The South Bay Bicycle Master Plan

August 2011

alta PLANNING + DESIGN

COUNTY OF LOS ANGELES Public Health

RENEW LOS ANGELES COUNTY

LOS ANGELES COUNTY BICYCLE COALITION WWW.LA-BIKE.ORG

SOUTH BAY BICYCLE COALITION

South Bay Bicycle Master Plan

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Foreword

The South Bay Bicycle Master Plan is the result of an innovative partnership between long-standing bike advocacy non-profit Los Angeles County Bicycle Coalition (LACBC) and local grass-roots bike advocates the South Bay Bicycle Coalition (SBBC). The two groups came together with the common goal of improving the safety and convenience of bicycling in Los Angeles County, and specifically in the South Bay Region.

The Los Angeles County Bicycle Coalition and the South Bay Bicycle Coalition are partnering to improve bicycling in the South Bay.

Photo Source: Kelly Morphy/WALC Institute for Vitality City

In December of 2009, the South Bay Bicycle Coalition approached a number of South Bay cities (defined as those cities encompassed by the South Bay Cities Council of Governments) to ask for their support and involvement in a multi-city bicycle master planning process. Seven of the cities responded favorably and within the specified time frame for grant eligibility. Those seven responsive cities are the cities that are represented in this master plan. The participating cities include: El Segundo, Gardena, Hermosa Beach, Lawndale, Manhattan Beach, Redondo Beach, and Torrance. This plan seeks to provide improved and increased connectivity across these seven cities. All seven City Councils have adopted supportive resolutions and have dedicated in-kind staff time to assist with plan review and data gathering.

Funding for this master planning process is made possible through the Department of Health and Human Services through the Los Angeles County Department of Public Health's Renew Environments for Nutrition, Exercise and Wellness in Los Angeles County (RENEW-LAC) initiative. RENEW-LAC is made possible by funds from the Center for Disease Control and Prevention – Communities Putting Prevention to Work Initiative. RENEW seeks to implement policy, systems and environmental change to improve nutrition, increase physical activity and reduce obesity, especially in disadvantaged communities. Engaging communities in active transportation through pedestrian and bicycle-friendly policies is one objective of the RENEW initiative.

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Executive Summary

The South Bay Bicycle Master Plan is intended to guide the development and maintenance of a comprehensive bicycle network and set of programs and policies throughout the cities of El Segundo, Gardena, Hermosa Beach, Lawndale, Manhattan Beach, Redondo Beach, and Torrance for the next 20 years. As the first-ever multi-jurisdictional bike plan, it has a unique focus on cross-city consistency and connectivity that is often lacking in singular city bike plans. Upon plan adoption, each participating city will be eligible for grant funding sources which they are not currently receiving.

Implementation of this plan is meant to promote and increase bicycle ridership for all levels of ability across the South Bay.

Implementation of this plan is meant to promote and increase bicycle ridership for all levels of ability across the South Bay. The South Bay has an existing base of recreational and enthusiast bicyclists; this plan's primary objective is to increase the number of those bicyclists, as well as create a larger base of utilitarian bicyclists, including bicycle commuters, through safe, accessible and consistent bicycle infrastructure, and the policies and programs that support it.

As discussed in Chapter One, there are numerous benefits that a bicycle master plan provides to both community members and the cities that implement it, including improved community health and quality of life, increased property values, decreased bicycle collisions and improved air quality mitigation, among others.

For a condensed review of the plan, please see the following sections:

- **Chapter Two: Goals, Objectives, and Policies** are meant to compliment the proposed network and are focused upon the six Es of a successful bike plan: evaluation and planning, engineering, education, enforcement, encouragement, and equity
- **Chapters Three through Nine: Individual City Chapters** include a discussion of a given city's existing bikeways, a high-level needs analysis, and the proposed bicycle facility improvements; the verbiage presented in each of these chapters is very similar to one another; as such it is recommended that the reader focuses on the city chapter of their preference

- **Chapter Ten: Recommended Programs** expands upon a few of the ideas presented through policy and provides the cities with further toolbox strategies to address the "six E's" of a successful bike plan
- **Chapter Eleven: Wayfinding and Signage** presents the regional wayfinding plan for the participating cities to inform bicyclists how to navigate through the network
- **Chapter Twelve: Funding** identifies potential funding sources that the cities could apply for to implement the proposed network presented in this Plan

As previously stated, this plan has a 20-year implementation time line. Adoption of this plan is the first of many steps that will need to be taken prior to implementation of any given proposed facility. Prior to facility implementation, each city will need to have their traffic engineering staff review the proposed facility and design the appropriate treatments. The majority of these facilities will be exempt from environmental review, although some may be subject to the California Environmental Quality Act (CEQA), as well as further public hearings and Council approval.

This Executive Summary contains a glossary of terms; the existing regional bike network; proposed regional and city-specific bikeway network maps; and a city-by-city breakdown of proposed bikeway mileage.

The following table discusses terms that are presented in this plan.

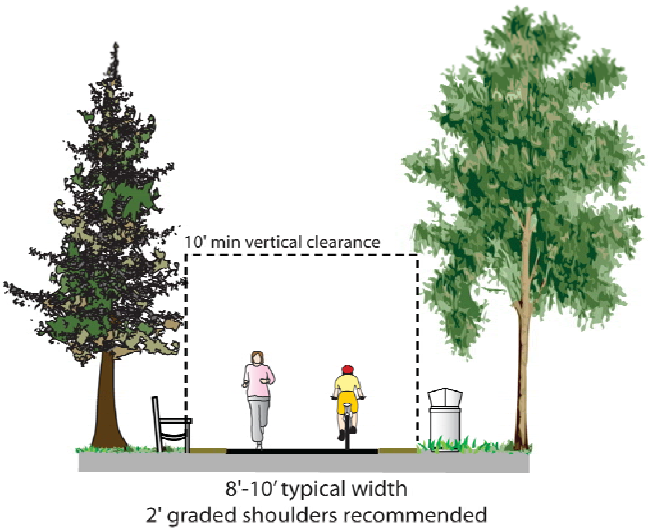
Word	Definition
Assembly Bill 1358	California Assembly Bill 1358, also known as the Complete Streets Act of 2008, amended the California Government Code §65302 to require that all major revisions to a city or county's Circulation Element include provisions for the accommodation of all roadway users including bicyclists and pedestrians. Accommodations include bikeways, sidewalks, crosswalks, and curb extensions.. See section 2.2.2.1 of this plan for more information.
Mobility Coordinator	A part- or full-time employee dedicated to the implementation of alternative transportation, which can include bicycle program administration. As related to bicycles, a mobility coordinator tracks, coordinates and oversees implementation of bike facilities, programs, grant applications and data collection.
Bicycle Facility	A street or off-road path designed for bicycle travel
Bike Path	A completely separated, paved right-of-way designated for the exclusive use of bicycles and pedestrians
Bike Lane	A restricted right-of-way striped on a street and designated for the exclusive use of bicycles, with crossflows by pedestrians and motorists permitted

Word	Definition
Bike Route	An on-street right-of-way designated by signs or pavement markings to be shared between bicyclists and motorists
Bicycle Transportation Account (BTA)	An annual program of the State of California providing state funds for city and county projects that improve safety and convenience for bicycle commuters. To establish eligibility for these funds, local agencies must have a Bicycle Transportation Plan that complies with Caltrans requirements in CA Streets and Highways Code Section 891.2. This plan complies with BTA requirements.
Class I, II, and III Bikeways	State of California definitions for Bicycle Paths, Bicycle Lanes, and Bicycle Routes, respectively, in the California Streets and Highways Code Section 890.4. For additional detail see Section 1.3 of this plan.
Complete Streets	Complete streets refers to the principle that all transportation improvements should address the safety, access, and mobility of all travelers, including motorists, bicyclists, pedestrians, transit riders, and the disabled. Caltrans Deputy Directive 64 formally states that Caltrans views all transportation improvements as opportunities to improve conditions for all users, and adopts such a policy for all planning, programming, design, construction, operations, and maintenance activities and products on the State Highway System.
Bike Friendly Street	Local roads that have been enhanced with treatments that prioritize bicycle travel. These treatments include wayfinding signage, pavement markings and traffic calming
Bike Station	Modeled after the secure indoor bicycle parking facilities provided by the private firm BikeStation, these are locations that provide bicycle storage and other amenities such as showers and bicycle repair stations. They are often located near transit stations.
Bike Valet	The provision of monitored bicycle parking, typically at a large event
Sharrows	Pavement markings denoting the safe and legal riding position for bicyclists. The name "sharrows" derives from "shared-use arrows." Among other things, sharrows clarify bicyclists' right to occupy the center of a travel lane, and encourage bicyclists to ride away from parked cars, so that they are not in danger of being struck by opening doors.

The following graphics describe the proposed bicycle facility types presented in this Plan: Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bicycle Friendly Streets.

Class I Bike Paths

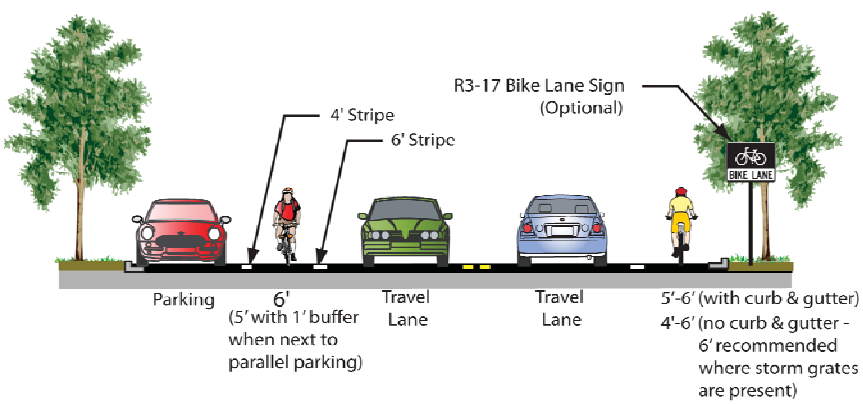
Provide completely separated right-of-way for exclusive use by bicycles and pedestrians with cross-flow minimized.



R5-3: No Motor Vehicles sign
R9-7: Shared-Use Path Restriction sign

Class II Bike Lanes

Provide striped lane for one-way bike travel on a street or highway

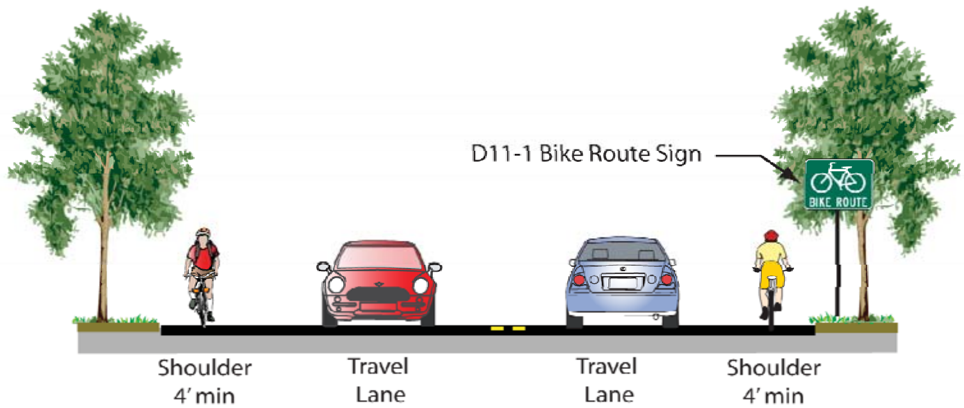


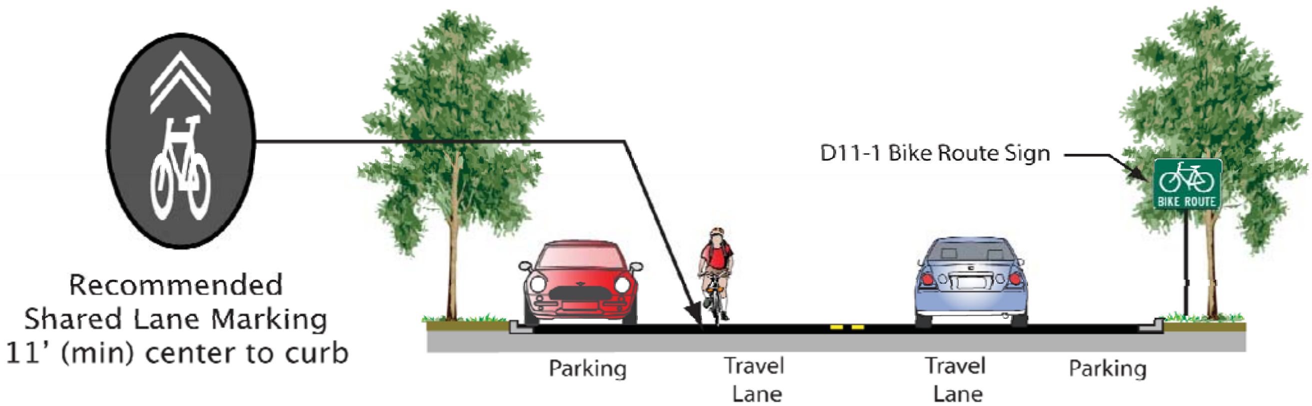
R3-17: Bike Lane sign
Placed at periodic intervals along bicycle lanes

Class III Bike Routes

Provide for shared-use with motor vehicles, typically on lower volume roadways.

