains the department's accident statistics, and oversees the HBPD's traffic-related grants. Traffic Units were the primary call-handling unit for the Traffic/Aero Bureau with 6,566 calls for service in 2013. Each call took approximately 39.8 minutes (travel and call-handling time). This equals a total of approximately 4,355 hours, or 16.9 percent of their annual work hours, that Traffic Units responded to and handled calls for service. The Traffic/Aero Bureau also has a Parking Enforcement Unit that is responsible for enforcing parking regulations; assisting Public Works with clearing the streets for street sweeping; and marking, tagging, and towing abandoned vehicles, including the related paperwork required by the state for reimbursement to the city.

The Special Enforcement Bureau has 21 staff and is composed of the Special Enforcement Team and the Crime Task Force (formerly Directed Enforcement Team). The Special Enforcement Team is staffed with one sergeant and eight officers who are assigned to work exclusively in the Downtown area or at the Bella Terra Mall. The six officers assigned to the Downtown area also provide high visibility patrol for order maintenance purposes. The Downtown area has a number of bars and establishments that serve alcoholic beverages, and it is common—especially during the warm weather months—for people to become disruptive and involved in fights. The officers' presence is intended to provide quick intervention for observed or reported incidents of disruptive or criminal behavior. The officers also visit businesses selling alcohol to ensure they operate within the confines of their permit issued by the California Department of Alcoholic Beverage Control. The officers in this unit have been involved in a project to identify persons who are homeless and to determine the availability of programs or assistance in helping them obtain health or other human services and/or permanent housing. The Crime Task Force is staffed with one sergeant and four officers who provide a wide range of proactive enforcement and problem solving. The Crime Task Force conducts proactive crime-related operations involving surveillance and obtaining/serving search warrants and arrest warrants. The unit also addresses longer-term police-related problems in the community, code enforcement violations, and quality-of-life concerns of business owners or residents.

Investigation Division

The Investigation Division is composed of three work units: the General Investigation Bureau, the Special Investigation Unit, and the Jail Bureau.

The General Investigation Bureau's primary task is to follow up on crimes or serious incidents that have occurred in the planning area. Detectives are responsible for the follow-up investigation of crimes committed against a person, such as murder, rape, robbery, and aggravated assault. This unit also is staffed with a full-time victim advocate (grant funded) who works with detectives to assist victims of violent crime. The unit also is responsible to conduct the follow-up investigation of property crimes, such as burglary, petty theft, grand theft, defrauding an innkeeper, and credit card fraud.

The Special Investigation Unit is staffed with one sergeant, seven detectives, and one police services specialist. The primary responsibility for this unit is to conduct proactive undercover investigations of crimes related to the use and sale of illegal narcotics and related to vice. Four detectives are assigned to investigate narcotics-related crimes and two detectives are assigned to vice operations. The work of these detectives also involves developing informants regarding crimes occurring in the planning area and responding to tips and complaints made by members of the public. This unit also conducts criminal intelligence operations related to narcotics and vice crimes as well as general intelligence operations for the HBPD. The Special Investigation Unit also has two detectives assigned to its Gang Unit to provide high visibility proactive patrol to reduce gang-related activity and crime.

The Jail Bureau is staffed with one detention administrator, four detention supervisors, 13 detention officers (four are officer/nurse positions), and two part-time detention officers. The nurse detention officers provide medical screening for persons being booked into the jail and when on duty can approve clearance, as appropriate, for persons that might otherwise require movement to a medical facility. The State of California classifies the Huntington Beach Jail as a Type 1 facility, which allows arrestees to be housed in the jail for up to 96 hours and convicted persons (inmates) for up to one year. Of the 82 beds in the facility, 70 are for pre-arraignment cells and 12 are for inmates. The jail averaged over 400 bookings monthly in 2013 and a total of 3,967 bookings into the facility for the year. The jail's average daily population in 2013 was approximately 15. Detention officers, with a police officer as an escort (detention officers are not armed), transport prisoners to the County Jail and to court. At large events, such as the U.S. Open of Surfing and July 4 events in the planning area, the detention officers also assist police officers in transporting arrestees.

Administrative Operations Division

The Administrative Operations Division provides most of the support services for the HBPD, including budgeting, processing, and maintaining the HBPD's crime and traffic reports, hiring new employees, communication and dispatching services, property/evidence processing, and facilities maintenance. The division provides general oversight for a variety of work units and departmental functions, including the Evidence & Property Room, Records Bureau, background investigations, personnel and payroll functions, alarm permitting and false alarm billing, community outreach/support services, general equipment/supply functions, and facilities maintenance.

Crime

The number of violent crimes in Huntington Beach decreased significantly from 2009 to 2012, with the number of robberies and aggravated assaults accounting for the decrease. However, property crimes saw a significant increase of 19.7 percent, with the number of burglaries up 13 percent and larcenies up almost 22 percent. The rate of violent crime in the planning area is significantly lower than in Orange County overall and is 38 percent lower than that of the state's crime rate. However, the planning area had a higher rate of rape than Orange County as a whole. Although the number of crimes committed in the planning area compares favorably to the region and the state, the planning area has experienced a significant increase in the number of larcenies in recent years.

One significant measure of the effectiveness of a police department is the number of crimes that are cleared (solved) by the agency in a year, either by an arrest or through other methods prescribed by the FBI's Uniform Crime Reports Manual. Huntington Beach's clearance rate for violent crimes over the last four

years has been significantly higher than the national average—an average of more than 50 percent compared to 43.6 percent. The homicide clearance rate has been 100 percent each year. The only violent crime for which the clearance rate does not exceed the national average is rape, which is more than 10 percentage points below the national clearance rate for cities the size of Huntington Beach. In 2009, the HBPD clearance rate for rapes was 57 percent, but the rate has dropped under the national average in each of the last three years. However, the overall violent crimes clearance rate is approximately 7 percentage points above the national average. In property crimes, both burglary and larceny clearance rates fall below the national average.

Schools

The planning area is served by one high school district and four middle/elementary school districts. The Huntington Beach Union High School District (HBUHSD) serves the entire planning area and portions of the cities of Fountain Valley, Garden Grove, Seal Beach, and Westminster, as well as unincorporated portions of Orange County. The Huntington Beach City School District (HBCSD), Westminster School District (WSD), Ocean View School District (OVSD), and the Fountain Valley School District (FVSD) all serve portions of the planning area. The HBCSD is the only district located entirely within the planning area. The HBUHSD operates seven high schools (four high schools, two continuation schools, and one adult education school) that primarily serve Huntington Beach students. The HBCSD operates 10 school facilities located in the planning area. The WSD, OVSD, and FVSD have schools in Huntington Beach but also serve neighboring jurisdictions. Table 2 shows the 2012-2013 locations and enrollments for all schools within the Huntington Beach planning area.

TABLE 2
SCHOOL LOCATIONS AND 2012-2013 ENROLLMENTS

School Name	Address	Enrollment (2012-2013)	Grades	School District
Coast High School	17231 Gothard Street	108	10-12	HBUHSD
Edison High School	21400 Magnolia Street	2,625	9-12	HBUHSD
Huntington Beach Adult High School	17231 Gothard Street	N/A	Diploma/GED/ Cont. Ed.	HBUHSD
Huntington Beach High School	1905 Main Street	2,909	9-12	HBUHSD
Marina High School	15871 Springdale Street	2,743	9-12	HBUHSD
Ocean View High School	17071 Gothard Street	1,470	9-12	HBUHSD
Valley Vista High School	9600 Dolphin Street	305	10-12	HBUHSD
Agnes L. Smith Elementary School	770 17th Street	834	K-5	HBCSD
Dr. Ralph E. Hawes Elementary School	9682 Yellowstone Drive	698	Pre K-5	HBCSD
Ethel R. Dwyer Middle School	1502 Palm Avenue	1,241	6-8	HBCSD
Huntington Seacliff Elementary School	6701 Garfield Avenue	685	K-5	HBCSD
Isaac L. Sowers Middle School	9300 Indianapolis Avenue	1,200	6-8	HBCSD
John H. Eader Elementary School	9291 Banning Avenue	619	Pre K-5	HBCSD
John R. Peterson Elementary School	20661 Farnsworth Lane	637	K-5	HBCSD
Joseph R. Perry Elementary School	19321 Harding Lane	436	K-3	HBCSD
Preschool Academy	20451 Craimer Lane	N/A	Pre K	HBCSD
S.A Moffett Elementary School	8800 Burlcrest Avenue	582	K-5	HBCSD
Newland Elementary School	8787 Dolphin Drive	429	K-5	FVSD
Oka Elementary School	9800 Yorktown Avenue	453	K-5	FVSD
Talbert Middle School	9101 Brabham Drive	666	6-8	FVSD
Circle View Elementary School	6261 Hooker Drive	786	K-5	OVSD
College View Elementary School	6582 Lennox Drive	471	K-5	OVSD
Golden View Elementary School	17251 Golden View Lane	566	K-5	OVSD

School Name	Address	Enrollment (2012-2013)	Grades	School District
Harbour View Elementary School	4343 Pickwick Circle	823	K-5	OVSD
Hope View Elementary School	17622 Flintstone Lane	702	K-5	OVSD
Lake View Elementary School	17451 Zeider Lane	395	K-5	OVSD
Marine View Middle School	5682 Tilburg Drive	888	6-8	OVSD
Mesa View Middle School	17601 Avilla Lane	756	6-8	OVSD
Oak View Elementary	17241 Oak Lane	721	K-5	OVSD
Oak View Prep Pre K	17131 Emerald Lane	216 (2014 enrollment)	Pre K	OVSD
Pleasant View/Ocean View Prep Preschool	16692 Landau Lane	94 (2014 enrollment)	Pre K	OVSD
Spring View Middle School	16662 Trudy Lane	795	6-8	OVSD
Sun View Elementary School	7721 Juliette Low Drive	294	K-5	OVSD
Village View Elementary School	5361 Sisson Drive	574	K-8	OVSD
Ada Clegg Elementary School	6311 Larchwood Drive	523	K-5	WSD
Helen Stacey Middle School	6311 Larchwood Drive	857	6-8	WSD
Schroeder Elementary School	15151 Columbia Lane	586	K-6	WSD

Source: Michael Baker 2014

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

Fire Protection Services

Federal Fire Protection Standards

The National Fire Protection Association Standard 1710 contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by career fire departments. The requirements address functions and objectives of fire department emergency service delivery, response capabilities, and resources. The code also contains general requirements for managing resources and systems, such as health and safety, incident management, training, communications, and pre-incident planning. The code addresses the strategic and system issues involving the organization, operation, and deployment of a fire department and does not address tactical operations at a specific emergency incident.

Police Services

There are no applicable federal regulations related to police services.

Schools

There are no applicable federal regulations related to schools.

State Plans, Policies, Regulations, and Laws

Fire Protection Services

California Fire Code

The California Fire Code is based on the International Fire Code. Topics addressed in the code include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion

hazards safety, hazardous materials storage and use, provisions intended to protect and assist first responders, industrial processes, and many other general and specialized fire safety requirements for new and existing buildings and premises. The code contains specialized technical regulations related to fire and life safety.

California Health and Safety Code

State fire regulations are set forth in California Health and Safety Code Sections 13000 et seq., which include regulations concerning building standards (as also set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility standards, and fire suppression training.

Police Services

There are no applicable state regulations related to police services.

Schools

Assembly Bill 2926

The State of California traditionally has been responsible for the funding of local public schools. To assist in providing facilities to serve students generated by new development projects, the state passed AB 2926 in 1986. This bill allowed school districts to collect impact fees from developers of new residential and commercial/industrial building space. Development impact fees also were referenced in the 1987 Leroy Greene Lease-Purchase Act, which required school districts to contribute a matching share of project costs for construction, modernization, or reconstruction. Development within the Specific Plan is required to pay school impact fees in accordance with state regulation. Generally, school impact fees are collected prior to issuance of a building permit.

California Education Codes

California SB 50 modifies Government Code Section 65995 to limit the acquisition of development fees by local agencies to three levels identified in Government Code Sections 65995, 65995.5, and 65995.7 and prohibits local agencies from denying a legislative or adjudicative action under CEQA involving real estate development on the basis of the inadequacy of school facilities.

California Education Code Section 17620 gives school districts the authority to levy a fee, charge, dedication, or other requirement against any construction within the boundaries of the district for the purpose of funding the construction or reconstruction of school facilities, subject to any limitations set forth in Government Code Title 7, Division 1, Chapter 4.9 (commencing with Section 65995).

Regional and Local Plans, Policies, Regulations, and Ordinances

Police Services, Fire Services, Schools

Huntington Beach Municipal Code

The Huntington Beach Municipal Code, Title 17, Chapter 17.73, Development Impact Fees – General, outlines development impact fees for public facilities for residential and non-residential uses and fee reductions for developers who construct their own public facilities. The general chapter includes a mechanism for assessing the impacts of new development on school facilities, and appropriate mitigation measures for the provision of school facilities if necessary. Specifically, Title 17, Chapter 17.74 of the Huntington Beach Municipal Code establishes standards to provide a mechanism for assessing the impacts of new development on fire facilities, and appropriate mitigation measures for the provision of fire facilities if necessary. Title 17, Chapter 17.75 of the Huntington Beach Municipal Code establishes standards to provide a mechanism for assessing the impacts of new development on police facilities, and appropriate mitigation measures for the provision of police facilities if necessary.

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Recreation

This section describes recreational resources within the city of Huntington Beach. The recreational resources information in this section is based on the Infrastructure and Public Facilities Technical Report prepared by Michael Baker International[1].

ENVIRONMENTAL SETTING

Existing Recreational Facilities

The planning area contains approximately 1,073 acres of parks and recreational facilities and offers a wide variety of recreational programs run by the city Department of Community Services[2]. The types of recreational facilities located within the planning area include community centers, senior centers, a golf course, clubhouses, a gym and pool, bikeways and equestrian trail systems, a historic structure, and campgrounds. In addition, the planning area also contains city-run marine-based amenities, such as beaches, a pier, and harbor channels, as well as two state beaches and one regional park (operated by Orange County).

Parks/Parkland

The planning area currently contains approximately 1,073 acres of parkland within 79 parks, public golf courses, city facilities, and beaches. The planning area classifies parks into four categories, based primarily on their size. The planning area also has other park facilities, including city-operated beaches, facilities, and the Meadowlark Golf Course, which do not fit into one of the four categories. The categories are listed in order of size from smallest (less than 2.5 acres) to largest (greater than 40 acres):

- Mini Park: Typically less than 2.5 acres in size. Provides passive open space and buffering from adjacent developments. Usually includes walking paths and benches. Designed to serve the immediate neighborhood in which it is located. Examples of mini parks within the planning area are Booster Park, French Park, and Tarbox Park.