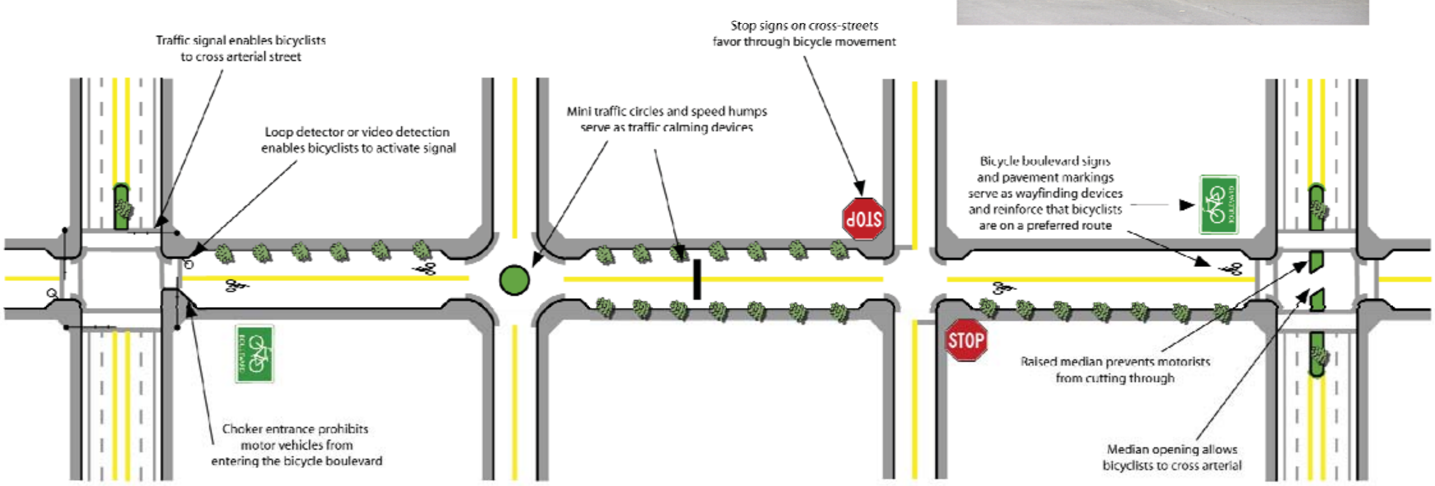
D11-1
Bike Route sign





Bike Friendly Streets

Local roads or residential streets that have been enhanced with traffic calming and other treatments to prioritize children, pedestrians, neighborhood traffic, and bicycles



The table below displays the mileage of existing and proposed bicycle facilities in each city by facility type. There are 73.2 existing miles of bikeways in the South Bay region. This Plan proposed an additional 213.8 miles of bicycle facilities. Following the table are maps presenting the existing and proposed bikeways in the seven participating cities.

City	Existing Mileage	Proposed Mileage
El Segundo		
Class I Bike Path	1.0	1.2
Class II Bike Lane	2.8	8.7
Class III Bike Route	2.0	5.0
Bicycle Friendly Street	0.0	6.4
TOTAL	**5.8**	**21.3**
Gardena		
Class I Bike Path	1.1	0.2
Class II Bike Lane	1.9	10.4
Class III Bike Route	12.7	3.9
Bicycle Friendly Street	0.0	16.8
TOTAL	**15.7**	**31.3**
Hermosa Beach		
Class I Bike Path	1.8	0.0
Class II Bike Lane	0.5	0.9
Class III Bike Route	2.8	4.7
Bicycle Friendly Street	0.0	3.8
TOTAL	**5.1**	**9.4**
Lawndale		
Class I Bike Path	0.0	0.4
Class II Bike Lane	0.0	9.7
Class III Bike Route	0.0	0.4
Bicycle Friendly Street	0.0	9.2
TOTAL	**0.0**	**19.7**

City	Existing Mileage	Proposed Mileage
Manhattan Beach		
Class I Bike Path	2.1	0.2
Class II Bike Lane	0.0	7.0
Class III Bike Route	1.1	7.1
Bicycle Friendly Street	0.0	16.7
TOTAL	**3.2**	**31.0**
Redondo Beach		
Class I Bike Path	3.5	0.8
Class II Bike Lane	5.9	18.9
Class III Bike Route	4.7	7.5
Bicycle Friendly Street	0.0	10.9
TOTAL	**14.1**	**38.1**
Torrance		
Class I Bike Path	0.0	0.5
Class II Bike Lane	14.3	28.0
Class III Bike Route	15.0	16.2
Bicycle Friendly Street	0.0	18.3
TOTAL	**29.3**	**63.0**
TOTAL	**73.2**	**213.8**

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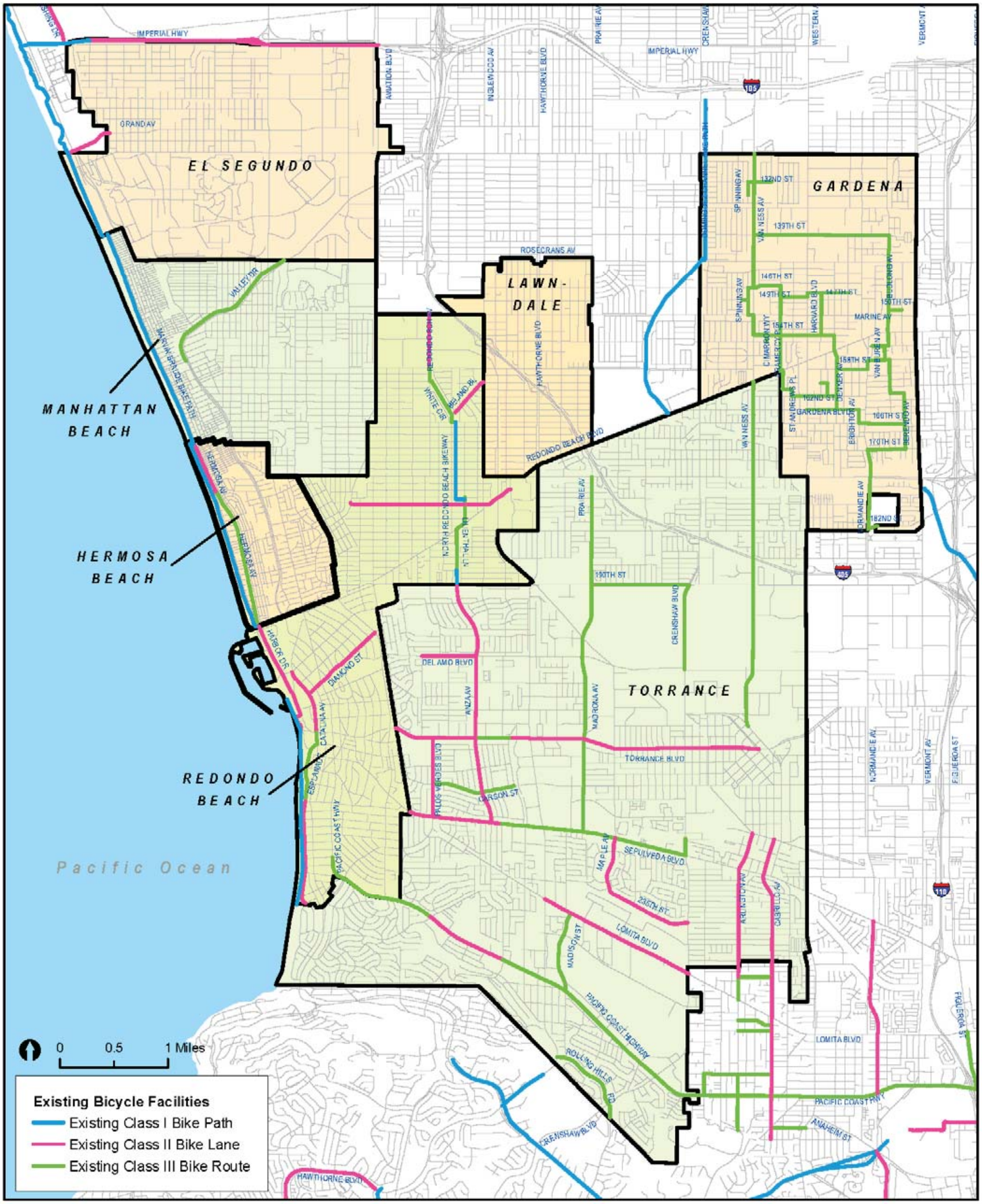
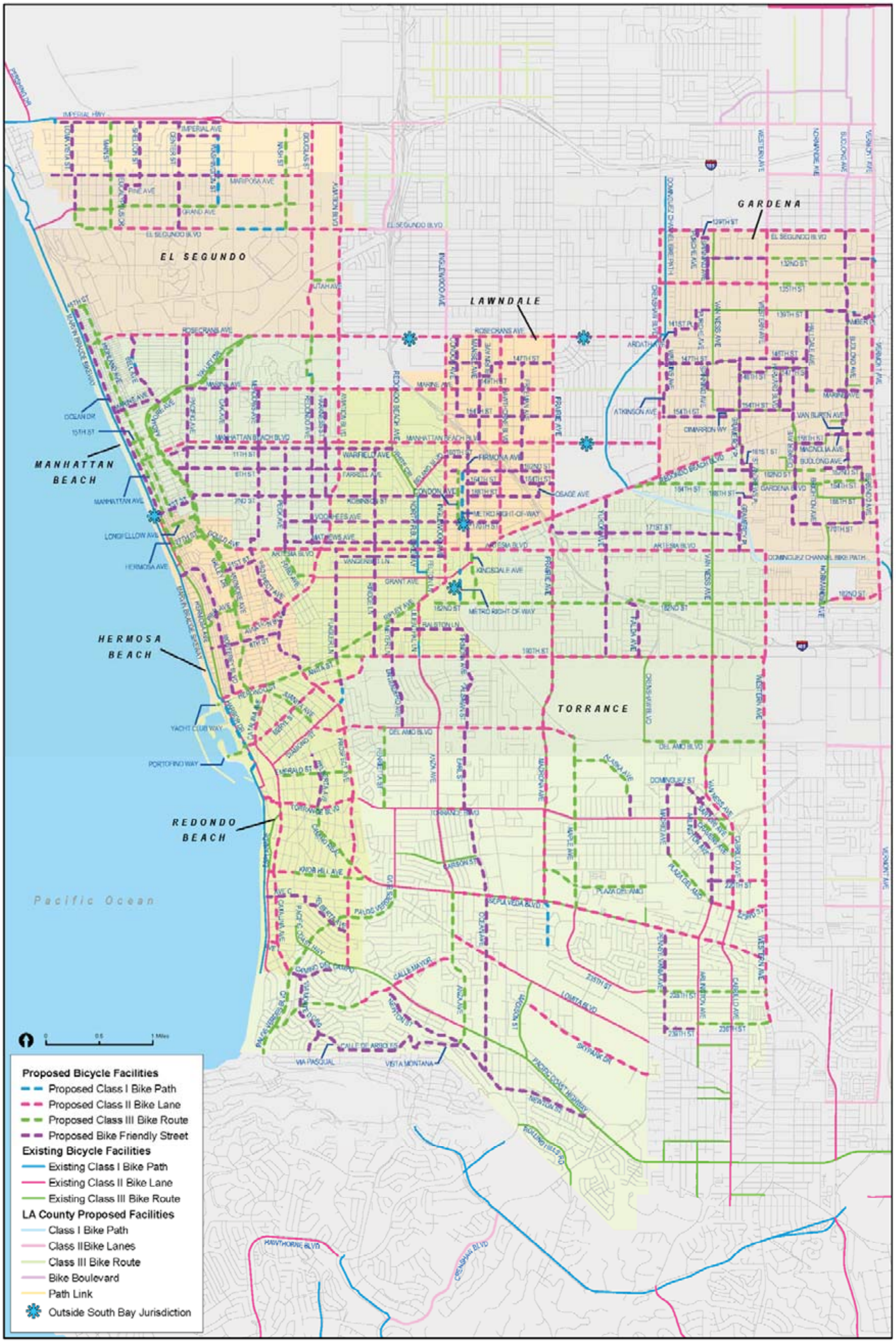


Existing Bicycle Facilities in the South Bay region



Proposed Bicycle Facilities in the South Bay region

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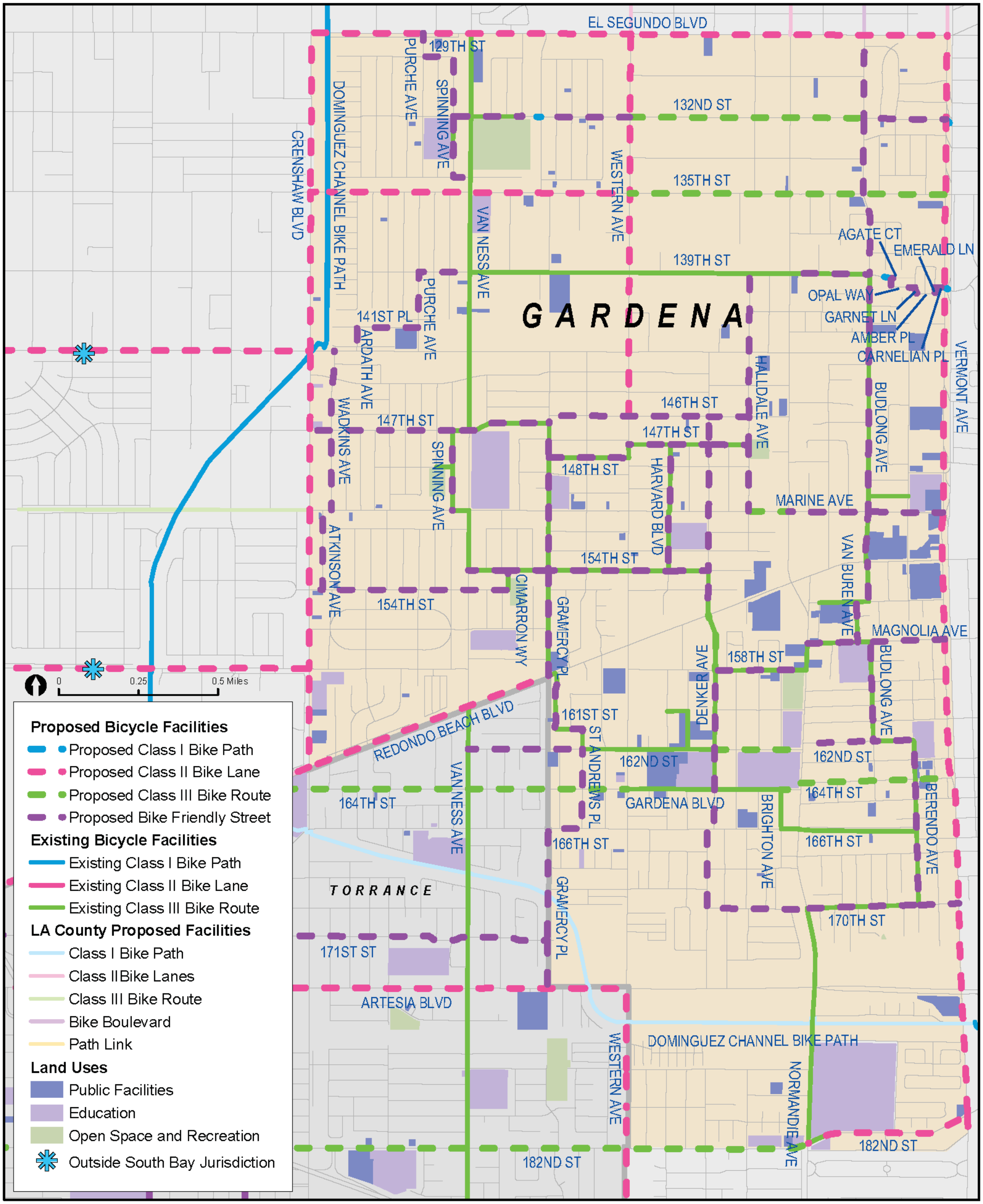
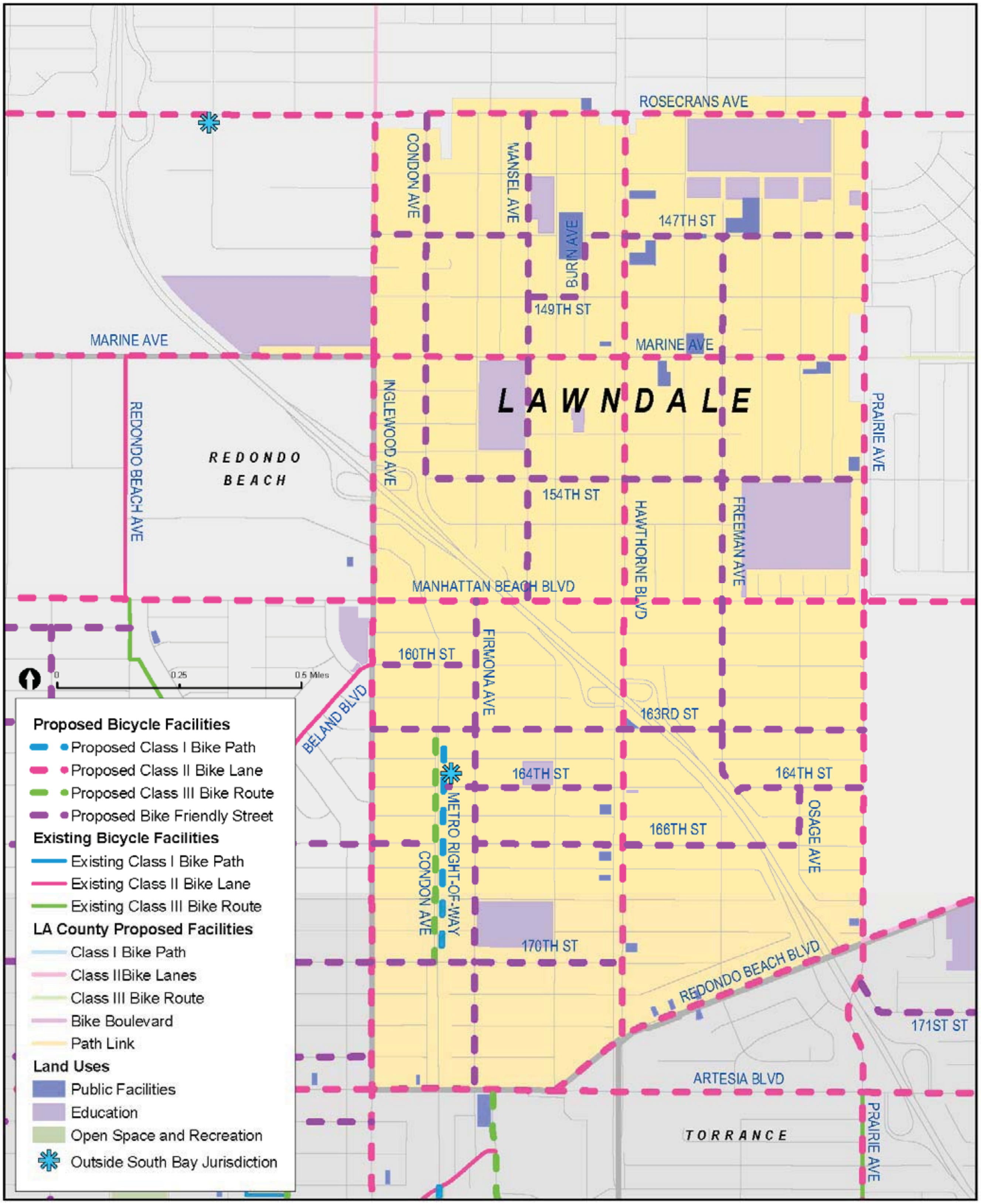
Proposed Bicycle Facilities in El Segundo



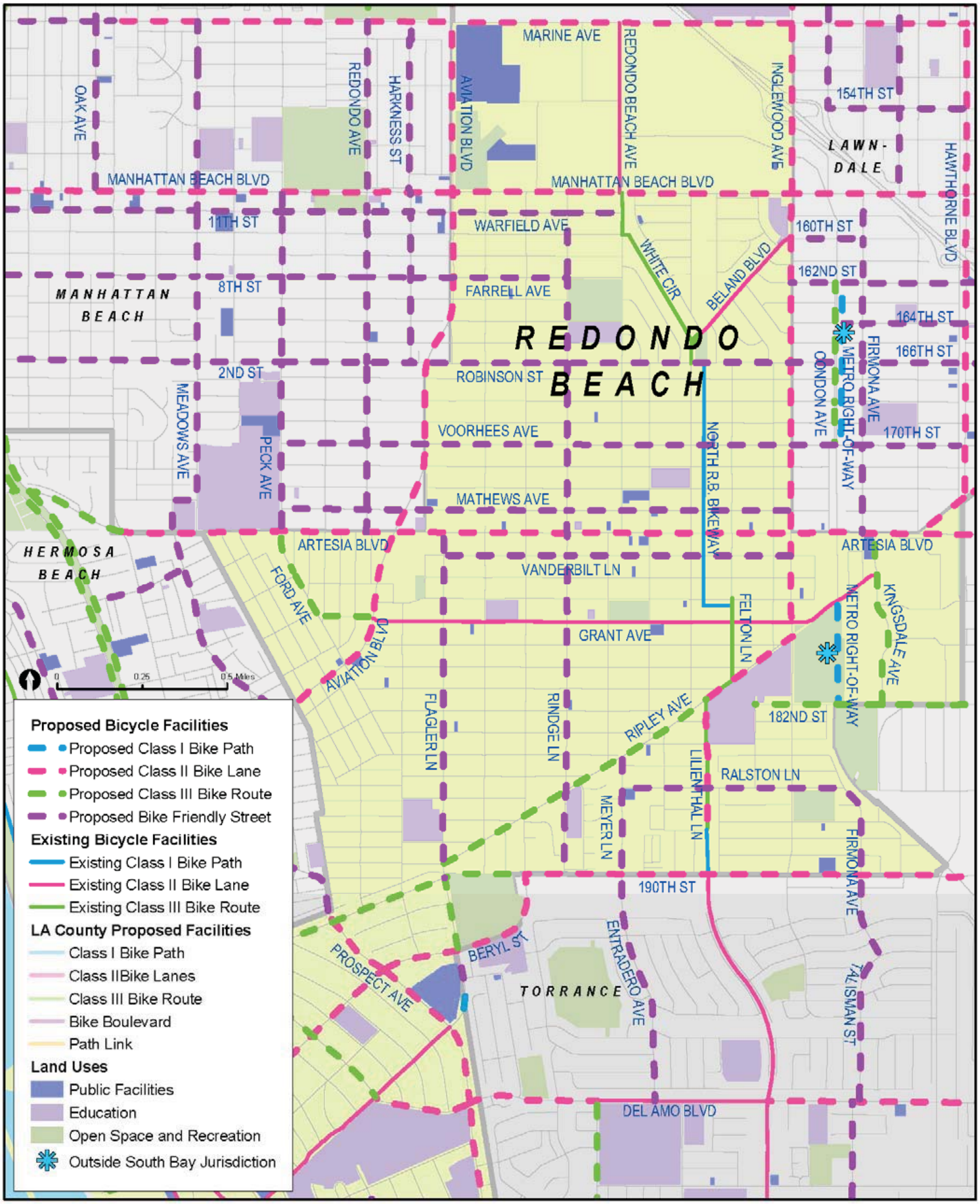
Proposed Bicycle Facilities in Gardena

Proposed Bicycle Facilities in Hermosa Beach



Proposed Bicycle Facilities in Lawndale

Proposed Bicycle Facilities in Manhattan Beach



Proposed Bicycle Facilities in North Redondo Beach

Proposed Bicycle Facilities in South Redondo Beach

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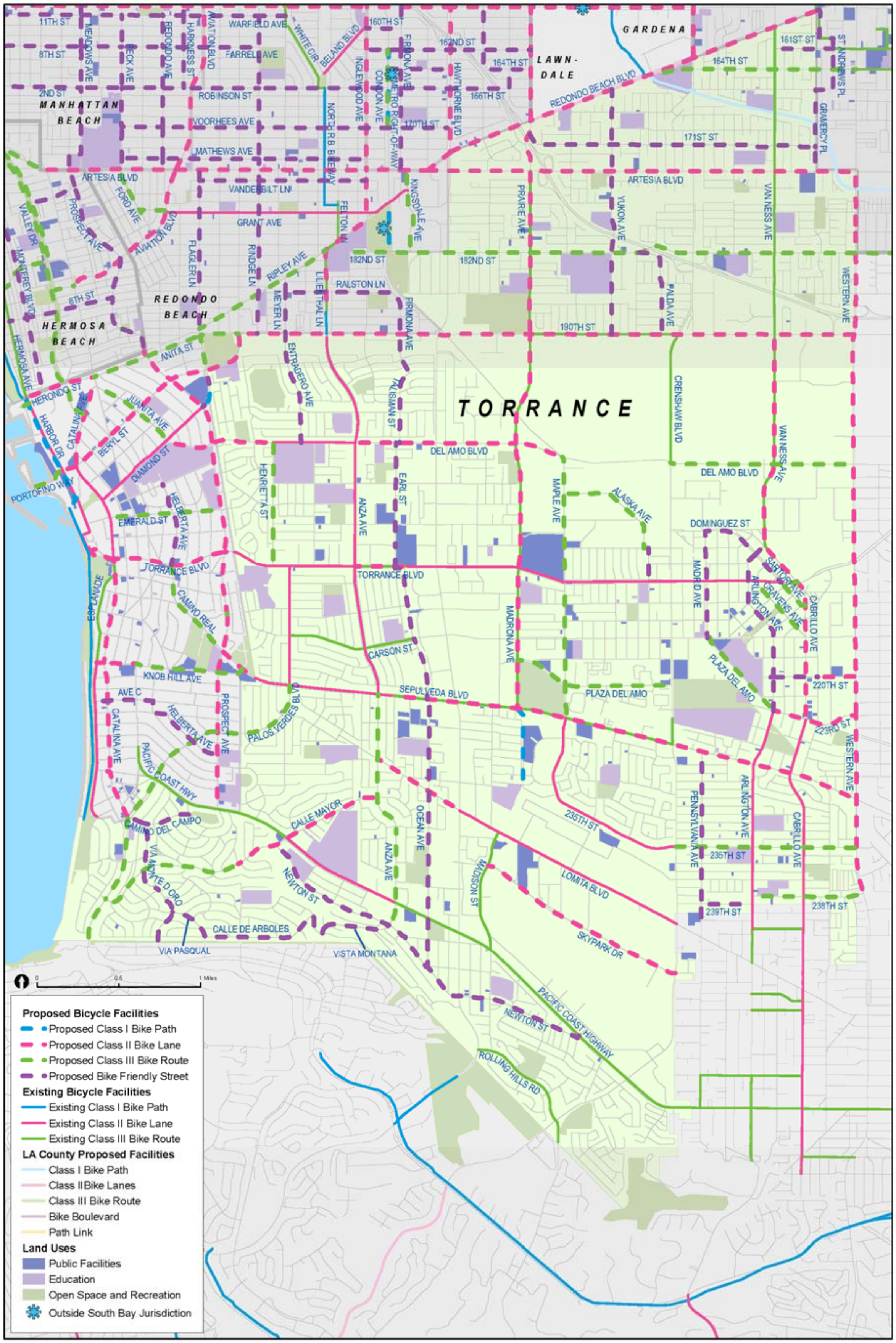