- Neighborhood Park: Generally between 2.5 and 10 acres in size and planned for activities of children from 5 to 14 years old. Usually centrally located within a neighborhood and often adjacent to a school. Designed to serve a one-quarter to one-half mile radius. Examples of neighborhood parks within the planning area are Burke Park, Conrad Park, Drew Park, and Wieder Park.

- Community Park: Designed to serve several neighborhoods, community parks usually range from 10 to 40 acres in size. These types of parks are planned for youth and adults and for a wider range of activities than smaller parks. Designed to serve a one to one-half mile radius. Examples of community parks within the planning area are Chris Carr Park, Gisler Park, Langenbeck Park, and Marina Park.

- Regional Park: Provides special recreational opportunities, such as youth camping, equestrian centers, nature preserves, trails, and lakes. Generally, regional parks are larger than 40 acres and are intended to serve a larger regional area. Designed to serve a 30- to 40-mile radius. An example of a regional park within the planning area is the Huntington Central Park.

Table 1 lists the total acreage of each park category in the planning area. Figure 1 shows the locations of the various parks located throughout the planning area.

1 Michael Baker International. 2014. Infrastructure and Public Facilities Technical Report for the General Plan Update. August.
2 Huntington Beach, City of. 2015. City of Huntington Beach Parks and Facilities Website. Accessed November 3, 2015, available http://www.huntingtonbeachca.gov/residents/parks_facilities/

TABLE 1
ACREAGE OF PARKS BY PARK CATEGORY

Park Category	Acres	Quantity
Parks	767.94	79
Public Golf Course (Meadowlark)	98	N/A
City-operated Beaches	207	N/A
Total	**1,072.94**	**79**

Source: Michael Baker 2014

In addition to the city-operated parks and parkland, the Harriet M. Weider Regional Park is located partially within the planning area but is under the jurisdiction of Orange County. The Harriet M. Weider Regional Park totals 106 acres, of which 45 acres is located within the city boundaries adjacent to the Bolsa Chica wetlands. The majority of this parkland is undeveloped and remains in its natural state. However, the portion of Harriet M. Weider Regional Park within the city has been accounted for within Table 1, along with the city-operated parks.

City Beaches

The planning area contains approximately 9.5 miles of shoreline, which includes Huntington City Beach, Sunset Beach, Bolsa Chica State Beach, and Huntington State Beach. Of these beaches, approximately 5 miles are owned and operated by the California Department of Parks and Recreation (CDPR). The remaining 4.5 miles of beach are operated by the city (which owns 2.1 miles of this area). City beaches provide a wide range of recreational activities, which include, but are not limited to, surfing, swimming, beach volleyball, fire rings for barbeques, beach trails for walking, running and bicycling, and other beach activities.

In addition to the four shoreline beaches, Huntington Harbour contains four beaches along its channels, which are located at the entrances to Davenport and Humboldt Islands and within the Trinidad Beach and Seabridge neighborhood parks. These beach parks offer additional recreational facilities and opportunities. Additionally, Sunset Beach contains one small inland beach located at 11th Street and Pacific Coast Highway.

State Beaches

The state of California, through the CDPR, operates two beaches within the planning area: Bolsa Chica State Beach and Huntington State Beach. The city operates 85.6 acres of Bolsa Chica State Beach under a long-term lease agreement to provide water and other services. Table 2 lists the acreages of the state-operated beaches along with their geographical boundaries.

TABLE 2
STATE BEACHES

Facility Name	Acres	Location
Bolsa Chica State Beach	96.8	Extends from Pacific Coast Highway at Seapoint Street to Pacific Coast Highway at Warner Avenue
Huntington State Beach	133.8	Beach Blvd to the mouth of the Santa Ana River

Source: Michael Baker 2014

Park Names and Numbers

1	11th Street Beach	21	Discovery Well	41	Huntington Central	61	Perry
2	Arevalos	22	Drew	42	Irby	62	Pleasant View
3	Baca	23	Eader	43	Lake	63	Prince
4	Bailey	24	Edison	44	Lake View	64	Robinwood
5	Banning/Magnolia	25	Farquhar	45	Lamb	65	Rogers Senior Center
6	Barlett	26	Finley	46	Lambert	66	Schroeder
7	Bauer	27	Franklin	47	Langenbeck	67	Seabridge
8	Bluff Top	28	French	48	Lark View	68	Seeley
9	Boardwalk	29	Gibbs	49	LeBard	69	Sowers
10	Bolsa View	30	Gisler	50	Manning	70	Sun View
11	Booster	31	Glen View	51	Marina	71	Sunset Beach Greenbelt
12	Burke	32	Golden View	52	Marine View	72	Talbert
13	Bushard	33	Green	53	McCallen	73	Tarbox
14	Carr	34	Greer	54	Moffett	74	Terry
15	Circle View	35	Harbour View	55	Murdy	75	Triangle
16	City Gym	36	Haven View	56	Newland	76	Trinidad
17	Clegg-Stacey	37	Hawes	57	Oak View	77	Wardlow
18	College View	38	Helme	58	Pacific City	78	Wieder
19	Conrad	39	Hope View	59	Parkside	79	Wieder Regional (OC)
20	Davenport Beach	40	Humboldt Beach	60	Pattinson	80	Worthy

Source: City of Huntington Beach & Michael Baker 2014

FIGURE 1
PARK LOCATIONS AND SERVICE AREA

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Other Recreational Facilities

In addition to the city's parks and parkland and city and state beaches, the city operates numerous other public recreational facilities that offer a wide range of activities. These activities include, but are not limited to, adult education, fitness classes, and historical preservation.

Park/Open Space Inventory

Table 3 outlines the park facilities across the city, as identified by the Community Services Department.

TABLE 3
PARK/OPEN SPACE INVENTORY

Park Name	Address	Total Acreage
11th Street Beach****	11th St and PCH	0.18
Arevalos	10441 Shalom Dr	2.58
Baca	7329 Sherwood Dr	14.35
Bailey	6782 Morning Tide Dr	0.59
Banning/Magnolia Park	22012 Magnolia St	1.18
Bartlett	19822 Beach Blvd	27.73
Bauer	21401 Newland St	2.04
Bluff Top	2201 Pacific Coast Hwy	19.66
Boardwalk	7441 Edinger Ave	0.50
Bolsa View	5653 Brighton Dr	2.70
Booster	16861 Baruna La	0.85
Burke	20701 Queens Park Ln	2.50
Bushard	9691 Warburton Dr	2.38
Carr	16532 Springdale St	10.72
Circle View	15720 Willet In	2.31
City Gym & Pool	1600 Palm Ave	0.78
Clegg-Stacey	6161 Larchwood Dr	2.80
College View	16281 Redlands Ln	2.70
Conrad	3612 Aquarius Dr	2.71
Davenport Beach****	4031 Davenport Dr	0.46
Discovery Well	6720 Summit Dr	6.60
Drew	20252 Cape Cottage Ln	2.28
Eader	9281 Banning Ave	2.68
Edison	21377 Magnolia St	39.69
Farquar	951 Main St	3.52
Finley	6782 Evening Hill Dr	0.56
Franklin	5760 Sands Dr	1.52
French****	3482 Venture Dr	0.33
Gibbs	16641 Graham St	6.83
Gisler	21215 Strathmoor Ln	11.67
Glen View	6721 Glen Dr	3.02
Golden View	17201 Cobra Ln	2.81
Green	18751 Seagate Dr	4.04
Greer	6900 McFadden Ave	10.44
Harbour View	16600 Saybrook Ln	4.02
Haven View	16041 Waikiki Ln	2.95
Hawes	9731 Verdant Dr	2.68
Helme	18591 Chapel Ln	2.02
Hope View	6371 Armada Dr	3.61

Park Name	Address	Total Acreage
Humbolt Beach****	4141 Humboldt Dr	0.48
Huntington Central	18002 Goldenwest St	343.22
Irby	6770 Ruth Dr	10.89
Lake	1035 11th St	4.75
Lake View	17461 Zeider Ln	2.16
Lamb	10151 Yorktown Ave	2.60
Lambert	18321 Newland St	3.50
Langenback	8721 Suncoral Dr	17.02
Lark View	17141 Fraser Ln	3.65
LeBard	20461 Craimer Ln	11.49
Manning	307 Delaware St	2.46
Marina	5562 Cross Dr	9.34
Marine View	17442 Frans Ln	2.96
McCallen	2309 Delaware St	5.84
Moffett	20400 Meander Ln	2.38
Murdy	7000 Norma Dr	16.04
Newland	19702 Topeka Ln	2.94
Oak View	17261 Oak Ln	1.31
Pacific City		2.03
Parkside		1.55
Pattinson	6200 Palm Ave	3.51
Perry	8152 Deauville Dr	1.88
Pleasant View	16650 Lanau Ln	2.17
Prince	3282 Venture Dr	0.22
Robinwood	5180 McFadden Ave	1.41
Rodgers Senior Center	1706 Orange	2.01
Schroeder	6231 Cornell Dr	2.37
Seabridge	16252 Countess Dr	3.91
Seeley	9711 Surfcrest Dr	3.37
Sowers	9272 Indianapolis St	2.65
Sunset Beach Linear Park***	btwn S. & N. Pacific Aves.	6.44
Sun View	16192 Sher Ln	2.45
Talbert	19222 Magnolia St	5.44
Tarbox	16601 Wellington Cir	0.44
Terry	7701 Taylor Dr	4.81
Triangle Park	TBD	1.11
Trinidad****	3601 Sagamore Dr	0.75
Wardlow	19761 Magnolia St	9.17
Wieder	16662 Lynn Ln	4.80
Orange County Regional Park (Wieder)*	19251 Seapoint St	45.00
Worthy	1831 17th St	6.61
Total		**767.94**

*Only includes park acreage within city limits
**City Beach & Sunset Beach
***Acreage excludes parking area
****Beach Park
Source: City of Huntington Beach Community Services Department 2016

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

There are no applicable federal plans, policies, regulations, or laws related to recreational facilities.

State Plans, Policies, Regulations, and Laws

Quimby Act

The Quimby Act (California Government Code Section 66477) was passed in 1975 and allows cities and counties to pass ordinances requiring developers to set aside land, donate conservation easements, or pay fees for park improvements. The Quimby Act allows local agencies to establish ordinances requiring developers of residential subdivisions to provide impact fees for land and/or recreational facilities. Revenues generated through the Quimby Act cannot be used for the operation and maintenance of park facilities. In 1982, the act was substantially amended, further defining the uses of or restrictions on Quimby Act funds, provided acreage-to-population standards and formulas for determining fee requirements, and indicated that these requirements must be closely tied to a project's impacts. Local ordinances now must include definite standards for determining the proportions of the subdivision to be dedicated and the amount of the fee to be paid.

Mitigation Fee Act

California Government Code Sections 66000 through 66008, the Mitigation Fee Act, gives cities the authority to impose a fee, other than a tax, that is charged to the applicant in connection with approval of a development project for the purpose of offsetting all or a portion of the cost of public facilities related to a development project, such as wear and tear of public recreational facilities.

State Public Park Preservation Act

The primary instrument for protecting and preserving parkland is the state Public Park Preservation Act. Under the Public Resource Code, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This provides no net loss of parkland and facilities.

Regional and Local Plans, Policies, Regulations, and Ordinances

There are no applicable regional plans, policies, regulations, or laws related to recreational facilities.

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Transportation/Traffic

This section describes the existing transportation/traffic conditions within the city of Huntington Beach. The existing transportation/traffic conditions in this section are based on the Existing Circulation Conditions Technical Report[1] and on the General Plan Circulation Update[2], both prepared by Stantec.

EXISTING CONDITIONS

Environmental Setting

The planning area includes a number of existing transportation systems that serve its residential, commercial, and industrial areas, including three major freeways/highways: I-405, also known as the San Diego Freeway; State Route 39 (SR-39), also known as Beach Boulevard; and State Route 1 (SR-1), also known as the Pacific Coast Highway. Additionally, the existing transportation system includes various local and regional transit systems, bicycle and alternative transportation facilities, and an extensive system of pedestrian facilities. The transportation system within the planning area provides easy access to the Los Angeles Airport, John Wayne Orange County Airport, and Long Beach Airport, which support air travel between the city and various locations throughout California and the United States. The transportation system within the planning area also provides easy access to the ports of Long Beach and Los Angeles, which support access to national and international commerce and trade.

Roadway Network

Regional Transportation System

Figure 1 illustrates the existing regional transportation system. Regional access to the planning area is provided via four interchanges with I-405 located at Springdale Street/Westminster Boulevard, Goldenwest Street/Bolsa Avenue, Beach Boulevard/Center Avenue, and Magnolia Street/Warner Avenue. I-405 operates in a north/south direction through California and traverses the northeastern part of the planning area. It begins at the El Toro "Y" interchange with Interstate 5 (I-5) and terminates in the Mission Hills district in Los Angeles, while providing regional access between southeastern Irvine and the northern portions of Los Angeles.

In addition to I-405, SR-1 and SR-39 are two arterial State Route facilities that traverse the planning area. SR-1 extends parallel to the coast in the western portion of the planning area and provides access to the city of Seal Beach to the north and the cities of Newport Beach and Costa Mesa to the south/southeast. SR-39 extends from the intersection with SR-1 through Orange and Los Angeles counties until its northern terminus at Islip Saddle on Angeles Crest Highway (State Route 2 (SR-2)) in the Angeles National Forest.