Proposed Bicycle Facilities in Torrance

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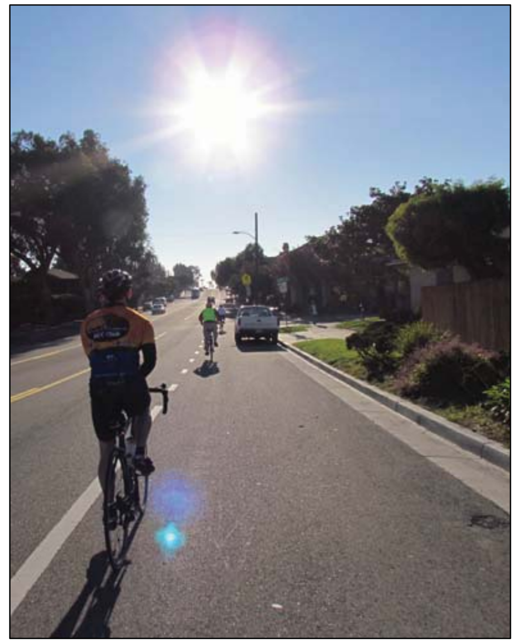
Chapter 1

Introduction

1 Introduction

The South Bay Bicycle Master Plan is intended to guide the development and maintenance of a comprehensive bicycle network and set of programs throughout the cities of El Segundo, Gardena, Hermosa Beach, Lawndale, Manhattan Beach, Redondo Beach, and Torrance for the next 20 years. This chapter introduces the seven participating South Bay cities and the South Bay region as a whole. It also presents the reasons for creating the South Bay Bicycle Master Plan, how the community has been involved in the planning process, and the framework for the ensuing chapters.



Bicyclists in the South Bay.

Photo Source: Kelly Morphy/WALC Institute for Vitality City

1.1 Setting

The South Bay region is located in southwest Los Angeles County and includes the cities along and inland of southern Santa Monica Bay. This bicycle master plan focuses specifically on seven cities within the South Bay region that have agreed to participate in this planning effort. Together, these cities comprise approximately 45 square miles of land area and have a combined population of over 350,000. The seven participating cities vary in size, population, socioeconomic factors, and climate, as well as in existing levels of bicycle infrastructure and bicycle usage. **Figure 1-1** displays the South Bay master plan cities within the Los Angeles region, and **Table 1-1** shows the population statistics for each city as compared to the project area as a whole.

Table 1-1: Population of the South Bay Bicycle Master Plan Cities

Location	Population	Percent Project Area Population
El Segundo	15,970	4.4%
Gardena	57,818	16.0%
Hermosa Beach	18,442	5.1%
Lawndale	31,729	8.8%
Manhattan Beach	34,039	9.5%
Redondo Beach	63,261	17.6%
Torrance	137,933	38.4%
TOTAL	**359,192**	**100%**

Source: U.S. Census 2000

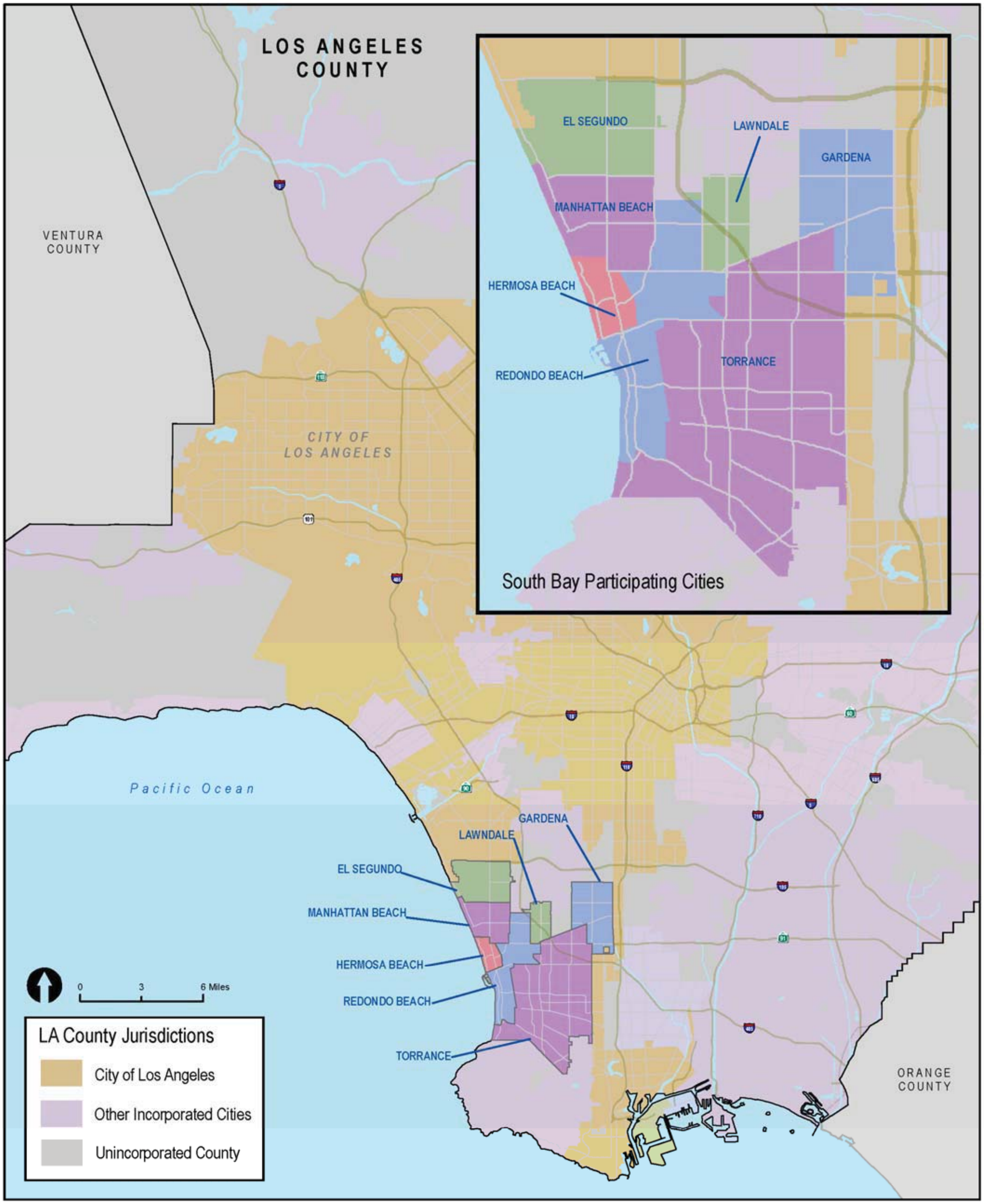


Figure 1-1: Location of South Bay Bicycle Master Plan Communities within Region

Los Angeles County Bicycle Master Plan

Source: Los Angeles County (2010)
Date: 11/2/2010

The South Bay currently faces several barriers to bicycling. This region is an area dominated by the automobile. Many streets carry high volumes of vehicles traveling at fast speeds (see **Appendix A-1**) creating challenging road conditions for bicyclists. Roads with fewer motorized vehicles are often residential streets that do not connect or end in cul-de-sacs, forcing bicyclists to travel far out of their way to reach their destinations. There is also a lack of regional bicycle connectivity between South Bay cities illustrated by bicycle facilities dropping at city boundaries, such as the bicycle lanes on Sepulveda Boulevard in Torrance stopping once the street enters Redondo Beach (see **Appendix A-2**).

1.2 Purpose of the Bicycle Master Plan

The South Bay Bicycle Master Plan provides a broad vision, as well as strategies and actions, to improve conditions for bicycling throughout the seven participating South Bay cities and address the barriers to bicycling discussed above. As a means of bettering the bicycling environment, this Plan provides direction for expanding the existing bikeway network, connecting gaps in and between the participating cities, and ensuring greater local and regional connectivity. The South Bay Bicycle Master Plan recommends a network in which bicyclists will be able to pass through the participating cities to reach their destinations without losing bicycle facilities at city boundaries, which will also allow residents of adjacent cities to benefit from the bicycle system. In addition to providing recommendations for bikeways and support facilities, the Plan offers recommendations for education, encouragement, enforcement, and evaluation programs.

In its recommendations, the South Bay Bicycle Master Plan includes facilities and programs that will encourage people of all ages and levels of ability to bike more frequently. Supported by data collected nationally since 2006, planners developed categories to address Americans' 'varying attitudes' towards bicycling, which are shown in **Figure 1-2**. As illustrated, less than one percent of Americans comprise a group of bicyclists who are '**Strong and Fearless**'. These bicyclists typically ride anywhere on any roadway regardless of roadway conditions, weather, or the availability of bicycle facilities. The strong and fearless bicyclists can ride faster than other user types, prefer direct routes, and will typically choose roadway connections – even if shared with vehicles – over separate bicycle facilities such as bicycle paths. This category of bicyclists will be less affected by this Plan than the following groups.

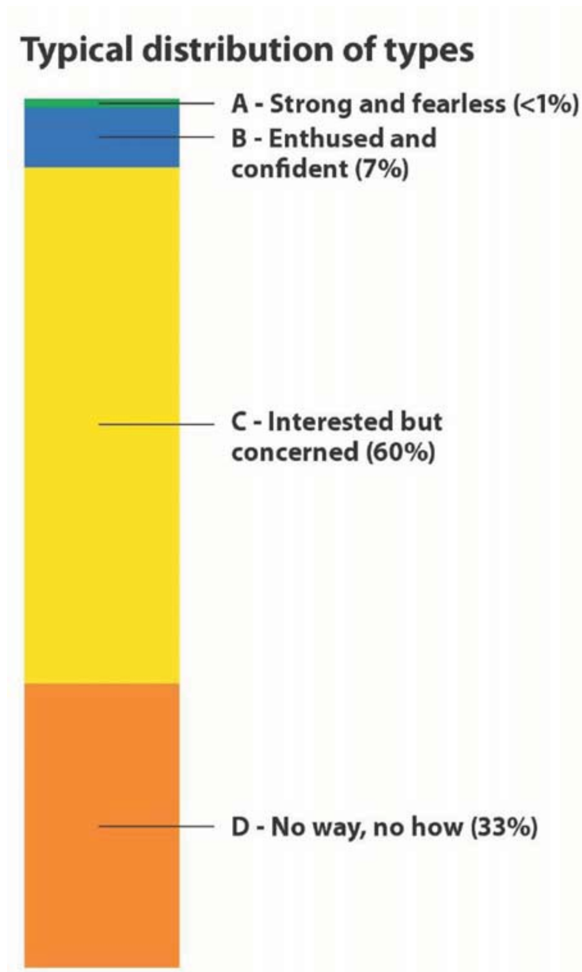


Figure 1-2: Typical Distribution of Bicyclists in the United States

Replacing vehicular trips with bicycle trips reduces human-generated greenhouse gases that are associated with climate change.

Approximately seven percent of Americans fall under the category of '**Enthused & Confident**' bicyclists who are confident and mostly comfortable riding on all types of bicycle facilities, but will usually prefer low traffic streets or multi-use pathways when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists including commuters, recreationalists, racers, and utilitarian bicyclists. The South Bay Bicycle Master Plan will provide this group of bicyclists more bicycle facility options, which should create a more comfortable bicycling environment for them.

The remainder of the American population does not currently ride a bicycle regularly, in large part due to perceived safety risks from riding with traffic. This Plan will affect the following two groups the most as it will provide for the facilities and programs that should encourage them to ride or ride more often. Approximately 60 percent of the population can be categorized as '**Interested but Concerned'** and represents bicyclists who typically only ride a bicycle on low traffic streets or bicycle paths under favorable conditions and weather. These bicyclists may ride more regularly with encouragement, education, experience, and the availability of bicycle infrastructure.

Approximately 33 percent of Americans are not bicyclists. They are referred to in the diagram as **'No Way, No How.'** Some people in this group may eventually consider bicycling and may progress to one of the user types above. A significant portion of these people will never ride a bicycle under any circumstances.

According to results from the South Bay bicycling survey administered in December of 2010 (see **Section 1.5**) 53 percent of respondents indicated that they are confident bicyclists and ride regardless of the availability of bicycle facilities. However, it is important to note that survey respondents were a self-selected group and are not necessarily representative of the entire South Bay region.

This Plan aims to shift people into higher categories, especially those in the "Interested but concerned" category into the "Enthused and confident" category, by improving the bicycling conditions in the South Bay participating cities. In addition, the Plan targets improvements for recreational and sport bicyclists as there is a large and growing group of them in the South Bay.

The South Bay Bicycle Master Plan should increase the numbers of new bicyclists and bicycle trips in the region by providing a safer bicycling environment. The availability of bicycle infrastructure has been found to reduce bicycle collision rates and the frequency of injury collisions. In a 2009 study published in *Environmental Health*, Reynolds et al investigated transportation infrastructure that reduced injuries and crashes of bicyclists. The study found that on-street bicycle facilities that separated vehicles and bicyclists, mainly bicycle lanes, reduced the number of collisions between bicyclists and motorists. Pavement markings, such as intersection crossing markings, and marked bicycle routes also minimized crashes as they alerted motorists to the presence of bicyclists. Certain roadway characteristics, including wide streets and lack of lighting, increased the severity of injury collisions.[1]

The City of New York recently added a significant amount of new bicycle infrastructure and has seen a steady increase in ridership, as well. Along with more bicycle facilities and bicyclists, annual casualties from bicycle collisions have also decreased. **Appendix B** presents the City's detailed data.

The City of New York recently added a significant amount of bicycle infrastructure and has seen a steady increase in ridership, as well.

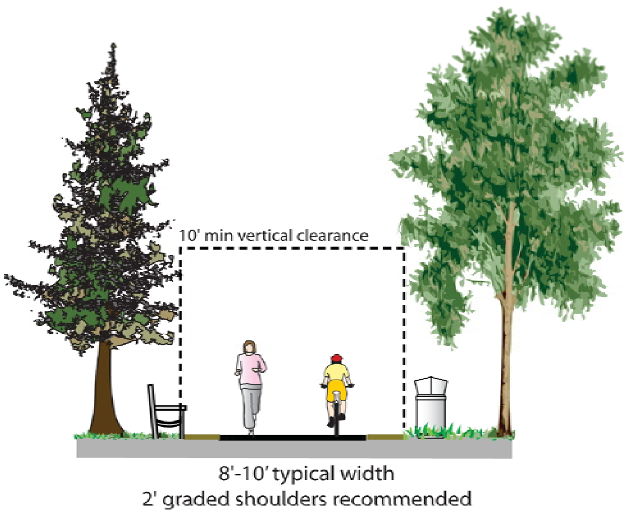
1.3 Bicycle Facility Types

The South Bay Bicycle Master Plan recommends four broad categories of bicycle facilities. The first three, Class I, II, and III, are defined by the State of California in the California Streets and Highways Code Section 890.4. The fourth category, bicycle-friendly streets, has emerged recently as a distinct facility type. Although bicycle-friendly streets are not yet codified by the State of California, they have been implemented with success in cities such as Berkeley, CA and Long Beach, CA. **Figure 1-3** and **Figure 1-4** illustrate recommended cross-sections for the four types of bicycle facilities, which are discussed in the following sections. Minimum standards are presented in **Appendix C**.

[1] Reynolds, C., Harris, M.A., Teschke, K., Cripton, P.A., Winters, M. (2009). The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. *Environmental Health* 8, 47.

Class I Bike Paths

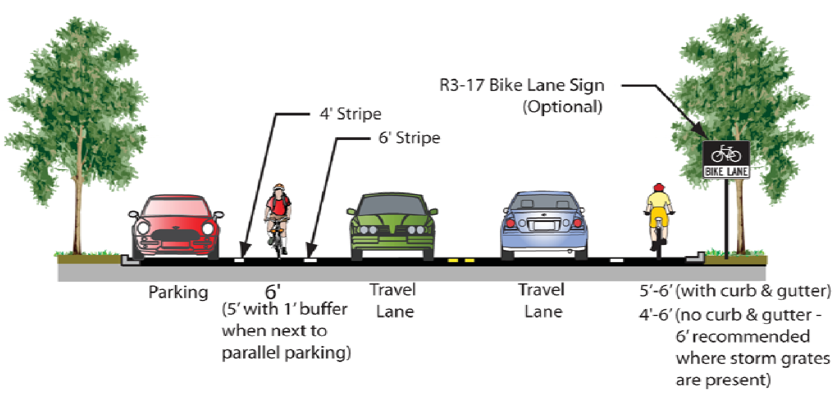
Provide completely separated right-of-way for exclusive use by bicycles and pedestrians with cross-flow minimized.



R5-3: No Motor Vehicles sign
R9-7: Shared-Use Path Restriction sign

Class II Bike Lanes

Provide striped lane for one-way bike travel on a street or highway



R3-17: Bike Lane sign
Placed at periodic intervals along bicycle lanes

Figure 1-3: Bicycle Path and Bicycle Lane Recommended Standards

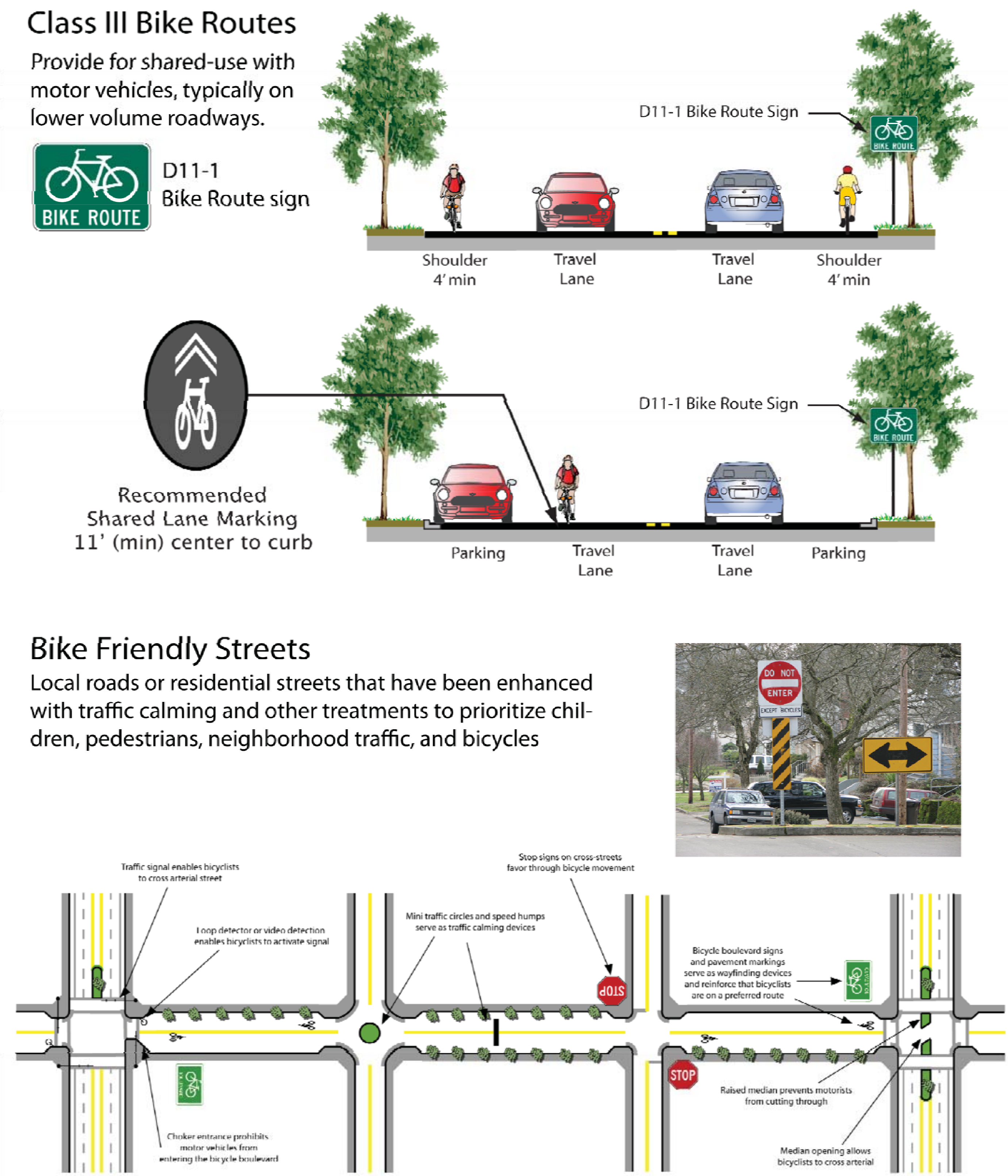


Figure 1-4: Bicycle Route and Bicycle Friendly Street Recommended Standards

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Torrance

1.3.1 Class I Bike Paths

Class I Bike Paths are paved rights-of-way for exclusive use by bicyclists, pedestrians, and those using non-motorized modes of transportation.

Class I Bike Paths are paved right-of-way for exclusive use by bicyclists, pedestrians, and those using non-motorized modes of transportation. Class I facilities can be constructed in roadway right-of-way or can have exclusive right-of-way off-street, such as in utility corridors. Bike Paths are beneficial to a bicycle network because they provide an alternative for bicyclists that do not feel comfortable riding with automobile traffic. When shared with pedestrians or other non-motorized modes, Class I bike paths are generally slower moving than other facility types. While they can be used by commuters to safely get to and from work, they are generally most popular with recreational cyclists, as illustrated by The Strand in the beach cities.

1.3.2 Class II Bike Lanes

Class II Bike Lanes are striped and signed on-street travel lanes exclusively for bicycles. Bike lanes provide physical separation from automobile traffic and appeal to bicyclists with moderate to high levels of experience. Because they often provide the most direct connections, these facilities tend to be most popular with experienced bicycle commuters.

1.3.3 Class III Bike Routes

Class III Bike Routes share the right-of-way between vehicles and bicyclists with signage and optional shared lane markings to indicate that the road is a shared use facility. Class III facilities are typically recommended for:

- Streets with relatively low traffic speeds (25 mph or less) and lower volumes (<3,000 ADT) such that less experienced bicyclists will feel comfortable bicycling with mixed traffic
- Streets with traffic speeds in excess of 25 mph and volumes greater than 3,000 ADT that normally warrant bike lanes but because of curb-to-curb or other ROW constraints, bicyclists must share traffic lanes with motorists; careful consideration must be given to designating these streets as shared roadways to ensure that roadway conditions are safe for bicyclists

1.3.4 Bike Friendly Streets

Bike friendly streets are local roads that have been enhanced with treatments that prioritize children, pedestrians, neighborhood traffic, and bicycles, and discourage cut-through traffic. Bike friendly streets include a wide range of treatment options, and thus the cost of implementation varies dramatically, as well. The list below includes example treatments of bike friendly streets:

- Wayfinding signage
- Pavement markings
- Traffic calming (bulb-outs, traffic diverters, chicanes, speed humps)
- High visibility pedestrian crosswalks
- Bicycle detectors at intersections
- Bicycle crossing signals

Bike friendky streets are local roads that have been enhanced with treatments that prioritize children, pedestrians, neighborhood traffic, and bicycles, and discourage cut-through traffic.

1.4 Benefits of Bicycling

Planning to create a more bicycle friendly region contributes to resolving several complex and interrelated issues, including traffic congestion, air quality, climate change, public health, and livability. By guiding the seven participating cities toward bicycle friendly development, this plan can affect all of these issue areas, which collectively can have a profound influence on the existing and future quality of life in the South Bay.

1.4.1 Environmental/Climate Change Benefits

Replacing vehicular trips with bicycle trips has a measurable impact on reducing human-generated greenhouse gases (GHGs) in the atmosphere that contribute to climate change.[2] Fewer vehicle trips and vehicle miles traveled (VMT) translates into reduced fuel consumption and subsequently fewer mobile source pollutants, such as carbon dioxide, nitrogen oxides, and hydrocarbons, being released into the air. Providing transportation options that reduce VMT is an important component of decreasing greenhouse gas emissions and improving air quality.

1.4.2 Public Health Benefits

Public health professionals have become increasingly aware that the impacts of automobiles on public health extend far beyond

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[2] Gotschi, Thomas (2011). Costs and Benefits of Bicycling Investments in Portland, Oregon. *Journal of Physical Activity and Health* (8), S49-S58.

In Los Angeles County as a whole, more than 20 percent of children in 5th, 7th, and 9th grades are obese. Creating bicycle-friendly environments is one of several effective ways to encourage active lifestyles.

asthma and other respiratory conditions caused by air pollution. There is a much deeper understanding of the connection between the lack of physical activity resulting from auto-oriented community designs and various health-related problems. Although diet and genetic predisposition contribute to these conditions, physical inactivity is now widely understood to play a significant role in the most common chronic diseases in the United States, including heart disease, stroke, and diabetes, and approximately 280,000 adults in the US die prematurely due to obesity-related illnesses every year.[3] A study published in the *American Journal of Preventive Medicine* in 2004 by Frank et al reported that for each extra 60 minutes spent in a car there was a six percent increase in the chance of being obese[4]. A survey conducted by Vitality City administered from September 30, 2010 to November 27, 2010 reported that 60 percent of respondents from Hermosa Beach, Redondo Beach, and Manhattan Beach considered themselves overweight or obese; 25 percent have had high cholesterol; and 23 percent have had high blood pressure.[5] In Los Angeles County as a whole, more than 20 percent of children in 5th, 7th and 9th grades are obese; 58 percent of adults are overweight or obese; and obesity rates continue to rise among adults, school-age children and kids as young as three to four years of age.[6] 46 percent of the Beach Cities respondents of the Vitality City survey also reported feeling stressed for a significant portion of the day.