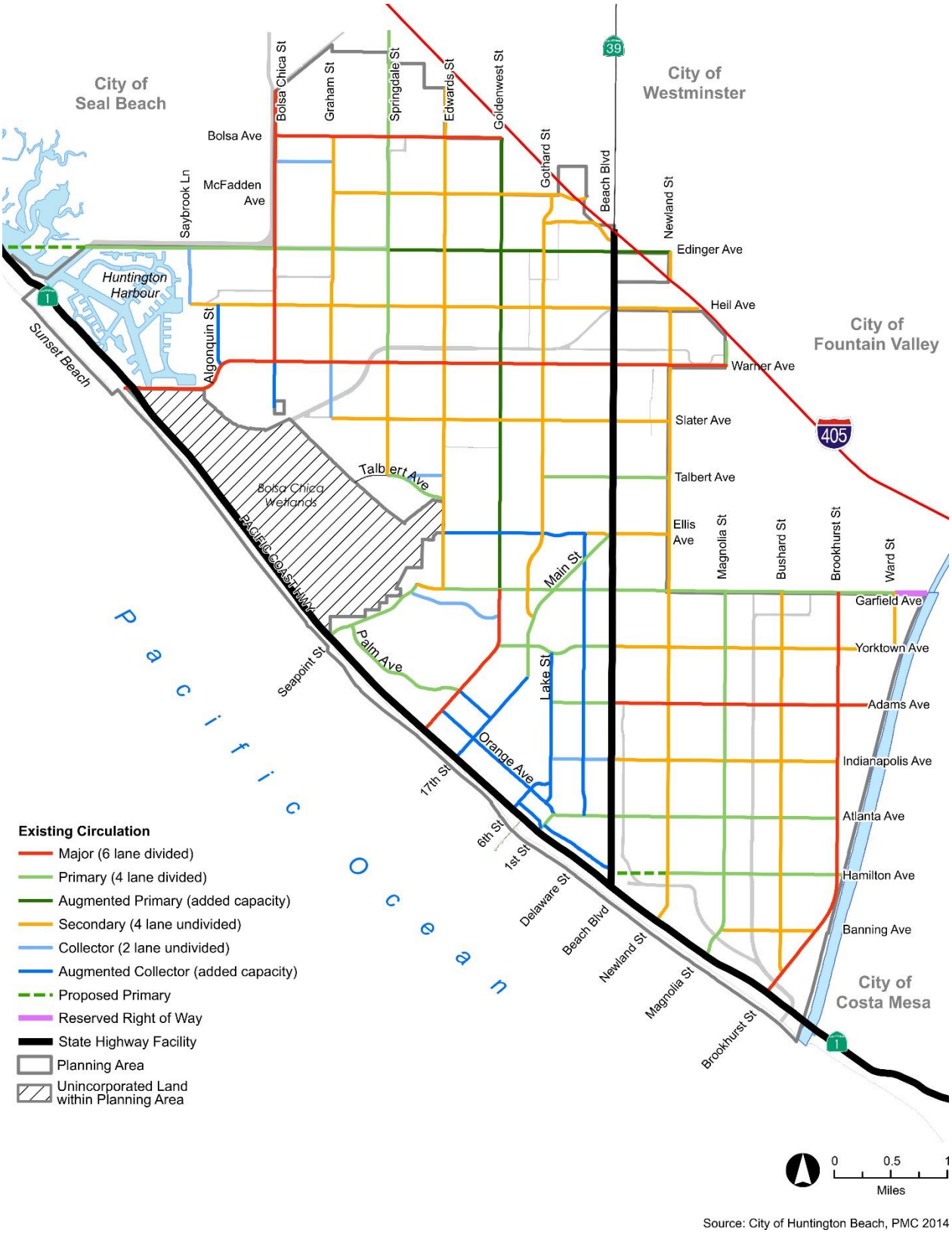
Local Roadway System

Figure 2 illustrates the existing adopted arterial plan within the planning area. Roadways within the planning area generally are laid out on a north-south trending grid system. The grid system becomes slightly modified in the area of Downtown, Huntington Harbour, and Sunset Beach, where roadways trend northeast-southwest.

1 Stantec. 2014. Existing Circulation Conditions Technical Report Traffic Study for the General Plan Update. August 22.
2 Stantec. 2017. General Plan Circulation Update. January.

Source: City of Huntington Beach, PMC 2014

FIGURE 1
REGIONAL TRANSPORTATION NETWORK



Source: City of Huntington Beach, PMC 2014

FIGURE 2
HUNTINGTON BEACH EXISTING ARTERIAL PLAN

While the local roadway system is organized in a hierarchical fashion based on the grid system, it becomes discontinuous due to natural barriers such as the Bolsa Chica wetlands, the Santa Ana River, the Pacific Ocean, and the Seal Beach Naval Weapons Station. This results in indirect and somewhat limited access to certain locations within the planning area, such as the Pacific Coast Highway from the north central portion of the planning area or access across the Santa Ana River from the southeastern portion of the planning area.

The roadways within the planning area are classified according to the hierarchy of arterial roadway classifications defined by the adopted arterial highway plan for the planning area (Figure 2). Each classification is described by size and function, and has specific physical dimensions with respect to the number of travel lanes. Table 1 illustrates the typical roadway characteristics by type of roadway located within the planning area. The planning area's local roadway system ranges in size from two to eight lanes depending on the mobility and access characteristics.

TABLE 1
ROADWAY CHARACTERISTICS BY TYPE

Standard Roadway Class	Mobility and Access Characteristics	Minimum Width (ROW/ Pavement)	Typical Number of Lanes	Maximum Two-Way Daily Traffic Volume (at LOS E)
Smart Street Arterial	High-capacity arterial roadways featuring enhanced traffic signal synchronization, bus bays, intersection improvements, and additional travel lanes. Direct access to adjacent properties is discouraged, except at signalized intersections.	Variable ROW (120 ft to 144 ft)	6 to 8 lanes with raised or painted median and additional turn lanes at intersections	79,000
Principal Arterial	Main thoroughfares providing access to major activity centers and the regional freeway system. Direct access to adjacent properties is discouraged, except at signalized intersections.	120 ft/ 140 ft	8 lanes with raised or painted median and additional turn lanes at intersections	65,000
Major Arterial	Major Arterials complement the principal system by providing a medium-capacity backbone system. Only limited access is provided, typically to commercial properties and not to residential properties.	120 ft/ 104 ft	6 lanes with raised or painted median and additional turn lanes at intersections	50,000
Primary Arterial	Roadways intended to carry traffic between local streets and Principal or Major Arterials. They are similar to Major Arterials, with only limited access to adjacent properties.	100 ft/84 ft	4 lanes undivided, with turn lanes as needed	35,000
Secondary Arterial	Roadways intended to carry traffic between local streets and Principal or Major Arterials. They are similar to Major Arterials, with only limited access to adjacent properties.	80 ft/64 ft	4 lanes undivided, with turn lanes as needed	25,000
Collector Street	Roadways providing property access and linking properties to Secondary, Major, and Principal Arterials.	Varies	2 lanes undivided	12,500

Source: City of Huntington Beach General Plan Circulation Element Update Traffic Study, Austin-Foust Associates, June 2012.

Freeways

Freeways are limited-access, high-speed, divided travelways of six lanes or more. Access is provided at strategically spaced, grade-separated on- and off-ramps. Freeways in the project area are under the jurisdiction of Caltrans District 12. Local development actions that affect Caltrans facilities may require consultation and coordination with Caltrans to determine whether encroachment permits or any other Caltrans approvals are required. I-405 is the only freeway within the planning area and provides regional freeway access to the planning area.

Smart Street Arterial

Smart Street arterials are six- to eight-lane roadways with enhanced capacity compared to a standard arterial street. They are designated by the Orange County Transportation Authority (OCTA) as important regional routes. Smart Street arterials are improved with Measure M2 funds. Such improvements include increased traffic capacity and flow through techniques such as signal synchronization, bus turnouts, intersection improvements, driveway consolidation, and prohibition of on-street parking. Traffic-carrying capacities of Smart Streets can range from 60,000 to 79,000 vehicles per day depending on the number of lanes, degree of access control, peak-period loading, and configurations of major intersections. Beach Boulevard is designated as a Smart Street arterial within the planning area.

Principal Arterial

Principal arterials act as main thoroughfares and provide access to major activity centers and the regional freeway system. They are typically eight-lane roadways featuring raised or striped medians. While the planning area does not currently have any principal arterials, this classification is part of the Orange County Master Plan of Arterial Highways (MPAH) and could be used for future reclassifications, if appropriate. Traffic-carrying capacities of approximately 65,000 vehicles per day can be achieved depending on the degree of access control, peak-period loading, and lane configurations at major intersections.

Major Arterial

Major arterials provide high-capacity roadways that are six lanes wide with either a painted or raised landscaped median. Left-turn restrictions at minor unsignalized driveways enhance vehicle flow. Maximum service volumes of approximately 50,000 vehicles per day can be achieved depending on degree of access control, peak-period loading, and lane configurations at major intersections.

Primary Arterial

Primary arterials are four-lane divided roadways carrying local and regional commuter traffic. Unsignalized minor street and driveway access may be allowed, but signalized access is preferred and left-turn restrictions are typically planned at unsignalized access locations. Maximum service volumes of 35,000 vehicles per day can be achieved depending on degree of access control, peak-period loading, and lane configurations at major intersections.

Secondary Arterial

Secondary arterials are four-lane roadways generally without medians. In some locations, Secondary arterials may include a limited median or be re-striped to provide a left-turn pocket. Maximum service volumes of approximately 25,000 vehicles per day can be achieved depending on degree of access control, intersection operation, and peak-period traffic loading.

Collector Arterial

Collector arterials provide access to local streets from the arterial roadway network and are typically two-lane roadways that sometimes feature painted medians for left-turn movements. Maximum service volumes of approximately 12,500 vehicles per day can be achieved depending on the degree of access control and peak-period traffic loadings.

Augmented Roadways

The “augmented” qualifier for arterial street classifications provides flexibility for customizing sections of roadway while retaining the basic qualities of the classification, such as the minimum number of lanes. Whether for aesthetic or capacity reasons, the intent is to allow these arterials to be compatible with their localized setting, providing a context-sensitive approach to the actual design parameters. Examples include the type and size of medians, the size and use of parkways, and in some cases, auxiliary lanes to facilitate local access.

Local Streets

Local streets are two-lane roadways without medians, and centerline striping is typically not provided. Traffic-carrying capacity is physically similar to a collector arterial; however, the qualitative limit of acceptable traffic volumes in a residential environment is lower (less than 5,000 vehicles per day).

Local Intersection System

Key intersections within the planning area that accommodate significant volumes of traffic and that are essential to the roadway system’s performance are referred to as “principal intersections.” If these intersections fail to operate at adopted performance standards, the entire local roadway system is affected. “Secondary intersections” have a similar but lesser role in achieving the overall system performance. These intersections are critical to the function of the entire local roadway system, and are regularly monitored and given priority for roadway improvements. In addition, “critical intersections” are intersections where the long-range level of service (LOS) is projected to be worse than the ideal threshold, and no feasible improvements are identified to improve LOS to an acceptable level. Traffic congestion typically is described in terms of LOS, with designations ranging from A to F, depending on the levels of congestion at arterial intersections.

The city has designated principal intersections and secondary intersections for use in evaluating the overall performance of the roadway system. These designations allow for intersections that primarily serve local traffic to have a better performance standard than intersections along major thoroughfares. Principal intersections are primarily located at intersections of higher-volume arterials. Principal and Secondary intersections have strategic importance in the existing adopted city arterial plan, and are monitored and given priority when roadway improvements are implemented. Figure 3 and Table 2 identify the existing Principal and Secondary intersections within the planning area.

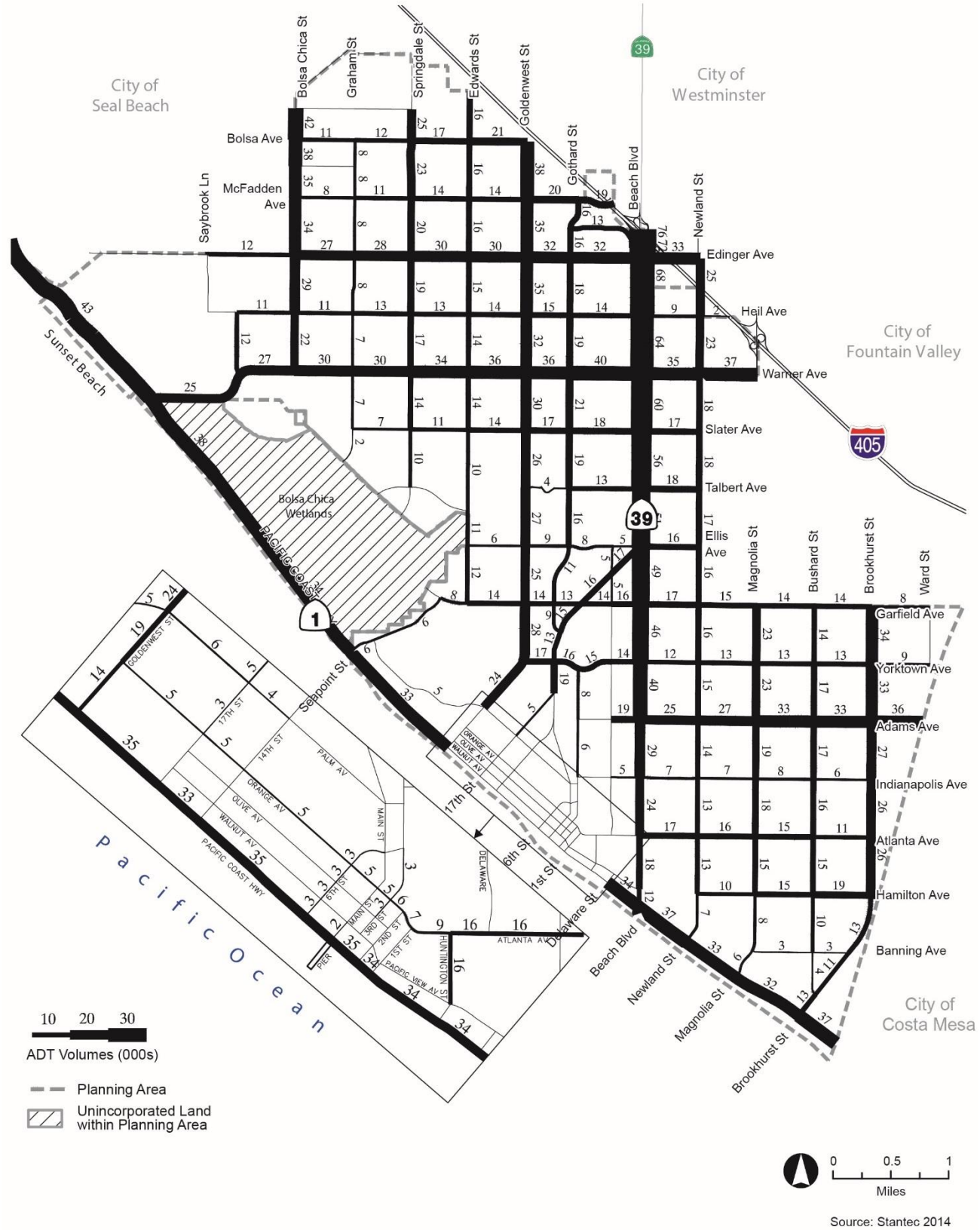
Average Daily Traffic Volumes

Figure 4 illustrates the existing ADT volumes on the arterial highway system, which are from a comprehensive count program conducted in the spring of 2014, and supplemented by other traffic counts conducted in 2012, 2013, and 2016.

While ADT volumes are a useful measure to show general levels of traffic on circulation facilities, they are not used as the basis for determining operating conditions on arterial street systems because ADT volumes do not always reflect operating conditions during peak periods.

Source: Stantec 2014

FIGURE 3
PRINCIPAL AND SECONDARY INTERSECTION



Source: Stantec 2014

FIGURE 4
EXISTING ADT VOLUMES

TABLE 2
INTERSECTION LIST BY DESIGNATION

Principal Intersections	
Bolsa Chica Street & Bolsa Avenue[1]	Beach Boulevard & Garfield Avenue
Graham Street & Bolsa Avenue	Magnolia Street & Garfield Avenue
Springdale Street & Bolsa Avenue	Brookhurst Street & Garfield Avenue
Edwards Street & Bolsa Avenue	Goldenwest Street & Yorktown Avenue
Goldenwest Street & Bolsa Avenue	Main Street & Yorktown Avenue
Springdale Street & McFadden Avenue	Lake Street & Yorktown Avenue
Goldenwest Street & McFadden Avenue	Beach Boulevard & Yorktown Avenue
I-405 SB Ramps & Center Avenue	Brookhurst Street & Yorktown Avenue
Beach Boulevard & Center Avenue	Beach Boulevard & Adams Avenue[1]
Bolsa Chica Street & Edinger Avenue	Newland Street & Adams Avenue
Springdale Street & Edinger Avenue	Magnolia Street & Adams Avenue
Goldenwest Street & Edinger Avenue	Bushard Street & Adams Avenue
Beach Boulevard & Edinger Avenue[1]	Brookhurst Street & Adams Avenue
Newland Street & Edinger Avenue	Beach Boulevard & Indianapolis
Bolsa Chica Street & Heil Avenue	Beach Boulevard & Atlanta Avenue
Beach Boulevard & Heil Avenue	Magnolia Street & Atlanta Avenue
Pacific Coast Highway & Warner Avenue[1]	Brookhurst Street & Atlanta
Algonquin Street & Warner Avenue	Magnolia Street & Hamilton Avenue
Bolsa Chica Street & Warner Avenue[1]	Brookhurst Street & Hamilton Avenue
Graham Street & Warner Avenue	Brookhurst Street & Banning
Springdale Street & Warner Avenue	Seapoint Avenue & Palm Avenue
Edwards Street & Warner Avenue	Goldenwest Street & Palm Avenue
Goldenwest Street & Warner Avenue	Goldenwest Street & Orange Avenue
Gothard Street & Warner Avenue	Seapoint Avenue & Pacific Coast Highway
Beach Boulevard & Warner Avenue[1]	Goldenwest Street & Pacific Coast Highway
Newland Street & Warner Avenue	17th Street & Pacific Coast Highway
Goldenwest Street & Slater Avenue	6th Street & Pacific Coast Highway
Beach Boulevard & Slater Avenue	Main Street & Pacific Coast Highway
Beach Boulevard & Talbert Avenue	1st Street & Pacific Coast Highway
Goldenwest Street & Ellis Avenue	Huntington Street & Pacific Coast Highway
Beach Boulevard & Ellis Avenue/ Main Street & Ellis Avenue	Beach Boulevard & Pacific Coast Highway[1]
Delaware Street & Main Street	Newland Street & Pacific Coast Highway
Edwards Street & Garfield Avenue	Magnolia Street & Pacific Coast Highway
Goldenwest Street & Garfield Avenue	Brookhurst Street & Pacific Coast Highway
Gothard Street & Garfield Avenue	6th Street & Orange Avenue
Main Street & Garfield Avenue	1st Street & Atlanta Avenue/Orange

TABLE 2
INTERSECTION LIST BY DESIGNATION

Secondary Intersections	
Graham Street & McFadden Avenue	Delaware Street & Ellis Avenue
Edwards Street & McFadden Avenue	Newland Street & Ellis Avenue
Gothard Street & McFadden Avenue	Newland Street & Garfield Avenue
Gothard Street & Center Avenue	Bushard Street & Garfield Avenue
Saybrook Lane & Edinger Avenue	Newland Street & Yorktown Avenue
Graham Street & Edinger Avenue	Magnolia Street & Yorktown Avenue
Edwards Street & Edinger Avenue	Bushard Street & Yorktown Avenue
Gothard Street & Edinger Avenue	Newland Street & Indianapolis Avenue
Graham Street & Heil Avenue	Magnolia Street & Indianapolis Avenue
Springdale Street & Heil Avenue	Bushard Street & Indianapolis Avenue
Edwards Street & Heil Avenue	Huntington Street & Atlanta Avenue
Goldenwest Street & Heil Avenue	Newland Street & Atlanta Avenue
Gothard Street & Heil Avenue	Bushard Street & Atlanta Avenue
Newland Street & Heil Avenue	Newland Street & Hamilton Avenue
Graham Street & Slater Avenue	Bushard Street & Hamilton Avenue
Springdale Street & Slater Avenue	Magnolia Street & Banning Avenue
Edwards Street & Slater Avenue	Bushard Street & Banning Avenue
Gothard Street & Slater Avenue	Main Street & 17th Street
Newland Street & Slater Avenue	17th Street & Palm Avenue
Gothard Street & Talbert Avenue	3rd Street & Orange Avenue
Newland Street & Talbert Avenue	Pacific Coast Highway & Park Avenue
Edwards Street & Ellis Avenue	Pacific Coast Highway & Coral Cay Lane
Gothard Street & Ellis Avenue	

(1) Congestion Management Program (CMP) intersection
Source: City of Huntington Beach General Plan Circulation Element Update Traffic Study, Austin-Foust Associates, June 2012

Performance Criteria

The city uses performance criteria to evaluate the arterial roadway system. These criteria include "performance standards" that represent ideal operating conditions for the roadway system. The city recognizes intersection performance as the primary criterion for evaluating the roadway system. Intersection performance also is used as a performance measure by Caltrans and by all local jurisdictions in Orange County, since it is a requirement of both the countywide Growth Management Plan (GMP) and Congestion Management Plan (CMP).

The performance criteria are based on two primary measures: (1) volume (V); and (2) capacity (C). Volume is either a traffic count (in the case of existing volumes) or a forecast for a future point in time, while capacity establishes the vehicle-carrying ability of a roadway. The ratio between volume and capacity equates to a V/C ratio, which determines the corresponding LOS designation.

Performance standards for intersections involve a policy component, which is the desired LOS, and a technical component, which involves the assumptions and procedures used to determine the LOS. The LOS standards are set by the city, except in the case of intersections under the Orange County CMP. The lowest acceptable performance standard for CMP intersections is LOS E. The following seven intersections/interchanges in the planning area are included in the CMP (see Figure 3):

- Beach Boulevard/I-405 SB Ramps/Edinger Avenue
- Beach Boulevard/Adams Avenue
- Beach Boulevard/ Pacific Coast Highway
- Beach Boulevard/Warner Avenue
- Bolsa Chica Street/Bolsa Avenue
- Bolsa Chica Street/Warner Avenue
- Pacific Coast Highway/Warner Avenue

Evaluation of volumes, capacities, and levels of service on the city street system are based on peak-hour intersection data since intersections are the primary limiting factor affecting traffic flow. The LOS standards are as follows:

- Principal Intersections—LOS D
- Secondary Intersections—LOS C
- Critical Intersections—LOS E

Intersection Capacity Utilization Methodology

For signalized intersections, the intersection capacity utilization (ICU) methodology is applied using peak-hour volumes and the geometric configuration of the intersection. The ICU methodology is a measure of the volume-to-capacity ratio for an intersection and is typically used to determine the peak-hour level of service for a given set of intersection values. This methodology sums the V/C ratios for the critical movements of an intersection and results in a total V/C for an intersection, which correlates to an LOS for the intersection. Therefore, the LOS methodology for the local roadway system is based on intersection operating conditions during the AM and PM peak hours during an average weekday.

Delay Methodology

For designated Caltrans intersections, the delay methodology as outlined in the *Highway Capacity Manual 2010*[3] also is used to determine peak-hour LOS. LOS is determined in the Delay Methodology based on "stopped delay" as calculated using the HCM signalized intersection methodology. For example, LOS D, which is the performance standard for Caltrans intersections, is calculated as a stopped delay for 35.01 to 55.00 seconds.

3 Transportation Research Board. 2010. Highway Capacity Manual, 5th edition. Washington, D.C.: TRB.

Level of Service Designations

Traffic congestion typically is described in terms of LOS. LOS designations range from A to F, depending on the levels of congestion at arterial intersections. Table 3 summarizes the LOS designations based on the HCM 2010 and describes the driving experience at arterial intersections operating at different LOS.

TABLE 3
LOS DESIGNATIONS FOR ARTERIAL INTERSECTIONS

LOS	Description	Delay Per Vehicle (in seconds)	Volume/ Capacity (ICU value)
A	LOS A describes operations with low control delay, up to 10 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.	< 10.0	< 0.61
B	LOS B describes operations with control delay greater than 10 seconds and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than under LOS A, causing higher levels of delay.	10.1 – 20.0	0.61 – 0.70
C	LOS C describes operations with control delay greater than 20 seconds and up to 35 seconds per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. Many vehicles stop at this level, though many still pass through the intersection without stopping.	20.1 – 35.0	0.71 – 0.80
D	LOS D describes operations with control delay greater than 35 seconds and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.1 – 55.0	0.81 – 0.90
E	LOS E describes operations with control delay greater than 55 seconds and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent.	55.1 – 80.0	0.91 – 1.00
F	LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered unacceptable to most drivers, often occurs with oversaturation; that is, when arrival flow rates exceed the capacity of lane groups. It also may occur at high V/C ratios with many individual cycle failures. Poor progression and long cycle lengths also may contribute significantly to high delay levels.	>80.0	> 1.00

Source: Stantec 2017; Highway Capacity Manual 2010, Transportation Research Board, National Research Council.

Adopted City Standards

The city designates intersections in the planning area as Principal and Secondary intersections. An additional category of "Critical" intersection also is used, which includes intersections where the long-range LOS is projected to be worse than the desired threshold and no feasible improvements are available to improve LOS to an acceptable level. No intersections within the planning area have been designated as critical at this time.

The city has adopted an acceptable threshold of LOS D (or ICU less than 0.91) for principal intersections and LOS C (or ICU less than 0.81) for secondary intersections. Table 4 lists the existing ICUs and corresponding LOS values. For the intersection of Main Street and Pacific Coast Highway, a pedestrian

ICU delay is added to the AM and PM ICU values to estimate the additional signal time provided at this intersection. The resulting ICU and LOS show that this intersection operates at a satisfactory LOS. On occasion, the high number of pedestrians will cause this intersection to experience longer-than-average delays. However, this does not occur often enough for this intersection to be identified as a location with an operational delay.

TABLE 4
EXISTING (2014) ICU AND DELAY SUMMARY

Intersection	Designation	AM Peak Hour ICU	AM Peak Hour LOS	PM Peak Hour ICU	PM Peak Hour LOS
City Intersections (ICU Analysis)					
Bolsa Chica Street & Bolsa Avenue[1]	Principal	0.50	A	0.52	A
Graham Street & Bolsa Avenue	Principal	0.32	A	0.37	A
Springdale Street & Bolsa Avenue	Principal	0.50	A	0.61	B
Edwards Street & Bolsa Avenue	Principal	0.52	A	0.55	A
Goldenwest Street & Bolsa Avenue	Principal	0.65	B	0.73	C
Graham Street & McFadden Avenue	Secondary	0.36	A	0.42	A
Springdale Street & McFadden Avenue	Principal	0.55	A	0.56	A
Edwards Street & McFadden Avenue	Secondary	0.51	A	0.49	A
Goldenwest Street & McFadden Avenue	Principal	0.64	B	0.69	B
Gothard Street & McFadden Avenue	Secondary	0.45	A	0.48	A
Gothard Street & Center Avenue	Secondary	0.27	A	0.58	A
I-405 SB Ramps & Center Avenue	Principal	0.43	A	0.67	B
Beach Boulevard & Center Avenue	Principal	0.59	A	0.67	B
Saybrook Lane & Edinger Avenue	Secondary	0.34	A	0.28	A
Bolsa Chica Street & Edinger Avenue	Principal	0.73	C	0.63	B
Graham Street & Edinger Avenue	Secondary	0.45	A	0.41	A
Springdale Street & Edinger Avenue	Principal	0.50	A	0.54	A
Edwards Street & Edinger Avenue	Secondary	0.53	A	0.57	A
Goldenwest Street & Edinger Avenue	Principal	0.56	A	0.62	B
Gothard Street & Edinger Avenue	Secondary	0.42	A	0.57	A
Beach Boulevard & Edinger Avenue[1]	Principal	0.65	B	0.78	C
Newland Street & Edinger Avenue	Principal	0.55	A	0.58	A
Bolsa Chica Street & Heil Avenue	Principal	0.56	A	0.56	A
Graham Street & Heil Avenue	Secondary	0.41	A	0.43	A
Springdale Street & Heil Avenue	Secondary	0.32	A	0.42	A
Edwards Street & Heil Avenue	Secondary	0.51	A	0.44	A
Goldenwest Street & Heil Avenue	Secondary	0.50	A	0.52	A
Gothard Street & Heil Avenue	Secondary	0.34	A	0.49	A
Beach Boulevard & Heil Avenue	Principal	0.48	A	0.71	C
Newland Street & Heil Avenue	Secondary	0.48	A	0.47	A
Pacific Coast Highway & Warner Avenue[1]	Principal	0.74	C	0.73	C
Algonquin Street & Warner Avenue	Principal	0.51	A	0.55	A
Bolsa Chica Street & Warner Avenue[1]	Principal	0.56	A	0.53	A
Graham Street & Warner Avenue	Principal	0.51	A	0.52	A
Springdale Street & Warner Avenue	Principal	0.60	A	0.64	B
Edwards Street & Warner Avenue	Principal	0.61	B	0.54	A
Goldenwest Street & Warner Avenue	Principal	0.62	B	0.64	B
Gothard Street & Warner Avenue	Principal	0.63	B	0.68	B
Beach Boulevard & Warner Avenue[1]	Principal	0.67	B	0.73	C