Creating bicycle-friendly communities is one of several effective ways to encourage active lifestyles, ideally resulting in a higher proportion of residents of the South Bay achieving increased activity levels and lower stress levels. Increased physical activity also has the potential to lower medical expenditures associated with obesity-related illnesses for South Bay residents. In a 2011 study published in the *Journal of Physical Activity and Health*, Thomas Gotschi assessed the reduction in medical costs that Portland will

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[3] *Allison D.B., Fontaine K.R., Manson J.E., Stevens J., VanIttallie T.B. Annual deaths attributable to obesity in the United States. JAMA 1999(282), 1530-1538.*

[4] Frank L.D., Andresen M.A., Schmid T.L. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine* 4(11), 11-13.

[5]http://hermosabeach.patch.com/articles/vitality-city-survey-residents-healthy-but-stressed

[6] RENEW-LAC http://www.choosehealthla.com/eat-healthy/

experience from its investments in bicycling. He estimated that a half hour of bicycling everyday will reduce medical costs by $544 per person per year.[7]

1.4.3 Economic Benefits

Bicycling is economically advantageous to individuals and communities. Replacing driving with bicycling reduces a person's expenses on vehicle maintenance, fuel costs, and insurance fees. These savings are accompanied by potential reductions in health care costs by participating in regular exercise and minimizing health complications associated with an inactive lifestyle. On a community scale, bicycle infrastructure projects are generally far less expensive than automobile-related infrastructure. Further, shifting a greater share of daily trips to bike trips reduces the impact on the region's transportation system, thus reducing the need for improvements and expansion projects. Bicycle-friendly neighborhoods have also been found to increase property values. Transit Oriented Developments (TODs), for example, are designed to encourage walking, bicycling, and use of public transit so that residents of these developments can be less dependent on motor vehicles. In a 2011 study published in *Urban Studies*, Michael Duncan reported that people were willing to pay more for condominiums in San Diego, CA located closer to transit stations,[8] while homes within a half mile of bikeway trail improvements experienced a $13,000 increase in property values.[9] Increased bicycling also has the potential to increase sales at local businesses. Bicyclists might have more disposable income from fewer vehicle-related expenditures and as seen in Toronto's Bloor Street, cyclists visit their local shops and spend more than their motorist counterparts.[10]

A 2004 study found that homes within a half mile of bikeway trail improvements experienced a $13,000 increase in property values.

[7] Gotschi, Thomas (2011). Costs and Benefits of Bicycling Investments in Portland, Oregon. *Journal of Physical Activity and Health* (8), S49-S58.

[8] Duncan, M. (2011). The impact of transit-oriented development on housing prices in San Diego, CA. *Urban Studies* 48, 101.

[9] Lindsey G, Man J, Payton S, et al. "Property Values, Recreation Values, and Urban Greenways." *Journal of Park and Recreation Administration*, 22(3): 69–90, 2004.

[10] Sztabinski, F. (2009). Bike Lanes, On-Street Parking and Business. *Clean Air Partnership* 18-20.

1.4.4 Community/Quality of Life Benefits

Fostering conditions where bicycling is accepted and encouraged increases a city's livability from a number of different perspectives that are often difficult to measure, but nevertheless important. The design, land use patterns, and transportation systems that comprise the built environment have a profound impact on quality of life issues. Studies have found that people living in communities with built environments that promote bicycling and walking tend to be more socially active, civically engaged, and are more likely to know their neighbors[11]; whereas urban sprawl has been correlated with social and mental health problems, including stress.[12] The aesthetic quality of a community improves when visual and noise pollution caused by automobiles is reduced and when green space is reserved for facilities that enable people of all ages to recreate and commute in pleasant settings.

The seven participating cities each held two public workshops to collect public input on the South Bay Bicycle Master Plan.

1.4.5 Safety Benefits

Conflicts between bicyclists and motorists result from poor riding and/or driving behavior, as well as insufficient or ineffective facility design. Encouraging development and redevelopment in which bicycle travel is fostered improves the overall safety of the roadway environment for all users. Well-designed bicycle facilities improve security for current bicyclists and also encourage more people to bike. This in turn can further improve bicycling safety. Studies have shown that the frequency of bicycle collisions has an inverse relationship to bicycling rates – more people on bicycles equates to fewer crashes.[13] Providing information and educational opportunities about safe and lawful interactions between bicyclists and other roadway users also improves safety.

1.5 Public Participation

Community outreach is a critical part of the planning process as it helps to identify the needs of bicyclists in the study area. The public participated in the creation of the South Bay Bicycle Master Plan through an online survey and two community workshops.

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[11] Leyden, K. 2003. Social Capital and the Built Environment: The Importance of Walkable Neighborhoods. *American Journal of Public Health* 93: 1546-51.

[12] Frumkin, H. 2002. Urban Sprawl and Public Health. *Public Health Reports* 117: 201-17.

[13] Jacobsen, P. Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. *Injury Prevention*, 9: 205-209. 2003.

To reach a broad cross-section of the public, the South Bay Bicycle Coalition, the Los Angeles County Bicycle Coalition, and the participating cities employed a variety of media and tactics, including:

- Radio advertisements
- Advertisements in newspapers, both print and online
- Advertisements in fitness magazines
- Flyers posted throughout the participating cities, at schools, bike shops, and community centers
- Advertisements on the city cable stations
- An advertisement on the I-405 digital marquee
- Facebook
- Emails
- In-person presentations to a variety of community groups and volunteer organizations
- Press releases
- Door-to-door flyering
- Presentations at various commission meetings
- Website postings on each City's homepage and events calendar
- Communications with Vitality City, an initiative of the Beach Cities Health District

LACBC, SBBC, and the participating cities used a variety of media and tactics to reach a broad cross-section of the public.

1.5.1 Bicycling Survey

With input from seven participating cities, Alta Planning + Design, the South Bay Bicycle Coalition and Los Angeles County Bicycle Coalition staff developed an online survey to determine the participating South Bay cities' general needs and concerns surrounding bicycling. The survey was available online from December 15, 2010 to February 8, 2011. It was distributed to the staff liaisons in each of the participating cities and emailed to all members of the South Bay Bicycle Coalition. As an incentive to complete the survey, respondents were entered to win a $100 gift certificate to Hermosa Cyclery in Hermosa Beach. A total of 277 people completed the survey. The data collected from respondents describe the bicycling needs, preferences, and behaviors of the South Bay community. Feedback pertaining to desired bicycle and bicycle support facilities is discussed in each City's chapter and a detailed summary of the survey results is presented in **Appendix D**.

1.5.2 Public Workshops

The first and second round of public workshops for the South Bay Bicycle Master Plan were well attended.

The seven participating cities each held two public workshops throughout the planning process for the South Bay Bicycle Master Plan. The first round of workshops were conducted as "open house" style at which attendees had the opportunity to view maps displaying the existing bicycling conditions in the region and provide feedback on what they would like to see implemented in the future. The first round of workshops were very well attended and had a considerable impact on the selection of corridors for improvements and on the content of the proposed programs.

The second round of public workshops took place in June through July of 2011. These workshops were also very well attended and workshop attendees provided input on a draft of the South Bay Bicycle Master Plan as well as draft maps of proposed improvements.

1.6 Plan Organization

For the most part, the South Bay Bicycle Master Plan is organized by participating city. This makes it easier for local stakeholders – such as city staff, decision makers, and residents – to find the material that is relevant to them. There are a few region-wide topics that are not organized by city, such as the goals, objectives, and policy actions framework established in **Chapter 2**.

The plan is broken into the following chapters:

- **Chapter 2: Goals, Objectives, and Policy Actions** summarizes existing regional plans and policies that relate to the bicycle planning efforts in the South Bay, as well as region-wide goals, objectives, and policy actions for the seven participating cities
- **Chapter 3: El Segundo** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of El Segundo
- **Chapter 4: Gardena** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Gardena
- **Chapter 5: Hermosa Beach** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Hermosa Beach

- **Chapter 6: Lawndale** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Lawndale
- **Chapter 7: Manhattan Beach** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Manhattan Beach
- **Chapter 8: Redondo Beach** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Redondo Beach
- **Chapter 9: Torrance** presents the existing bicycling conditions that influenced recommendations in this Plan, as well as proposed policies and bicycle facilities in the City of Torrance
- **Chapter 10: Recommended Programs** discusses proposed education, encouragement, and enforcement programs, as well as public awareness campaigns to increase bicycling in the participating cities; it also presents methods for monitoring and evaluating the success of the Plan
- **Chapter 11: Wayfinding and Signage Plan** presents the region-wide signage plan to make South Bay bikeways and key destinations easier to navigate to by bicycle
- **Chapter 12: Funding** discusses potential funding sources to help the participating cities to implement their proposed bicycle networks

Chapter 11: Wayfinding and Signage Plan presentsthe region-wide signage plan to make South Bay bikeways and key destinations easier to navigate to by bicycle.

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Chapter 2

Goals, Objectives, and Policy Actions

2 Goals, Objectives, and Policy Actions

The vision of the South Bay Bicycle Master Plan is to create a bicycle-oriented South Bay region in which bicycling is a safe, convenient, attractive, and viable transportation option for all levels of bicycling abilities. This chapter outlines the goals, objectives, and policies that support this vision and will serve as guidelines in the development of a bicycle-friendly South Bay. These policies provide the framework and accountability for plan implementation. This chapter also includes the goals, objectives, and policy actions' relationship with regional existing plans and policies as mandated by State law. The relationship to existing City-specific plans and policies is located in each City's chapter.

The vision of the South Bay Bicycle Master Plan is to create a bicycle-oriented South Bay region in which bicycling is a safe, convenient, attractive, and viable transportation option for all levels of bicycling abilities.

2.1 South Bay Goals, Objectives, and Policies

In order to ensure a thorough and successful planning process, it is important to establish a set of goals, objectives, and policies that will serve as the basis for the recommendations in this Plan. The goals, objectives, and policies in this Plan are derived from information gathered over the course of the planning process, including community input from public workshops, as well as a review of bicycle master plans from other cities.

> Goals are broad statements that express general public priorities. Goals are formulated based on the identification of key issues, opportunities, and problems that affect the bikeway system and were formed by public input.
>
> Objectives are more specific than goals and are usually attainable through strategic planning and implementation activities. Implementation of an objective contributes to the fulfillment of a goal.
>
> Policies are rules and courses of action used to ensure plan implementation. Policies often accomplish a number of objectives. Policies are generally carried out by the City. In the case that a particular group or individual is identified, the City will ensure those groups or individuals are in place to carry forward their responsibility or will find other means to implement the relevant policies.

The following tables outline the goals, objectives, and policies of the South Bay Bicycle Master Plan. Each policy has an implementation time frame assigned to it ranging from immediate (2012), to the first 0-5 years (2012-2017), 5-10 years (2017-2022), or ongoing throughout the length of the 20-year plan starting in 2012 (2012-2032).

Goal 1.0: Create a Bicycle-Friendly South Bay	
Create a bicycle-friendly environment throughout the South Bay region for **all types** of bicycle riders and all trip purposes in accordance with the 6 Es (Equity, Education, Encouragement, Enforcement, Engineering, Evaluation) as a means of improving regional health, increased road safety, reduced carbon emissions and an overall increase in bike ridership.	
Objective 1.1	**Connectivity through an Expanded Bikeway Network** Expand the existing bicycle network to provide a comprehensive, regional network of Class I, Class II, and Class III facilities that increases connectivity between homes, jobs, public transit, schools and recreational resources for a variety of road users in the South Bay.
Policy Actions	**1.1.1** Develop a 20-year implementation strategy for the South Bay Bicycle Master Plan that will begin to implement the policies and facilities herein. Schedule: 2012 **1.1.2** Develop an extensive bikeway network through the use of standard and appropriate innovative treatments as provided in the Manual on Uniform Traffic Control Devices or the National Association of City Transportation Officials Urban Bikeway Design Guide and other such guidelines and standards, with available funding. Schedule: 2012-2032 **1.1.3** Establish Bicycle Friendly Streets to encourage bicycling on streets with low traffic volumes (existing ADT under 7,000 and 3,000 ADT after implementation) and slow speeds (25 mph or under). Appropriate streets will be determined by staff review. Schedule: 2012 - 2032 **1.1.4** Review and encourage implementation of policies and facilities proposed in the South Bay Bicycle Master Plan whenever planning new bicycle facilities or Capital Improvement Projects that may be related to bicycle improvements. Schedule: 2012-2032 **1.1.5** Incorporate the proposed policies, facilities and programs from the South Bay Bicycle Master Plan in whole or by reference into the City's Circulation Element upon future General Plan updates. Schedule: 0 – 5 years **1.1.6** Coordinate with adjoining jurisdictions on bicycle planning and implementation activities on east-west corridors to link inland cities to coastal resources and on north-south corridors to link the region to neighboring communities. Schedule: 2012-2032
Objective 1.2	**Consistent Design and Engineering for Bicycles** Promote safe and equitable bicycle access on all roadways by integrating bicycle travel considerations into all roadway planning, design, construction and maintenance, as well as incorporation of Complete Street standards into all Capital improvements, in accordance with AB 1358.