TABLE 4
EXISTING (2014) ICU AND DELAY SUMMARY

Intersection	Designation	AM Peak Hour		PM Peak Hour	
		ICU	LOS	ICU	LOS
Newland Street & Warner Avenue	Principal	0.75	C	0.70	B
Graham Street & Slater Avenue	Secondary	0.35	A	0.30	A
Springdale Street & Slater Avenue	Secondary	0.46	A	0.43	A
Edwards Street & Slater Avenue	Secondary	0.49	A	0.38	A
Goldenwest Street & Slater Avenue	Principal	0.69	B	0.65	B
Gothard Street & Slater Avenue	Secondary	0.52	A	0.59	A
Beach Boulevard & Slater Avenue	Principal	0.70	B	0.82	D
Newland Street & Slater Avenue	Secondary	0.58	A	0.60	A
Gothard Street & Talbert Avenue	Secondary	0.50	A	0.51	A
Beach Boulevard & Talbert Avenue	Principal	0.62	B	0.74	C
Newland Street & Talbert Avenue	Secondary	0.49	A	0.59	A
Edwards Street & Ellis Avenue	Secondary	0.35	A	0.36	A
Goldenwest Street & Ellis Avenue	Principal	0.40	A	0.45	A
Gothard Street & Ellis Avenue	Secondary	0.33	A	0.40	A
Delaware Street & Ellis Avenue	Secondary	0.41	A	0.42	A
Beach Boulevard & Ellis Avenue	Principal	0.48	A	0.61	B
Newland Street & Ellis Avenue	Secondary	0.48	A	0.52	A
Main Street & Ellis Avenue	Principal	0.26	A	0.36	A
Delaware Street & Main Street	Principal	0.26	A	0.31	A
Edwards Street & Garfield Avenue	Principal	0.46	A	0.48	A
Goldenwest Street & Garfield Avenue	Principal	0.42	A	0.38	A
Gothard Street & Garfield Avenue	Principal	0.34	A	0.36	A
Main Street & Garfield Avenue	Principal	0.29	A	0.28	A
Beach Boulevard & Garfield Avenue	Principal	0.57	A	0.68	B
Newland Street & Garfield Avenue	Secondary	0.41	A	0.45	A
Magnolia Street & Garfield Avenue	Principal	0.56	A	0.54	A
Bushard Street & Garfield Avenue	Secondary	0.36	A	0.41	A
Brookhurst Street & Garfield Avenue	Principal	0.48	A	0.58	A
Goldenwest Street & Yorktown Avenue	Principal	0.45	A	0.51	A
Main Street & Yorktown Avenue	Principal	0.47	A	0.52	A
Lake Street & Yorktown Avenue	Principal	0.48	A	0.42	A
Beach Boulevard & Yorktown Avenue	Principal	0.56	A	0.69	B
Newland Street & Yorktown Avenue	Secondary	0.47	A	0.58	A
Magnolia Street & Yorktown Avenue	Secondary	0.51	A	0.45	A
Bushard Street & Yorktown Avenue	Secondary	0.47	A	0.46	A
Brookhurst Street & Yorktown Avenue	Principal	0.47	A	0.57	A
Beach Boulevard & Adams Avenue[(1)]	Principal	0.52	A	0.62	B
Newland Street & Adams Avenue	Principal	0.46	A	0.44	A
Magnolia Street & Adams Avenue	Principal	0.67	B	0.60	A
Bushard Street & Adams Avenue	Principal	0.57	A	0.50	A
Brookhurst Street & Adams Avenue	Principal	0.66	B	0.64	B
Beach Boulevard & Indianapolis Avenue	Principal	0.43	A	0.46	A
Newland Street & Indianapolis Avenue	Secondary	0.51	A	0.44	A
Magnolia Street & Indianapolis Avenue	Secondary	0.44	A	0.42	A
Bushard Street & Indianapolis Avenue	Secondary	0.42	A	0.34	A

TABLE 4
EXISTING (2014) ICU AND DELAY SUMMARY

Intersection	Designation	AM Peak Hour		PM Peak Hour	
		ICU	LOS	ICU	LOS
Huntington Street & Atlanta Avenue	Secondary	0.30	A	0.35	A
Beach Boulevard & Atlanta Avenue	Principal	0.45	A	0.63	B
Newland Street & Atlanta Avenue	Secondary	0.38	A	0.42	A
Magnolia Street & Atlanta Avenue	Principal	0.53	A	0.49	A
Bushard Street & Atlanta Avenue	Secondary	0.46	A	0.38	A
Brookhurst Street & Atlanta Avenue	Principal	0.38	A	0.42	A
Newland Street & Hamilton Avenue	Secondary	0.42	A	0.53	A
Magnolia Street & Hamilton Avenue	Principal	0.49	A	0.55	A
Bushard Street & Hamilton Avenue	Secondary	0.45	A	0.45	A
Brookhurst Street & Hamilton Avenue	Principal	0.67	B	0.67	B
Magnolia Street & Banning Avenue	Secondary	0.19	A	0.19	A
Bushard Street & Banning Avenue	Secondary	0.22	A	0.17	A
Brookhurst Street & Banning Avenue	Principal	0.23	A	0.20	A
Seapoint Avenue & Palm Avenue	Principal	0.19	A	0.17	A
Goldenwest Street & Palm Avenue	Principal	0.37	A	0.34	A
Goldenwest Street & Orange Avenue	Principal	0.32	A	0.31	A
Seapoint Avenue & Pacific Coast Highway	Principal	0.63	B	0.62	B
Goldenwest Street & Pacific Coast Highway	Principal	0.64	B	0.65	B
17th Street & Pacific Coast Highway	Principal	0.65	B	0.58	A
6th Street & Pacific Coast Highway	Principal	0.43	A	0.41	A
Main Street & Pacific Coast Highway[2]	Principal	0.68	B	0.61	B
1st Street & Pacific Coast Highway	Principal	0.40	A	0.43	A
Huntington Street & Pacific Coast Highway	Principal	0.59	A	0.51	A
Beach Boulevard & Pacific Coast Highway[1]	Principal	0.54	A	0.62	B
Newland Street & Pacific Coast Highway	Principal	0.59	A	0.56	A
Magnolia Street & Pacific Coast Highway	Principal	0.56	A	0.57	A
Brookhurst Street & Pacific Coast Highway	Principal	0.64	B	0.66	B
Main Street & 17th Street	Secondary	0.43	A	0.32	A
17th Street & Palm Avenue	Secondary	0.48	A	0.29	A
6th Street & Orange Avenue	Principal	0.19	A	0.22	A
3rd Street & Orange Avenue	Secondary	0.26	A	0.43	A
1st & Atlanta Avenue/Orange Avenue	Principal	0.33	A	0.37	A
Pacific Coast Highway & Park Avenue	Secondary	0.63	B	0.63	B
Pacific Coast Highway & Coral Cay Lane	Secondary	0.69	B	0.65	B
Caltrans Intersections (HCM Analysis)					
Beach Boulevard (SR-39) Intersections					
I-405 SB & Center Avenue	Principal	0.26	C	0.29	C
Beach Boulevard & Center Avenue	Principal	0.11	B	0.16	B
Beach Boulevard & Edinger Avenue[1]	Principal	**0.63**	**E**	**0.72**	**E**
Beach Boulevard & Heil Avenue	Principal	0.11	B	0.12	B
Beach Boulevard & Warner Avenue[1]	Principal	0.31	C	0.33	C
Beach Boulevard & Slater Avenue	Principal	0.27	C	0.39	D
Beach Boulevard & Talbert Avenue	Principal	0.24	C	0.30	C
Beach Boulevard & Ellis Avenue	Principal	0.31	C	0.29	C
Beach Boulevard & Garfield Avenue	Principal	0.24	C	0.29	C

TABLE 4
EXISTING (2014) ICU AND DELAY SUMMARY

Intersection	Designation	AM Peak Hour		PM Peak Hour	
		ICU	LOS	ICU	LOS
Beach Boulevard & Yorktown Avenue	Principal	0.21	C	0.27	C
Beach Boulevard & Adams Avenue(1)	Principal	0.21	C	0.29	C
Beach Boulevard & Indianapolis Avenue	Principal	0.11	B	0.11	B
Beach Boulevard & Atlanta Avenue	Principal	0.20	C	0.27	C
Pacific Coast Highway (SR-1) Intersections					
Pacific Coast Highway & Warner(1)	Principal	0.27	C	0.25	C
Seapoint Avenue & Pacific Coast Highway	Principal	0.09	A	0.11	B
Goldenwest & Pacific Coast Highway	Principal	0.10	B	0.11	B
17th Street & Pacific Coast Highway	Principal	0.70	A	0.70	A
6th Street & Pacific Coast Highway	Principal	0.60	A	0.70	A
Main Street & Pacific Coast Highway	Principal	0.10	B	0.70	A
1st Street & Pacific Coast Highway	Principal	0.11	B	0.11	B
Huntington Street & Pacific Coast Highway	Principal	0.90	A	0.10	A
Beach Boulevard & Pacific Coast Highway(1)	Principal	0.11	B	0.16	B
Newland Street & Pacific Coast Highway	Principal	0.80	A	0.70	A
Magnolia Avenue & Pacific Coast Highway	Principal	0.12	B	0.11	B
Brookhurst Street & Pacific Coast Highway	Principal	0.19	B	0.19	B

Notes and Acronyms:
Bold and shading denotes intersections that exceed the city's performance standard: LOS D for Principal Intersections, LOS C for Secondary Intersections
SB = South Bound
LOS = Level of Service
ICU = intersection capacity utilization
HCM = Highway Capacity Manual
(1) Denotes CMP intersection where performance standard is LOS E.
(2) A pedestrian delay is included in the ICUs at this location.
Source: Data compiled by Stantec, 2014.

Level of Service Ranges

LOS	ICU	Delay (in seconds)
A	0.00 - 0.60	0 – 10.00
B	0.61 - 0.70	10.01 – 20.00
C	0.71 - 0.80	20.01 – 35.00
D	0.81 - 0.90	35.01 – 55.00
E	0.91 – 1.00	55.01 – 80.00
F	Above 1.00	80.01 and up

Vehicle Miles Traveled and Vehicle Hours Traveled

VMT and vehicle hours traveled (VHT) are useful data for supporting GHG emission analysis as well as providing data that may be useful in tandem with future performance criteria alternatives to LOS. Table 5 summarizes the 2014 VMT and VHT information for an average weekday for internal trips (both trip ends within the planning area), internal/external trips (only one trip end within the planning area), and pass-through trips (neither trip end within the planning area). Residents, commuters, and the city have limited ability to influence pass-through trips, which contribute a substantial amount to VMT and VHT totals.

TABLE 5
2014 VMT SUMMARY (AVERAGE WEEKDAY)

Scenario	Internal Trips[1]	Internal/External Trips[2]	Pass-Through Trips[3]
2014 VMT Summary			
AM Peak Hour	45,017	610,120	27,357
PM Peak Hour	61,450	661,636	26,279
Daily	730,945	6,992,901	250,833
Annual	252,731,575	2,417,865,432	86,728,127
2014 VHT Summary			
AM Peak Hour	1,455	20,093	523
PM Peak Hour	2,081	22,260	506
Daily	22,614	202,054	4,788

[1] *Both trip ends (origin and destination) are within the city limits*
[2] *One end of the trip (origin or destination) lies within the city limits*
[3] *Neither end of the trip (origin nor destination) lies within the city limits.*
Source: Data compiled by Stantec, 2014 using the Huntington Beach traffic model.

Transit Network

The planning area has both fixed-route transit services and demand-responsive transit services to meet the needs of riders. Fixed-route bus services include transit lines that are operated by the OCTA, while demand-responsive services have defined service areas but do not operate based on fixed schedules or routes. OCTA currently operates 16 bus routes through the planning area, with the number of routes and lines being adjusted based on ridership patterns. Figure 5 illustrates the existing bus transit routes.

Both the city and OCTA operate demand-responsive services. OCTA runs the ACCESS program, while both the city and OCTA operate the Senior Services Mobility Program. Two park-and-ride facilities are located within the planning area, one at the Goldenwest Transportation Center near the intersection of Gothard Street and Center Avenue, and a second at The Boeing Corporation campus near the intersection of Bolsa Chica Street and Bolsa Avenue.

The regional transit connections from Huntington Beach to locations outside the planning area are made by personal automobiles. Several transit routes provide service to local locations, including Westminster Mall, Golden West College, Bella Terra Mall, and the Golden West Transportation Center with a park-and-ride lot. A Union Pacific Railroad right-of-way runs east of Gothard Street and extends from the northern limits of the planning area to its terminus just north of Garfield Avenue. The Union Pacific Railroad provides freight service to the industrial corridor located along Gothard Street.

FIGURE 5
EXISTING TRANSIT ROUTES

Bicycle Network

The first city Bike Master Plan was approved on November 18, 2014, and identifies prioritized bicycle infrastructure projects. The Bike Master Plan also provides for improved bicyclist and motorist safety education and encouragement programs. Development of the Bike Master Plan involved significant field work, community outreach, and detailed documentation of the existing and future opportunities and constraints. The planning area has an extensive system of bikeways to accommodate the demand for cycling facilities and to provide an alternative to using cars for local travel. Figure 6 illustrates the existing bicycle facilities within the planning area, and the following are brief descriptions of each bikeway class:

- **Class 1: Multi-use Pathways –** These pathways provide the greatest degree of separation from motorized traffic. These facilities are for the exclusive use of pedestrians and cyclists and automobile traffic is prohibited. As such, Multi-Use Pathways are the safest bicycle facility and often provide for the best experience for cyclists.

- **Class 2: Bike Lanes –** Bike lanes are on-street right-of-way reserved for cyclists. The bike lane is marked with striping, and cyclists travel in the same direction as motorized vehicles.

- **Class 3: Bike Routes –** These provide for lane sharing between automobiles and bicycles and are used to indicate the preferred route for cyclists between destinations or bike lanes. Their presence is often indicated with a "sharrow," which also provides guidance for cyclist alignment within the lane. These facilities should only be provided when traffic speed and volume allows for relatively safe sharing of street space.