Policy Actions	**1.2.1** Evaluate and encourage reallocation of roadway rights-of-way where appropriate to accommodate bicycling and bicycle facilities. Schedule: 2012-2032 **1.2.2** Consider adopting Complete Streets policies that are incorporated into all Capital Improvements and generally align with the policy elements defined by the National Complete Streets Coalition (see Appendix N for policy language from the Complete Streets Act of 2008 and complete streets policies from the National Complete Streets Coalition). Schedule: **1.2.3** Prioritize opportunities that improve walkability and bikeability by utilizing Complete Streets standards for all Capital Improvement Projects. Schedule: 2012-2032 **1.2.4** Consider removal of on-street parking to accommodate striped bike lanes, to the extent feasible. Schedule: 2012-2032 **1.2.5** Ensure that existing on-street bicycle routes, bicycle lanes, and off-street bicycle paths are appropriately signed, marked, and/or traffic-calmed. Schedule: 0-5 years **1.2.6** Promote consistent signage that directs bicyclists to neighborhood destinations and increases the visibility of the regional bicycle network and is consistent with the signage plan herein. Schedule: 2012-2032 **1.2.7** Provide amenities and enhancements, such as traffic calming treatments, streetscape improvements, bicycle parking and wayfinding signage along City bikeways that increase their utility and convenience for all bicyclists. Schedule: 2012-2032 **1.2.8** Explore the use of the "sharrow" markings on all existing and proposed Class III facilities, as feasible and in accordance with the most current edition of the Manual on Uniform Traffic Control Devices. Schedule: 0-5 years **1.2.9** Coordinate bicycle facility improvements or upgrades with the City's resurfacing schedule. Schedule: 2012-2032 **1.2.10** Explore opportunities to include bicycle detection as part of all traffic signal improvements in conformance with the current edition of the California Manual on Uniform Traffic Control Devices, to the extent feasible.

	Schedule: 2012-2032 **1.2.11** Considering adopting an updated streets and highways manual that includes comprehensive Complete Streets standards. Schedule: 0-5 years **1.2.12** Begin to utilize new signage, markings and facility designs as new and innovative treatments become adopted standards at the State and Federal levels. Schedule: 2012-2032 **1.2.13** Consider instituting a pilot program that will test new facility types aimed at improving bicycle safety and convenience before they are adopted standards. Schedule: 2012-2032
Objective 1.3	**Increased Mobility through Bicycle-Transit Integration** Further improve access to major employment and activity centers and encourage multi-modal travel for longer trip distance by supporting bicycle-transit integration.
Policy Actions	**1.3.1** Support the development of bicycle facilities that provide access to regional and local public transit services. Schedule: 2012-2032 **1.3.2** Coordinate with transit providers to ensure bicycles can be accommodated on all forms of transit vehicles in the immediate future and that adequate space is devoted to their storage on board whenever possible. Schedule: 2012-2032 **1.3.3** Coordinate with transit agencies to install and maintain convenient and secure short-term and long-term bike parking facilities – racks, on-demand bike lockers, in-station bike storage, and staffed or automated bicycle parking facilities – at transit stops, stations, and terminals. Schedule: 5-10 years **1.3.4** Provide current and relevant information to bicyclists regarding bike parking opportunities and bicycle access located at transit stations through a variety of formats, such as on City websites and regional bike maps. Schedule: 0-5 years
Objective 1.4	**Provide Convenient and Consistent Bicycle Parking Facilities** Encourage the use of bicycles for everyday transportation by ensuring the provision of convenient and secure bicycle parking and support facilities region-wide and promote facilities to the public.
Policy Actions	**1.4.1** Establish bicycle parking standards for City-owned bicycle parking facilities that address the location, design and capacity that should be provided by all City bicycle parking facilities. Schedule: 0-5 years **1.4.2** Install and support high-quality, bicycle parking within the public right-of-way and on public property, especially in high demand locations, such as near commercial centers,

	employment centers, schools, colleges and parks. Schedule: 5-10 years **1.4.3** Consider providing bicycle parking (sheltered where feasible and appropriate) at all new and existing City-owned facilities, public parking lots and recreational facilities that will support an appropriate ratio of the estimated employees and daily visitors of that location. Schedule: 2012-2032 **1.4.4** Consider adopting bicycle parking ordinances or modifying existing sections of the municipal code to require bicycle-parking in new large commercial or multi-family developments. Cities with existing bike parking ordinances or Municipal Code sections exempted. Schedule: 0-5 years **1.4.5** To the extent feasible, consider conditions of approval or appropriate incentives for new commercial developments and employment to provide showers and clothing lockers along with secure bike parking in areas where employment density warrants. Schedule: 2012-2032 **1.4.6** Consider amending the Municipal Code to decrease the number of required automobile parking spaces in commercial buildings where bicycle parking is provided, as feasible and appropriate. Schedule: 0-5 years **1.4.7** Require secure bike parking at large or heavily attended events or destinations, by providing permanent bicycle parking facilities at event locations or requiring use of temporary portable facilities, such as bike valets. Schedule: 0-5 years **1.4.8** Work with Metro, local transit agencies and adjacent property owners to provide bicycle parking in proximity to bus stops and other transit facilities. Schedule: 2012-2032

Goal 2.0: Create a Safer Bicycling Environment in the South Bay	
Create a safe bicycling environment in the South Bay through comprehensive education of all road users, enforcement efforts focused on cycling safety and reduced cycling conflicts, and consistent maintenance of a variety of bikeways.	
Objective 2.1	**Increase Bicycle Education and Awareness for All Road Users** Increase education of bicycle safety through programs and trainings of the general public and City employees.
Policy Actions	**2.1.1** Partner with local bike advocacy groups, bicycle related businesses, or other such organizations to provide bicycle-safety curricula to the general public and targeted populations, including diverse age, income, and ethnic groups. Schedule: 0-5 years **2.1.2** Provide multi-lingual bicycle safety information in languages that are widely used throughout the South Bay region. Schedule: 2012-2032 **2.1.3** Work with local bike advocacy groups and schools to develop and provide bicycle-safety curricula for use in elementary, middle, and high schools. Schedule: 2012-2032 **2.1.4** Support continuous bicycle education to City staff that are involved in the design or other such decisions that affect roadways; such as traffic engineers, planners, public works engineers, and parks and recreation staff. Schedule: 2012-2032 **2.1.5** Support programs and public service announcements that educate motorists, bicyclists, and the general public about bicycle operation, bicyclists' rights and responsibilities, and safe road-sharing behavior via city's website, local newspapers, and other such publications. Schedule: 2012-2032 **2.1.6** Provide increased bicycle safety education to law enforcement that focuses on safe cycling, relevant traffic laws, and safe sharing of the roadway. Schedule: 2012-2032
Objective 2.2	**Enforcement for Improved Cycling Safety** Increase enforcement activities that enhance safety of bicyclists on bike paths and roadways.
Policy Actions	**2.2.1** As appropriate and feasible, increase enforcement of unsafe bicyclist and motorist behaviors and laws that reduce bicycle/motor vehicle collisions and conflicts, and bike lane obstruction. Schedule: 2012-2032

	2.2.2 Explore opportunities to increase motorist awareness of possibility of the presence of bicyclists, specifically at locations with a high incidence of bicycle collisions. Schedule: 2012-2032 **2.2.3** To the extent feasible, consider utilizing bicycle-mounted patrol officers to promote bicycling awareness, prominence and law enforcement accessibility. Schedule: 2012-2032 **2.2.4** Develop or promote existing mechanisms for reporting behaviors that endanger cyclists. Schedule: 2012-2032
Objective 2.3	**Maintenance for Safe and Consistent Bikeability** Maintain bikeways that are clear of debris and provide safe riding conditions.
Policy Actions	**2.3.1** Coordinate with Public Works Department regarding existing routine maintenance schedules for bikeway sweeping, litter removal, landscaping, re-striping, signage, and signal actuation devices to provide increased priority to bike facilities. Schedule: 2012-2032 **2.3.2** Prioritize roadways with existing or proposed bike facilities in the City's street resurfacing plan, as necessary or appropriate. Schedule: 2012-2032 **2.3.3** Plan for bicyclist safety during construction and maintenance activities, including prominent signage and public announcements regarding construction and improvements that may affect bicycle travel. Schedule: 2012-2032 **2.3.4** Establish a maintenance reporting program to receive and respond to issues that impact bicyclist safety, such as potholes and street sweeping. Schedule: 2012-2032

Goal 3.0: Ensure an Enduring Bicycling Culture	
Develop infrastructure and a City-wide culture that respects and accommodates all users of the road, leading to a more balanced transportation system and measurable increases in bike ridership.	
Objective 3.1	**Partner with Local Bike Advocacy Groups** Foster community support for bicycling by raising public awareness about bicycling and supporting programs that encourage more people to bicycle.
Policy Actions	**3.1.1** Partner with local bike advocacy groups to publicize updated bike maps, safety tips, bike events, classes and commuting advice. Schedule: 0-5 years **3.1.2** Provide information to local bike groups, such as the South Bay Bicycle Coalition, to assist in promoting bicycling at public events, such as Bike to Work Day/Month and various City events. Schedule: 0-5 years **3.1.3** Upon meeting eligibility requirements, apply for designation of "Bicycle Friendly Community" through the League of American Bicyclists. Schedule: 0-5 years **3.1.4** Pending funding availability, expand bicycle promotion and incentive programs for City employees to serve as a model program for other South Bay employers. Schedule: 0-5 years
Objective 3.2	**Continuous Evaluation of Implementation and Performance** Establish accountability mechanisms that will ensure the plan's success through continuous monitoring of the implementation progress of Bicycle Master Plan policies, programs, and projects.
Policy Actions	**3.2.1** Designate a Mobility Coordinator within the City or assist the South Bay Cities Council of Governments (SBCCOG) in establishing a regional position to coordinate and oversee implementation of bike facilities, programs, grant applications and data collection, and provide regular updates to SBCCOG's Livable Communities Working Group and City Councils regarding plan implementation and progress. Schedule: 2012 **3.2.2** Mobility Coordinator or designated city staff will track city and/or region-wide benefits of plan implementation and trends in bicycle commuting through the use of Census data, travel surveys, and volunteer-led bicycle counts. Schedule: 2012-2032 **3.2.3** Mobility Coordinator or designated city staff will also regularly monitor bicycle safety and seek a continuous reduction in bicycle-related collisions on a per capita basis over the next twenty years.

	Schedule: 2012-2032 **3.2.4** Mobility Coordinator or designated City staff will ensure that Bicycle Master Plan programs and projects are implemented in an equitable manner, both geographically and socioeconomically. Schedule: 2012-2032 **3.2.5** Designate a council liaison to serve on a regional Bicycle Advisory Committee (BAC) comprised of community members and council members from each City that will meet regularly and will monitor the progress of bikeway implementation for each City. Schedule: 2012-2032 **3.2.6** To ensure continued eligibility for additional funding, update the City's section of the South Bay Bicycle Master Plan every five (5) years. Schedule: 2012-2032 **3.2.7** Amend the Municipal Code to require a public hearing with the appropriate Traffic, Public Works, Planning, or other such Commission for the removal of any existing bikeway. Cities with such existing policy are exempted. Schedule: 0-5 years **3.2.8** Coordinate with SBCCOG to integrate the electric local use vehicle program with proposed bike facilities and programs, as appropriate and as government code and guidelines allow. Schedule: 2012-2032
Objective 3.3	**Consistently Apply for Available Funding Sources** Ensure implementation of bikeways in the South Bay is prompt and continuous by consistently applying to the numerous local, state and federal funding sources available for which the City is eligible.
Policy Actions	**3.3.1** To the extent feasible, consistently pursue diverse sources of funding and support efforts to maintain or increase federal, state and local funding for the implementation of the South Bay Bicycle Master Plan programs and infrastructures. Funding sources that may be applied for annually or bi-annually as well as apportioned funds that may be partially dedicated to bicycle projects, include the following: A. Metro Call for Projects (bi-annual) B. State Safe Routes to School Funding (annual) C. Office of Traffic Safety Grants (annual) D. Caltrans Highway Safety Improvement Program (annual) E. Federal Safe Routes to School Funding (annual) F. Prop A Funds (annual) G. Coastal Conservancy Funds (annual) H. Federal Lanes Highway Funds (annual)

	I. Caltrans Bicycle Transportation Account (annual) J. Caltrans Community Based Transportation Planning Grant (annual) K. Prop C Transportation Demand Management Funds (annual) Schedule: 2012-2032 **3.3.2** Reference the prioritized project list provided in this plan when determining how to prioritize funding applications and City budget allocations for bikeways and support facilities. Schedule: 2012-2032 **3.3.3** Mobility Coordinator or designated City staff should coordinate bicycle improvement funding applications among all involved cities to increase probability of receiving grant funding. Schedule: 2012-2032 **3.3.4** Mobility Coordinator or designated City staff will develop a regular report to City Council that will include a summary of funds applied for, funding applications due in the short term, and an overview of implementation progress. Schedule: 2012-2032 **3.3.5** Consider a bicycle improvements line item in the City's Capital Improvements Program (CIP). Schedule: 2012-2032 **3.3.6** Consider allocating a proportional percentage of the City's local return Measure R funds specifically to active transportation infrastructure, such as bicycle and pedestrian facilities. Schedule: 0-5 years

2.2 Relevant Regional Existing Plans and Policies

The South Bay Bicycle Master Plan is an opportunity to coordinate with neighboring communities' efforts to plan and build bicycle infrastructure.