The planning area has 8.8 miles of Class 1 bicycle paths, 77.8 miles of Class 2 on-street bike lanes, and 0.5 miles of Class 3 bicycle routes. Table 6 summarizes the existing bike facilities in the planning area.

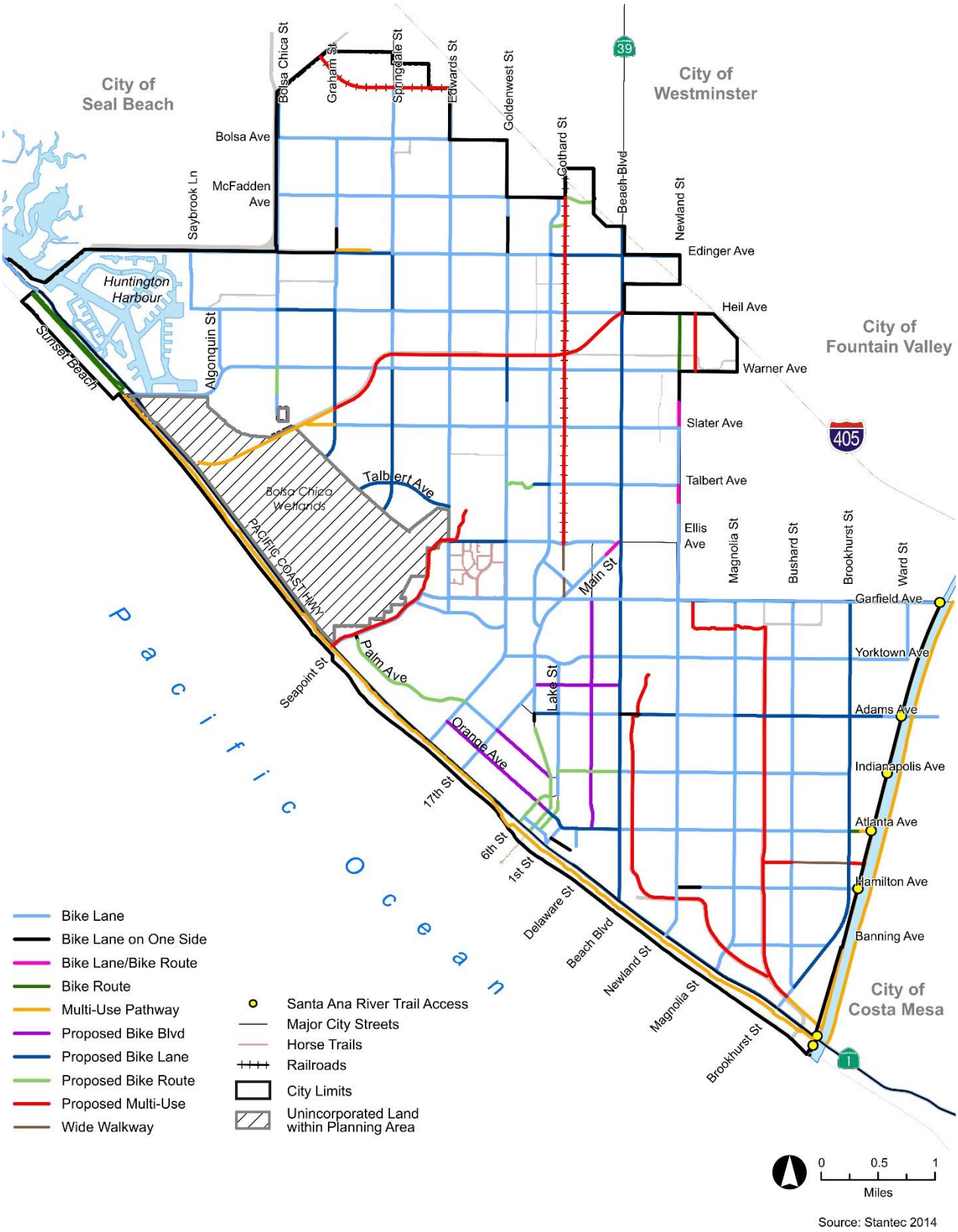
TABLE 6
SUMMARY OF EXISTING BICYCLE FACILITIES

Bicycle Facility Type	Miles	Notes
Existing Class 1 Multi-Use Pathways		
Huntington Beach Multi-Use Beach Path	8.4	Between southern city limit and Warner Avenue
Santa Ana River Channel (West)	0.4	2,200-foot section between Brookhurst Street and Santa Ana River Trail; follows Santa Ana River just outside city limits
Total	8.8	
Existing Class 2 Bike Lanes		
Adams Avenue	1.2	
Algonquin Street	0.5	
Atlanta Avenue	2.1	Westbound only between Brookhurst Street and Surge Lane
Banning Avenue	0.8	
Bolsa Avenue	1.5	
Bolsa Chica Street	2.2	
Brookhurst Street	0.2	
Bushard Street	3.4	
Edinger Avenue	3.5	Westbound only between Bolsa Chica and Graham Streets
Edwards Street	4.4	
Ellis Avenue	1.0	
First Street	0.2	
Garfield Avenue	4.5	
Goldenwest Street	4.6	Southbound only between Bluebonnet Drive and Edinger Avenue
Gothard Street	3.8	

TABLE 6
SUMMARY OF EXISTING BICYCLE FACILITIES

Bicycle Facility Type	Miles	Notes
Graham Street	1.5	Northbound only between Edinger Avenue and Cross Drive
Hamilton Avenue	1.7	Westbound only between Newland Street and Seaforth Lane
Heil Avenue	3.8	
Huntington Street	0.2	
Indianapolis Avenue	2.0	
Lake Street	1.2	
Magnolia Street	3.3	
Main Street	1.8	
McFadden Avenue	2.5	
Newland Street	4.6	
Pacific Coast Highway	1.7	Northbound only between Huntington Street and start of parking lanes
Palm Avenue	0.5	Northbound only between Seapoint Street and Camelback Drive
Peninsula Lane	0.1	
Promenade Parkway	0.4	
Saybrook Lane	0.5	
Seapoint Street	0.9	
Seventeenth Street	1.0	
Skylab Road	0.0	
Slater Avenue	3.0	
Springdale Street	1.9	
Summit Drive	0.8	
Sunset Beach	0.2	
Talbert Avenue	1.1	
Ward Street	0.5	
Warner Avenue	4.9	
Yorktown Avenue	3.5	
Total	77.8	
Existing Class 3 Bike Routes		
Newland Street	0.5	Within city limit
Total	0.5	
Existing Bike Lane/Bike Route Combination		
Heil Avenue	0.5	Westbound lanes between Bolsa Chica and Graham Streets
Main Street	0.1	Southbound lanes between Ellis Avenue and Florida Street
Newland Street	0.4	Northbound lanes between Slater Avenue/Friesland Drive and Talbert Avenue/Springhurst Drive
Total	1.0	
Existing Wide Walkways		
Langenbeck Park Path	0.6	Wide walkway through Langenbeck Park/Edison right-of-way
Union Pacific ROW	0.3	Gated and currently not open for general public
Edison Greenway	0.7	Walkway between Bushard and Brookhurst Streets
Total	1.6	

Source: Bicycle Master Plan, City of Huntington Beach, KTU+A, May 2013



Source: Stantec 2014

FIGURE 6
EXISTING BIKEWAYS

Rail Service

For passenger service, Amtrak stations are located in Santa Ana and Anaheim, each approximately 20 minutes away from the planning area. The Union Pacific Railroad runs east of Gothard Street and extends from the northern planning area limits to its terminus just north of Garfield Avenue. It provides freight service to the industrial corridor located along Gothard Street as well as direct line shipment to the Midwest and Northwest.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

No federal plans, policies, or laws related to transportation and traffic apply to the planning area.

State Plans, Policies, Regulations, and Laws

Statewide Transportation Improvement Program

The California 2010 Statewide Transportation Improvement Program (STIP), approved by the U.S. Department of Transportation in October 2009, is a multi-year, statewide, intermodal program of transportation projects that is consistent with the statewide transportation plan and planning processes, metropolitan plans, and CFR Title 23. The STIP is prepared by Caltrans in cooperation with the metropolitan planning organizations and the regional transportation planning agencies. The STIP contains all capital and non-capital transportation projects or identified phases of transportation projects for funding under the Federal Transit Act and CFR Title 23, including federally funded projects.

Congestion Management Program

State Proposition 111, passed by voters in 1990, established a requirement that urbanized areas prepare and regularly update a CMP. The purpose of a CMP is to monitor the performance of the region's transportation system, develop programs to address near-term and long-term congestion, and better integrate transportation and land use planning. A CMP has been prepared for Orange County.

Regional and Local Plans, Policies, Regulations, and Laws

Southern California Association of Governments 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy

The 2012–2035 RTP/SCS provides a comprehensive outline of the regional vision for transportation investment in Southern California through 2035. The RTP was adopted in 2012 and is updated every four years to address regional transportation needs. Only transportation projects included in the RTP become eligible for federal and state funding and federal environmental clearance. To fulfill its commitments as a metropolitan planning organization under SB 375, SCAG adopted an SCS as part of the 2012–2035 RTP designed to reduce GHG emissions from passenger vehicles by 8 percent per capita by 2020, and by 13 percent per capita by 2035 compared to 2005, consistent with regional targets set by the California Air Resources Board. The SCS focuses the majority of new regional housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development.

One aspect of SB 375 that is unique to the SCAG region is that sub-regions within SCAG have the option of creating their own sub-regional SCS. Of SCAG's 15 sub-regions, two accepted this option, including OCCOG. The underlying land use, socioeconomic, and transportation data provided in the OCCOG sub-regional SCS were incorporated into the regional SCS. In Huntington Beach, the Beach Boulevard and Edinger Avenue transportation corridors are identified as SCS high-quality transit areas in 2035. The SCS identifies several GHG emissions reduction actions and strategies for the state, SCAG, and local jurisdictions. The SCS recommends that local jurisdictions: (1) update zoning codes to accelerate adoption of SCS land use strategies; (2) prioritize transportation investments to support compact infill development that includes a mix of land uses and housing options; (3) develop infrastructure plans and educational

programs that promote active transportation options; (4) emphasize active transportation projects as part of complying with the Complete Streets Act (AB 1358); and (5) increase the efficiency of existing transportation systems[4].

South Coast Air Quality Management District

SCAQMD adopted its latest AQMP in 2012 The 2012 AQMP mandates a variety of measures to reduce traffic congestion and improve air quality. The measures are implemented at the federal, state, and regional level. At the regional level, SCAG assists subregional and local governments in playing a role in forming the air quality portion of transportation planning. In addition, local governments serve an important role in developing and implementing the AQMP's transportation control measures.[5]

Orange County Transportation Authority Long Range Transportation Plan

The Long Range Transportation Plan (LRTP) was adopted in 2010 as a blueprint for Orange County's transportation future through 2035 for all transportation modes, including freeways, roadways, buses, and rail transit. The LRTP is the vehicle by which OCTA plans for the county's transportation, in response to changing trends in population and workforce, where residents live, how they commute, the dollars available to carry out transportation solutions, environmental priorities, and the policies and programs that foster mobility. The LRTP incorporates Measure M, the Orange County MPAH, Orange County CMP, and the Orange County Commuter Bikeways Strategic Plan.

Measure M/M2

In 1990, Orange County voters approved Measure M, which authorized a half-cent retail sales tax increase for a period of 20 years effective April 1, 1991. A portion of the revenue generated by Measure M is returned to local jurisdictions for use on local and regional transportation improvements and maintenance projects. To qualify for this revenue, each jurisdiction must comply with the Countywide Traffic Improvement and Growth Management Program. Specifically, to receive allocation of Measure M funds, Huntington Beach must submit a statement of compliance with the growth management components of the program. Requirements include the adoption of a traffic circulation plan consistent with the Orange County MPAH, adoption of a Growth Management Element within the General Plan, adoption and adequate funding of a local transportation fee program, and adoption of a seven-year capital improvement program that includes all transportation projects funded either partially or fully by Measure M.

The current Measure M expired in 2011 and a November 2006 ballot measure renewed the program (now known as M2) through 2041. M2 extends the requirements of Measure M, without increasing sales taxes, to fund freeway, street, transit, and environmental projects identified in a Transportation Investment Plan considered by voters in tandem with the renewal measure. The M2 renewal does not specify compliance with or adoption of a Growth Management Plan. Key M2 projects benefitting Huntington Beach include widening of freeway lanes and improvements to interchanges and overcrossings of I-405, transit extensions to Metrolink, and numerous roadway and intersection improvements.

Orange County Congestion Management Program

OCTA is the designated Congestion Management Agency for Orange County and is responsible for the conformance monitoring and biennial updating of the County's CMP. The CMP includes an established Highway System, which consists of principle local arterials, Super Streets, intersections, and State Highways.

The following intersections/interchanges in the planning area are included in the CMP:

- Beach Boulevard/I-405 SB Ramps/Edinger Avenue

4 Southern California Association of Governments (SCAG). 2012. 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy: Towards a Sustainable Future. April.
5 South Coast Air Quality Management District (SCAQMD). 2013. Final 2012 Air Quality Management Plan. February 2013. Accessed July 31, 2014 at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-2012-air-quality-management-plan

- Beach Boulevard/Adams Avenue
- Beach Boulevard/Pacific Coast Highway
- Beach Boulevard/Warner Avenue
- Bolsa Chica Street/Bolsa Avenue
- Bolsa Chica Street/Warner Avenue
- Pacific Coast Highway/Warner Avenue

A minimum operating LOS E is required on CMP facilities, unless the facility was operating at a worse level when the baseline counts were conducted in 1991. Cities are required to maintain LOS E or better (or baseline levels, if worse than LOS E) on the Highway System. All of the CMP intersections/interchanges within the planning area meet or operate at better than the target LOS E performance standard.

An important aspect of the CMP regulations is the requirement that new developments mitigate any significant traffic impacts to the Highway System. This means that Orange County cities need to develop a review process whereby the traffic impacts of new projects are evaluated and impacts mitigated. This serves to ensure that the LOS standards on the Highway System are maintained. In addition, the CMP contains requirements such as a Capital Improvement Program submittal, a trip reduction program, and the need for inter-jurisdictional coordination.

Orange County Master Plan of Arterial Highways

OCTA administers the Orange County MPAH, which defines the long-range highway system in Orange County. The MPAH map is a critical element of overall transportation planning and operations in Orange County as it defines a countywide circulation system in response to existing and planned land uses. In order to be eligible for Measure M2 revenues and programs, including the Orange County Comprehensive Transportation Funding Program, the city's General Plan Circulation Element must be consistent with the MPAH. Changes to the MPAH can be requested and are subject to a set of guidelines for requisite technical studies and administrative actions.

Orange County Commuter Bikeways Strategic Plan

The Commuter Bikeways Strategic Plan, administered by OCTA, is a regional planning document that identifies existing and proposed bikeways in Orange County. This comprehensive inventory of County bikeways was achieved through the cooperation of cities and the County to identify priority corridors for new bikeways. OCTA's bikeway classification system is employed by Huntington Beach. The city bikeway plan is linked to regional County bikeways.

Huntington Beach Five-Year Capital Improvement Program

The city Capital Improvement Plan (CIP) is the main planning tool used to coordinate financing and scheduling for major projects, including transportation improvements undertaken by the city. The CIP is developed to address elements contained in the city General Plan, as well as City Council-adopted planning documents and master plans. Projects within the CIP correspond to the goals of the city Strategic Plan in the areas of Public Safety, Infrastructure and Transportation, Community Livability, and Environment and Natural Resources. The CIP is prepared in conjunction with the budget process and is revised annually to meet changing needs, priorities, and financial conditions.

Transportation Demand Management Ordinance

The city Transportation Demand Management (TDM) Ordinance was established to help mitigate potential impacts of development projects on mobility, congestion, and air quality, as well as to promote TDM strategies. The city uses the TDM Ordinance to encourage changes in individual travel behavior, where certain TDM activities are made mandatory by the ordinance. In particular, employers with 100 or more employees are required to support alternative forms of transportation by providing appropriate facilities, including showers and lockers, parking for vanpools, bicycle parking, and passenger loading areas.

Utilities and Service Systems

This section describes the utilities and service systems within the city of Huntington Beach. Information in this section is based on the Infrastructure and Public Facilities Technical Report prepared by Michael Baker International[1].

ENVIRONMENTAL SETTING

Water

Water Sources

Three agencies work together to provide water to Huntington Beach: Metropolitan, the MWDOC, and the OCWD. The OCWD establishes a yearly groundwater production allocation known as the basin production percentage (BPP). The BPP is the percentage of each retail water agency's total water supply that comes from groundwater pumped from the basin. This percentage becomes the basis for the city's imported water deliveries through the MWDOC, which wholesales and distributes water from Metropolitan to 26 member agencies, including the city[2]. The 2013–2014 water year BPP was set at 70 percent by the OCWD Board of Directors. The BPP increased to 72 percent for FY 2014–2015. In January 2013, the OCWD Board adopted a policy to reach and maintain a 75 percent BPP by FY 2015–2016. The BPP for the FY 2107-2018 is 75 percent.

The city pays a replenishment assessment to the OCWD for each acre-foot of water taken from the groundwater basin. For fiscal year 2017–2018, the replenishment assessment was $445 per acre-foot of water[3]. Groundwater production above the BPP set by the OCWD for any given year requires the payment of an additional Basin Equity Assessment (BEA), which is intended to discourage over-pumping by increasing the cost of groundwater production above the cost of imported water.

For fiscal year 2017–2018, the total cost of water once the BEA was assessed was $520 per acre-foot in the Huntington Beach service area. According to city staff, Huntington Beach does not exceed the BPP and avoids paying the premium associated with the BEA. The cost of the BEA has served as a deterrent to over pumping[4].

Water Treatment

Water treatment for Metropolitan water used in the planning area occurs at the Robert B. Diemer Filtration Plant located in Yorba Linda and the Joseph Jensen Filtration Plant located in Granada Hills. Metropolitan tests and treats its water for microbial, organic, inorganic, and radioactive contaminants as well as pesticides and herbicides. When treated, water is conveyed through Metropolitan's transmission mains and delivered to the city distribution system through three interconnections[5]. In addition to Metropolitan's quality control for imported water, city staff collects daily water samples throughout the planning area for regular testing and to monitor chlorine levels. The city also tests Metropolitan imported water for chloramines and flouride[6].

1 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
2 Ibid
3 Ibid
4 Orange County Water District (OCWD). 2017. Orange county Water District Board Meeting Agenda: April 19, 2017.
5 Ibid
6 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.

According to the MWDOC, there are no specific water quality concerns with imported Metropolitan water; however, the MWDOC and its 28 member agencies have worked with Metropolitan to address issues such as disinfection byproducts, chlorine residual, and average total dissolved solids goals[7].

Groundwater Supply and Quality

The Orange County Groundwater Basin covers an area of approximately 350 square miles. Aquifers comprising the basin extend over 2,000 feet below ground level and form a complex series of interconnected sand and gravel deposits. The Orange County Groundwater Basin is the only major non-adjudicated groundwater basin in Southern California. To manage potential overdraft of the basin, the OCWD has developed a groundwater management plan that incentivizes sustainable groundwater production and recharge practices[8].

The OCWD conducts an extensive groundwater quality monitoring program that routinely monitors groundwater quality throughout the Orange County Groundwater Basin[9]. In addition, the city routinely conducts water quality monitoring of all groundwater wells, reservoirs, and distribution system within the planning area per the Comprehensive Water Quality Control Plan managed by the Utilities Division. Areas of specific concern include salinity, nitrates, methyl tertiary butyl ether, N-nitrosodimethylamine, 1,4-dioxane, emerging contaminants, total organic carbon, bromide, arsenic, and uranium. Although groundwater and imported water quality will vary slightly over time, no issues have prevented the city from meeting water quality standards set by the EPA and the California Department of Public Health. The city adds fluoride and chlorine to groundwater at its source and chlorine at all reservoirs. Metropolitan adds chloramine and fluoride to water at its treatment facilities[10].

Water Distribution Facilities

The city-operated water system includes four reservoirs (Overmeyer, Peck, Springdale, and Edwards Hill) with a combined maximum storage capacity of 55 million gallons, and four booster stations with a combined capacity to pump 62,690 gpm into the water system from reservoirs during high demand[11]. The transmission/distribution system consists of approximately 620 miles of pipeline ranging in size from 4 to 42 inches in diameter, 5,784 public hydrants, 711 private hydrants, and over 17,471 valves. Metropolitan provides water to the planning area through the following three main interconnections:

- OC 9—Located in the northeast corner of the planning area, this interconnection has a 6,300 gpm delivery capacity into the water[12]. Between July 2013 and February 2014, actual flows were approximately 2,500 gpm.
- OC 35—Located in the northwest corner of the planning area, this interconnection has a 9,000 gpm delivery capacity into the water system. Between July 2013 and February 2014, actual flows were approximately 1,800 gpm.
- OC 44—Located in the southeast portion of the planning area, this interconnection has a 6,700 gpm delivery capacity into the water system. Between July 2013 and February 2014, actual flows were approximately 2,800 gpm.

Note that actual gpm flows through these interconnections are higher than normal due to the Coastal Pumping Transfer Program. The OCWD began this program in July 2013 to reduce groundwater pumping

7 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
8 Ibid
9 Ibid
10 Ibid
11 Ibid
12 DeBow, Deborah. 2014. Principal Civil Engineer, City of Huntington Beach. E-mail to Xico Manarolla, PMC senior GHG analyst. April 2, 2014.

along the coast to reduce seawater intrusion. As a result, Huntington Beach imported more water than a typical year in 2013[13].

Water Demand

Across all of the 19 agencies served in the OCWD's territory, total water demand was approximately 445,000 acre-feet in 2013. Of this demand, 325,000 acre-feet (73 percent) was met by local groundwater, while the remaining 120,000 acre-feet (27 percent) came from water imports[14]. While most new water demand is expected to be met by water imports, the amount of water Huntington Beach and other jurisdictions can pump from groundwater has been increasing. As noted previously, in 2013–2014, the BPP was 70 percent, and the OCWD has a target BPP of 75 percent by 2015–2016. This proposed increase in BPP has been possible due to the amount of water that is being replenished into the basin through the Groundwater Replenishment System (GWRS). In all, the BPP is estimated to be 16 percent higher than it would otherwise be, due to the GWRS[15].

In 2015, the OCWD plans to complete the first expansion of the GWRS program, increasing replenishment by 30,000 acre-feet per year. This does not mean that the basin is being recharged, as the BPP is set based on the assumption of average rainfall. Recently, the region has experienced several drought years, which has led to the basin being overdrafted. The basin is expected to be filled during wetter periods[16].

According to estimates provided by the city, total water demand in Huntington Beach is forecast to increase by roughly 8 percent from 2020 to 2040. Table 1 identifies expected retail demands through 2040 within the planning area. Metropolitan has made large investments in water storage capacity over the last 20 years, which has kept it and the MWDOC, generally, from having to implement drought allocation programs most years, even as California continues to experience a severe drought[17].

TABLE 1
CITY OF HUNTINGTON BEACH PLANNED WATER RETAIL DEMAND (2020-2040)

Water Sources	2020	2025	2030	2035	2040
Total (AFY)	28,090	30,153	30,360	30,352	30,396

Source: 2015 Urban Water Management Plan

Note: AFY = acre-feet per year

Recycled Water

Currently, the city neither uses nor supplies recycled water to customers within the planning area[18]. The planning area benefits, however, from the recycled water produced by the joint OCWD and OCSD GWRS. OCSD Reclamation Plant No.1 sends treated water to the GWRS which is then used to replenish the groundwater basin or injected into Orange County's sea water barrier. The city does not send its sewage to Reclamation Plant No. 1 and therefore does not contribute to the GWRS, but the program has enabled the OCWD to increase the BPP even as a drought has persisted, enabling the city to increase the percentage of water it obtains from groundwater.

OCWD Groundwater Replenishment System

The GWRS is a facility that takes highly treated wastewater that would otherwise be discharged into the Pacific Ocean and further purifies it with microfiltration, reverse osmosis, and ultraviolet light with hydrogen peroxide, producing high-quality tertiary-treated wastewater that is pumped into seawater barriers and

13 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
14 Ibid
15 Ibid
16 Ibid
17 Ibid
18 Ibid

groundwater recharge basins. The GWRS can produce up to 100 mgd[19]. The purpose of this facility is to increase groundwater recharge and protect the groundwater basin from further seawater intrusion. The planning area, therefore, indirectly benefits from this regional use of recycled water. Currently, all wastewater treated at the OCSD Reclamation Plant No. 1 goes to replenish groundwater. The OCSD is studying options for sending all water treated at Treatment Plant No. 2 to the GWRS, but distance and the presence of industrial water at Treatment Plant No. 2 may be limiting factors[20].

OCWD Green Acres Project

OCWD owns and operates the Green Acres Project (GAP), a water recycling system that provides up to 8,400 AFY of recycled water for irrigation and industrial uses. GAP includes the pumping of sanitary sewer flows from Bolsa State Beach to a city owned sewer lift station. Additionally, sanitary sewer flows from Huntington State Beach flow directly to an OCSD sewer main.

Wastewater

Sewer Collection and Conveyance Systems

Sewer collection pipelines are owned and maintained by five agencies in the planning area (city of Seal Beach, Sunset Beach Sanitary District, city of Huntington Beach, OCSD and numerous Home Owner Associations). Both of the state-owned/run beaches have their own sewer systems. However, pipelines in most of the planning area are owned and maintained by the city. As shown in Table 2, the Huntington Beach city sewer system consists of approximately 360 miles of sewer lines (including gravity and force mains but excluding sewer laterals), 10,000 manholes/personnel access covers, and 28 lift stations. Pipelines in a portion of the Sunset Beach area are owned and maintained by the Sunset Beach Sanitary District (SBSD). The SBSD services a 175-acre area that includes Sunset Beach and Surfside Colony, a small gated community in the city of Seal Beach[21]. The SBSD operates 25,000 feet of sewer mains and one sewage pump station. In addition, one city of Seal Beach lift station located within the Sunset Aquatic Park area conveys sewage over the Edinger Avenue Bridge into the Huntington Beach system.

TABLE 2
CITY OF HUNTINGTON BEACH SANITARY SEWER INFRASTRUCTURE INVENTORY WITHIN THE PLANNING AREA (BY OWNERSHIP)

Item/ Description	Huntington Beach[1]	OCSD	Sunset Beach San. District	Home Owners Associations[2]	Seal Beach	Other[3]	TOTAL
Pipelines (Miles)	360.0	45.0	4.6	59.2	0.0	18.7	487.5
Force Mains (Miles)	2.30	0.89	0.84	0.34	0.34	0.02	4.73
Manholes	7,678	466	68	1,578	0	440	10,230
Pump/Lift Stations	28	2	1	4	0	18	53

Source: Michael Baker 2014
NOTES:
1 - Includes pipelines and manholes within HOAs that are owned and maintained by the City of Huntington Beach.
2 - Includes facilities within HOAs that are owned and maintained by the HOA.
3 - Includes facilities within shopping centers, business parks, schools, and other private property that are privately owned and maintained.
4 - Not Available (NA)

19 Arcadis. 2016. 2015 Huntington Beach Urban Water Management Plan. June 2016.
20 Ibid
21 Sunset Beach Sanitary District (SBSD). 2014. District Overview. Available at http://www.sunsetbeachsd.org/. Accessed November 1, 2015.

The SBSD contracts with the city to convey all sewage collected by the SBSD through city pipelines and lift stations to the OCSD for sewage treatment[22].

Sewage collected by the city and the SBSD and Seal Beach systems flows into the OCSD trunk sewer system which ultimately leads to OCSD Treatment Plant No. 2. Huntington Beach's estimated sewer flows in 2012 were 14.53 mgd, with approximately 0.21 mgd coming from Sunset Beach and Seal Beach[23].

As part of the annexation agreement with the city, the SBSD will remain an independent agency for 50 years. The connecting sewage pipeline between the SBSD and the city was replaced through the Warner Avenue Gravity Sewer/Lift Station "C" Project. The new line replaced four pumps with a gravity sewer and increased capacity for residences and businesses in the area. The project was completed in fall 2014[24].

The OCSD operates the third largest sewage collection and treatment system on the West Coast. The OCSD system covers 479 square miles and consists of nearly 600 miles of trunk sewers and 200 miles of sub-trunk sewers, 15 off-plant pump stations, two on-plant pump stations, approximately 3,285 maintenance covers, and two regional treatment plants[25]. The combined design capacity of both treatment plants is 332 mgd of secondary treatment during dry weather flow and 591 mgd of secondary treatment during wet weather flow. The OCSD system in Huntington Beach collects sewage through an extensive 53.17-mile sewer system that includes gravity lines, pump stations, and 1.48 miles of pressurized sewers (force mains). Force main pipe widths range from 18 to 36 inches in diameter, while the entire sewer system has pipes that range from 8 to 120 inches. Within the planning area, the OCSD operates two lift stations, one on Slater Avenue and another on Edinger Avenue[26].

Sewage Treatment

Huntington Beach sends all of its sewage to the OCSD, which operates two treatment facilities. All sewage from Huntington Beach is treated at OCSD Treatment Plant No. 2[27].

OCSD Treatment Plant No. 2 is located in Huntington Beach adjacent to the Santa Ana River, approximately 1,500 feet from the ocean. Treatment Plant No. 2 provides a mix of advanced primary and secondary treatment. All of the influent receives secondary treatment using an activated sludge system or trickling filter/solids contact process. The current capacity for Reclamation Plant No. 1 is 182 mgd of secondary average daily dry weather flow and 274 mgd secondary average daily wet weather flow. Average actual daily flows of wastewater are roughly 100 mgd. The current capacity for Treatment Plant No. 2 is 150 mgd of secondary dry weather flow and 317 mgd of secondary wet weather flow. Average actual daily flow at Plant No. 2 is also roughly 100 mgd[28].

All of the effluent from Treatment Plant No. 2 is discharged to a 120-inch outfall line (Discharge Point 001) at a depth of approximately 195 feet below sea level, 4.5 miles offshore from the Santa Ana River. The outfall pipe has a permitted capacity of 332 mgd during dry weather and 591 mgd during wet weather (Michael Baker 2014). A second, older 78-inch outfall pipe (Discharge Point 002) that travels approximately 1 mile offshore from the mouth of the Santa Ana River is used only in emergencies and during essential maintenance of the primary outfall pipe. A third discharge (Discharge Point 003) is made of up two extreme emergency overflow discharge points with a total capacity of 605 mgd.

22 Sunset Beach Sanitary District (SBSD). 2014. District Overview. Available at http://www.sunsetbeachsd.org/. Accessed November 1, 2015.
23 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
24 Ibid
25 Ibid
26 Ibid
27 Ibid
28 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.

Recent and Future Upgrades to OCSD Infrastructure

In 2012, the OCSD completed an upgrade project that added secondary treatment capacity at both wastewater treatment facilities. Improvements at Treatment Plant No. 2 added a 60 mgd trickling filter/solids contact system and rehabilitated existing activated sludge equipment. These improvements enable both facilities to treat all wastewater with secondary treatment[29].

Numerous upgrades are currently under way at Treatment Plant No. 2 including construction to add sludge-thickening treatment to treat activated sludge plant solids (estimated completion in 2016), rehabilitation of the ferric chloride station and assorted pipelines (estimated completion in 2014), and outfall pipe rehabilitation (2014 estimated completion). These improvements will increase the capabilities of the plant and improve existing performance. These projects will upgrade current treatment capabilities at the facilities rather than expand treatment capacity.

Solid Waste and Landfills

The city has an 18-year automatically renewed, exclusive franchise agreement with Republic Services for all solid waste collection services[30]. Republic Services operates a transfer station located at 17121 Nichols Avenue in Huntington Beach. This location houses a public dump and a compressed natural gas fueling station that is open to the public, as well as a transfer station and materials recovery facility. Republic Services also provides recycling services, including green waste composting, within the planning area.

In addition to services offered by Republic, the city offers used oil recycling services (either curbside or via drop-off at a collection center) and household hazardous waste disposal services through the Orange County Household Hazardous Waste Collection Center.

The city has a solid waste flow agreement with Orange County through 2020 that requires all solid waste collected by Republic Services in Huntington Beach to be disposed of at County landfills. Any waste disposed of at non-County landfill facilities is either special waste, self-haul waste, or waste originated from school sites not serviced by Republic. Under state law, school sites are exempt from local solid waste franchises[31].

All solid waste collected in the city by Republic Services is taken to the transfer station/materials recovery facility located at 17121 Nichols Avenue. The facility has a permitted capacity of 4,000 tons per day and currently receives approximately 1,800–2,000 tons of solid waste per day[32]. The majority of waste that is not recycled or otherwise diverted is then transported to the Frank Bowerman Landfill in Bee Canyon, located in Irvine, which is expected to remain open until 2053[33]. In addition to the Frank Bowerman Landfill, solid waste hauled from Huntington Beach can be transported to 13 landfills, with a small amount sent to two waste-to-energy facilities for incineration (see Table 3).

In 2008, SB 1016 built on the Integrated Waste Management Act of 1989 to set “not to exceed” per capita disposal rates as opposed to a quantifying yearly waste diversion. For 2012, the most recent reporting year available, the per capita limit for Huntington Beach was 10.4 pounds of waste per person per day. Actual waste flows were around 4.6 pounds per person per day, less than the limit imposed by Cal Recycle.[34]

29 Millea, Kathleen. 2014. Engineering Supervisor, Orange County Sanitation District. Telephone conversation with Xico Manarolla, PMC senior GHG analyst. April 3, 2014.
30 Republic Services. 2014. Accessed November 1, 2015, available at http://republicservices.com
31 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
32 Republic Services. 2014. Accessed November 1, 2015, available at http://republicservices.com.
33 Michael Baker International. 2014. Draft Infrastructure and Public Facilities Technical Report for the City of Huntington Beach General Plan Update. August.
34 Ibid

TABLE 3
HUNTINGTON BEACH SOLID WASTE DISPOSED BY LANDFILL (2012)

Waste Facility Name	SWIS Number	Tons Hauled	Percentage of Total Waste	Remaining Capacity at Landfill (cubic yards)	Landfill Closure Date
Antelope Valley Public Landfill	19-AA-5624	31	<1%	20,400,000	2042
Azuza Land Reclamation Co. Landfill	19-AA-0013	3,281	<1%	N/A	N/A
California Street Landfill	36-AA-0017	319	<1%	6,800,000	2042
Chiquita Canyon Sanitary Landfill	19-AA-0052	130	<1%	29,300,000	2019
Commerce Refuse-to-Energy Facility	19-AA-0506	1	<1%	N/A	N/A
El Sobrante Landfill	33-AA-0217	1,100	<1%	145,530,000	2045
Frank R. Bowerman Sanitary Landfill	30-AB-0360	196,095	90%	205,000,000	2053
Lancaster Landfill and Recycling Center	10-AA-0050	36	<1%	14,514,648	2044
McKittrick Waste Treatment Site	15-AA-0105	1,232	<1%	841,498	2029
Olinda Alpha Sanitary Landfill	30-AB-0035	9,631	<1%	38,578,383	2021
Otay Landfill	37-AA-0010	1,427	<1%	24,514,904	2028
Prima Deshecha Sanitary Landfill	30-AB-0019	485	<1%	87,384,799	2067
Puente Hills Landfill	19-AA-0053	23	<1%	0	2013
Simi Valley Landfill & Recycling Center	56-AA-0007	3,378	<1%	119,600,000	2052
Southeast Resource Recovery Facility (Waste-to- Energy Facility)	19-AK-0083	4	<1%	N/A	N/A
Total		**217,173**			

Source: Michael Baker 2014
Note: Total may not appear to add correctly due to rounding.

REGULATORY FRAMEWORK

Federal Plans, Policies, Regulations, and Laws

The federal programs that would apply to infrastructure are implemented through state agencies and are coupled with corresponding state regulations and oversight. These programs are, therefore, discussed under State Plans, Policies, Regulations, and Laws.

State Plans, Policies, Regulations, and Laws

Senate Bill 610

Senate Bill (SB) 610 (Section 21151.9 of the Public Resources Code and Section 10910 et seq. of the Water Code) requires the preparation of "water supply assessments" for large developments. These are defined as projects of 500 or more residential units; 500,000 square feet of retail commercial space; or 250,000 square feet of office commercial space. These assessments, prepared by public water systems responsible for service, address whether adequate existing or projected water supplies are available to

serve proposed projects, in addition to urban and agricultural demands and other anticipated development in the service area in which the project is located.

Where a water supply assessment concludes that insufficient supplies are available, it must describe steps that would be required to obtain the necessary supply. The content requirements for the assessment include identification of the existing and future water suppliers and quantification of water demand and supply by source in five-year increments over a 20-year projection. This information must be provided for average normal, single-dry, and multiple-dry years. The absence of an adequate current water supply does not preclude project approval, but does require a lead agency to address a water supply shortfall in its project approval findings.

Groundwater Management Act

The Groundwater Management Act, codified in Sections 10750–10756 of the Water Code, provides a systematic procedure for, but does not require, an existing local agency to develop a groundwater management plan. This section of the code provides such an agency with the powers of a water replenishment district to raise revenue to pay for facilities to manage the basin (extraction, recharge, conveyance, and quality). In some basins, groundwater is managed under other statutory or judicial authority (such as adjudicated groundwater basins) and is not subject to the provisions of this act for groundwater management plans. A groundwater management plan covering the planning area was first developed in 1989 by the OCWD.

Orange County Water District Act

The Orange County Water District was formed by an act of the California state legislature in 1933. The Orange County Water District Act was signed on June 14, 1933, by then-Governor James Rolph Jr. Passage of the act allowed the Orange County Water District to manage the groundwater basin that serves the coastal areas of Orange County that many water agencies in Orange County rely upon.

Urban Water Management Planning Act

The California Urban Water Management Planning Act of 1983, also known as AB 797, requires that the city prepare, update, and adopt its Urban Water Management Plan at least once every five years on or before December 31 in years ending in 5 and 0. The plan describes and evaluates sources of water supply, projected water needs, conservation, and an implementation strategy and schedule. In 2010, new requirements regarding statewide water conservation were added to the Water Code Sections 10610–10656, including changing projections from 20 years to 25 years. Various other amendments have increased requirements to include sections on recycled water use, demand management measures, and water shortage contingency plans.

The last city Urban Water Management Plan was adopted by the City Council on June 20, 2011, and submitted to the California Department of Water Resources on or before August 1, 2011. The city adopted an update to the Urban Water Management Plan in June 2016.

Water Conservation Act of 2009 (SB X7-7)

The Water Conservation Act of 2009 (SB X7-7) affects urban water and agricultural water. The 20x2020 Water Conservation Plan sets forth a statewide road map to maximize the state's urban water efficiency and conservation opportunities between 2009 and 2020 and beyond for urban water. It aims to set in motion a range of activities designed to achieve the 20 percent per capita reduction in urban water demand by 2020. These activities include improving an understanding of the variation in water use across California, promoting legislative initiatives that incentivize water agencies to promote water conservation, and creating evaluation and enforcement mechanisms to ensure regional and statewide goals are met. Alternative approaches are also specified in the law (Division 6 Part 2.55 of Water Code Sections 10608–10631.5).

Sewer System Management Plan

The State Water Resources Control Board requires wastewater collection providers to report sanitary sewer overflows and to prepare and implement Sewer System Management Plans (SSMP). The SSMP policy

requires dischargers to provide adequate capacity in the sewer collection system, take feasible steps to stop sewer overflows, identify and prioritize system deficiencies, and develop a plan for disposal of grease, among other requirements. In addition, wastewater providers must report sanitary sewer overflows to the Santa Ana Regional Water Quality Control Board, keep internal records of these overflows, and produce an annual report on overflows. Huntington Beach's wastewater collection provider, OCSD, prepared a SSMP in December 2014, in compliance with the State Water Resources Control Board.

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989 (CIWMA) established a waste management hierarchy to guide local agencies in implementation of source reduction, recycling and composting, and environmentally safe transformation and land disposal.

The CIWMA created the six-member California Integrated Waste Management Board whose principle purpose was to promote recycling and the protection of air and water resources. The board was abolished in 2010 and replaced by CalRecycle, which has numerous responsibilities, such as ensuring and evaluating compliance with recycling laws, and is responsible for approving permits for waste facilities, approving local agencies' diversion rates, and enforcing the planning requirements of the law through local enforcement agencies. Local enforcement agencies are responsible for enforcing laws and regulations related to solid waste management, issuing permits to solid waste facilities, ensuring compliance with state-mandated requirements, coordinating with other government agencies on solid waste–related issues, and overseeing corrective actions at solid waste facilities. Local enforcement agencies also inspect facilities, respond to complaints, and conduct investigations into various aspects of solid waste management.

As of July 2012, pursuant to Public Resources Code Sections 42649–42649.7, all businesses in the planning area are required to reuse, recycle, compost, or otherwise divert refuse from disposal. All cities are required to either create a commercial recycling program or expand an existing program.

In 2008, SB 1016 built on the CIWMA to set "not to exceed" per capita disposal rates as opposed to quantifying yearly waste diversion. For 2012, the most recent reporting year available, the per capita limit for Huntington Beach was 10.4 pounds of waste per person per day.

Local Plans, Policies, Regulations, and Laws

Huntington Beach Urban Water Management Plan

The 2010 city Urban Water Management Plan was prepared and adopted in 2011. Urban Water Management Plans prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides over 3,000 acre-feet of water annually or serves 3,000 or more connections is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years. This assessment is to be included in its Urban Water Management Plan, which is to be updated every five years and submitted to the California Department of Water Resources. The department then reviews the submitted plans to make sure they have completed the requirements identified in the Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code Sections 10610–10656). The city adopted an update to the Urban Water Management Plan in June 2016.

Huntington Beach Master Facilities Plan

The 2011 Master Facilities Plan compiles water infrastructure projects needed to meet the theoretical buildout plans of the existing General Plan. The Master Facilities Plan provides for three types of projects: maintenance, repair, and rehabilitation of existing infrastructure; future development; and enhancements to quality of life for residents.

Huntington Beach Municipal Code

Municipal Code Chapter 14.18 establishes baseline water conservation requirements and a program to reduce water usage during times of water shortage to enable effective water supply planning, ensure reasonable and beneficial use of water, prevent waste of water, and maximize water use efficiency. Three tiers of water conservation requirements are established depending on the severity of a water shortage. Level one is the least severe, while level three is used during emergency conditions. The level of severity is determined by the City Public Works Department and declared by a City Council resolution.

City Municipal Code Section 14.52 includes water-efficient landscape requirements. This section of the Municipal Code addresses state requirements for enhancing water-efficient landscaping and reducing potable water demand.