The South Bay Bicycle Master Plan is an opportunity to coordinate with neighboring communities' efforts to plan and build bicycle infrastructure. A number of different jurisdictions border the project area, including the City of Los Angeles, unincorporated areas of the County of Los Angeles, and other incorporated cities. This section discusses the relationship between the South Bay Bicycle Master Plan and existing plans in neighboring communities.

2.2.1 Local and Regional Plans

There are six incorporated cities that lie adjacent to at least one participating city in the South Bay Bicycle Master Plan. These cities include:

- City of Hawthorne
- City of Inglewood
- City of Lomita
- City of Los Angeles
- City of Palos Verdes Estates
- City of Rolling Hills Estates

The City of Los Angeles is the only adjacent community with a Bicycle Master Plan, which is discussed in the following section.

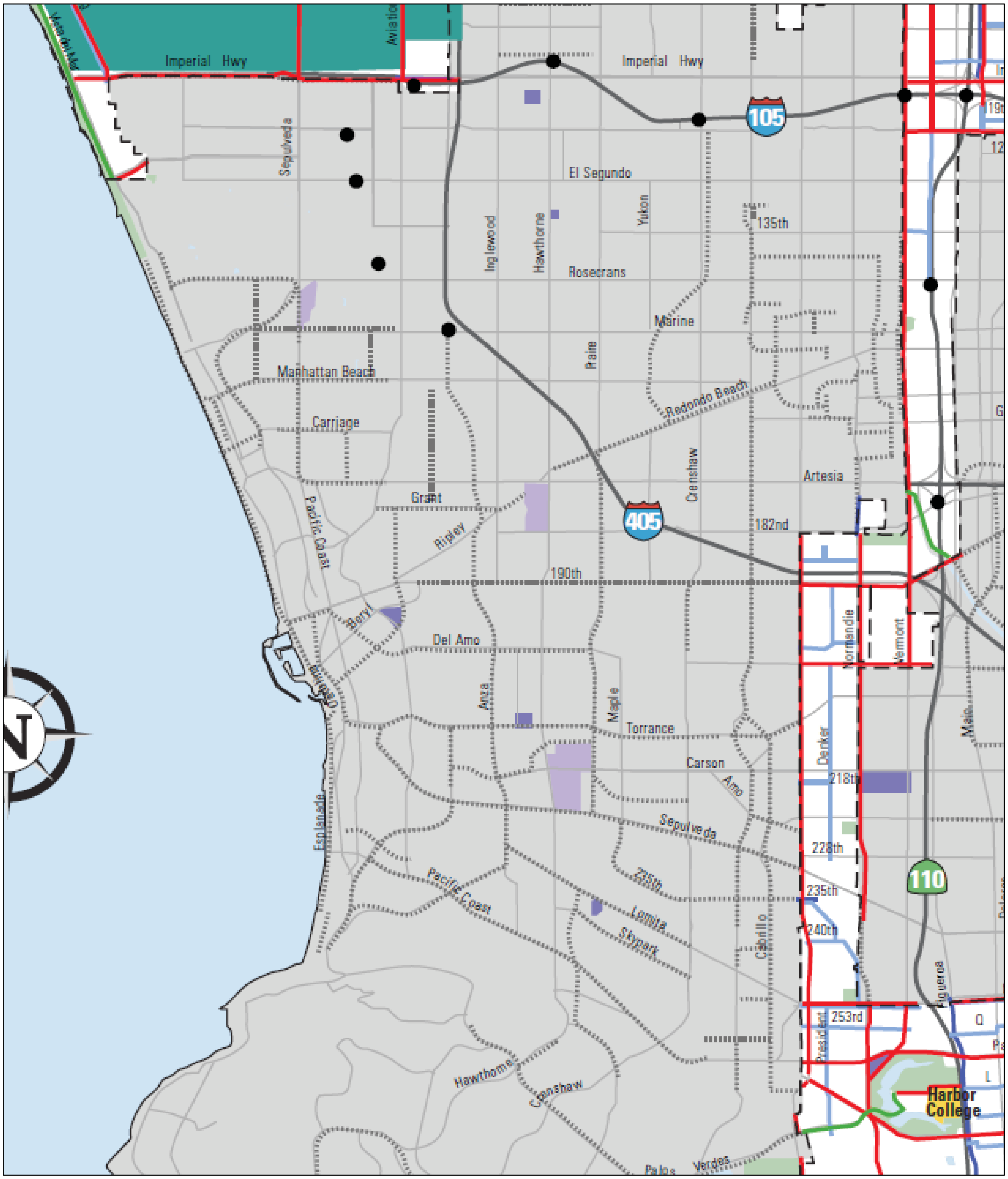
2.2.1.1 City of Los Angeles Bicycle Plan (2010)

The City of Los Angeles Bicycle Plan proposes 1,680 miles of bicycle facilities to promote bicycling as a viable transportation alternative. Of the proposed facilities, there are several that link to the participating cities of El Segundo, Gardena, and Torrance. The City of Los Angeles' proposed bikeways adjacent to the participating South Bay cities are shown in **Figure 2-1**.

2.2.1.2 Metro Bicycle Transportation Strategic Plan

As the Regional Transportation Planning Agency for Los Angeles County, the Los Angeles County Metropolitan Transportation Authority (Metro) is the primary local funding source for transportation projects, including bicycle and pedestrian projects. The Bicycle Transportation Strategic Plan (BTSP) developed by Metro provides an inventory of existing and planned facilities within Los Angeles County. This inventory assisted in identifying routes that may eventually provide trans-jurisdictional continuity

Figure 2-1: City of Los Angeles Proposed Bicycle Facilities



for bicyclists. Secondly, the BTSP outlines a strategy for prioritizing regional bikeway projects. The BTSP outlines a regional strategy to fund projects that improve bicycle access to transit or close gaps in the regional bikeway network. Upon adoption of the South Bay Bicycle Master Plan, the participating cities will have the opportunity to apply for funding through Metro to implement their proposed bikeways.

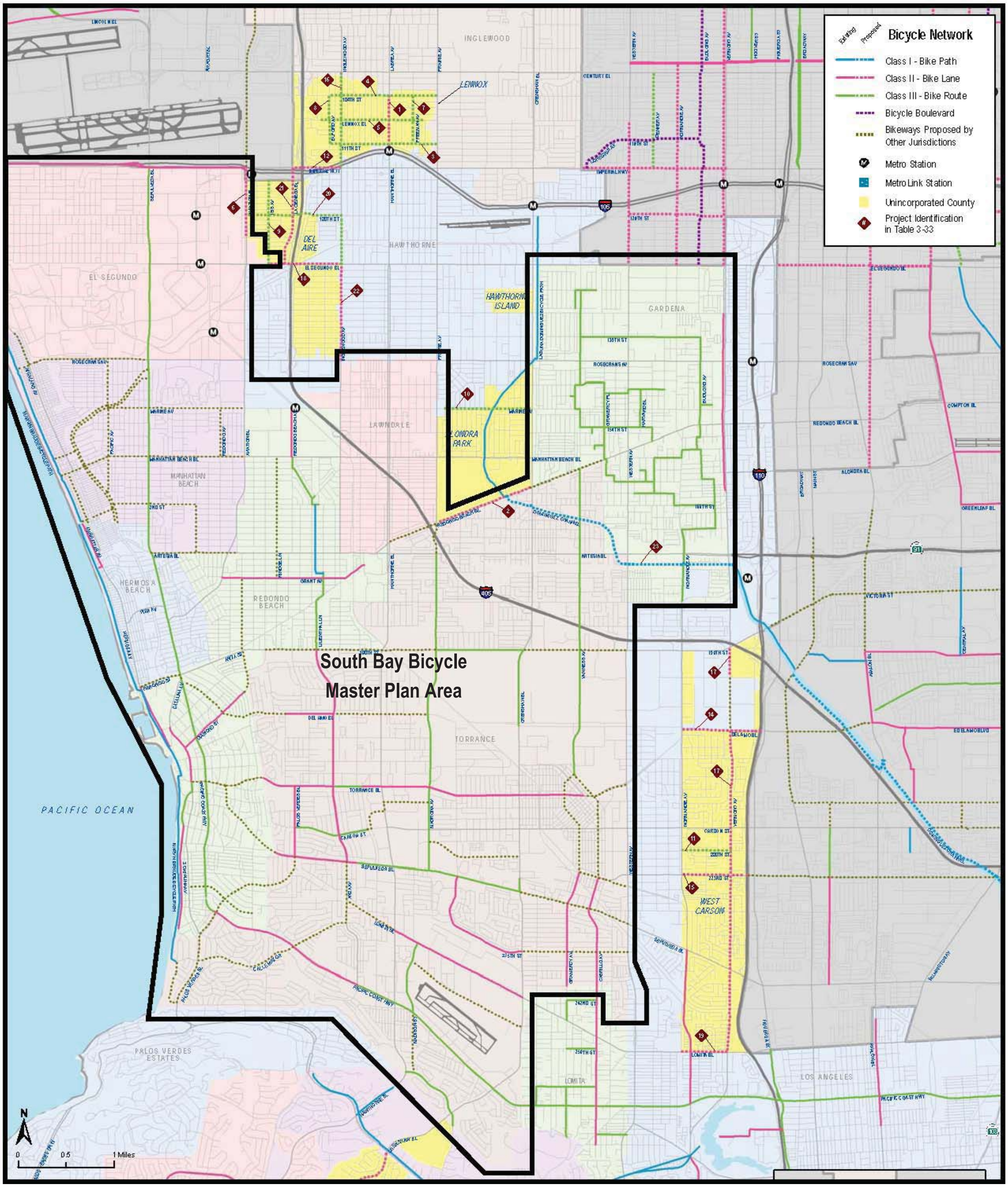
2.2.1.3 County of Los Angeles Bicycle Master Plan (BMP)

The County of Los Angeles Bicycle Master Plan guides the development and maintenance of a comprehensive bicycle network and programs within the unincorporated communities of the County of Los Angeles. The implementation of the Los Angeles County BMP will start in 2012 after California Environmental Quality Act (CEQA) review has been completed. Several proposed bikeways in the County provide potential connection opportunities to the participating South Bay cities of El Segundo, Lawndale, Gardena, and Torrance. These bikeways are shown in the yellow sections in **Figure 2-2**. The participating cities in the South Bay Bicycle Master Plan are outlined in black.

The Marvin Braude Bikeway is a prominent facility that is maintained by the County of Los Angeles and runs through five of the participating cities: El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance.

Appendix A-2 shows the existing bikeways in the County of Los Angeles that provide potential connection opportunities to the participating cities. The Marvin Braude Bikeway is a prominent facility that is maintained by the County of Los Angeles and runs through five of the participating cities: El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance. It extends for 21 miles parallel to the Pacific coastline, passing through the City of Santa Monica into the City of Los Angeles at its northernmost portion. Many bicyclists and pedestrians of all ages use the path, both for utilitarian and recreational purposes. As a consequence of its popularity, the path is often congested. Some areas have adopted measures to prevent conflicts between users; for example, when the path is crowded with pedestrians in Hermosa Beach, flashing lights and signs direct bicyclists to dismount and walk their bikes.

Figure 2-2: County of Los Angeles Proposed Bicycle Facilities



2.2.1.4 Southern California Association of Governments Regional Transportation Plan (2008)

This plan presents the transportation objectives through the year 2035 for the areas under the jurisdiction of the Southern California Association of Governments (SCAG), which includes the South Bay. The RTP aims to integrate bicycling and other non-motorized transportation with transit to extend the commuting range of bicyclists in Southern California, where the average commute length is approximately 19.2 miles.

The SCAG RTP aims to integrate bicycling and other non-motorized transportation with transit to extend the commuting range of bicyclists in Southern California.

Bicycle and pedestrian improvements are addressed as they relate to larger street maintenance and construction projects, and are recommended in general plan updates. SCAG's Compass Blueprint Program serves as a resource for local municipalities looking to enhance non-motorized transportation infrastructure under the principles of mobility, livability, prosperity and sustainability.

The RTP allocates over $1.8 billion for non-motorized transportation. Specific objectives regarding the future of bicycle transportation in the region and that apply to the South Bay Bicycle Plan include:

- Decrease bicyclist and pedestrian fatalities and injuries in the state to 25% below 2000 levels
- Increase accommodation and planning for bicyclists and pedestrians: The needs of non-motorized travel (including pedestrian, bicyclists and persons with disabilities) need to be fully considered for all transportation planning projects
- Increase bicycle and pedestrian use in the SCAG Region as an alternative to utilitarian vehicle trips: Create and maintain an atmosphere conducive to non-motorized transportation, including well-maintained bicycle and pedestrian facilities, easy access to transit facilities, and increasing safety and security. While pedestrian sidewalks are fairly well established in most areas, it is estimated that there are only 3,218 miles of dedicated bicycle facilities in the region, with an additional 3,170 miles planned
- Increase non-motorized transportation data: To make non-motorized modes an integral part of the region's intermodal transportation planning process and system, reliable data for planning are needed. Non-motorized transportation data needs include, but are not limited to, comprehensive user statistics; user demographics; bicycle

travel patterns/corridors; accident mapping; bikeway system characteristics; and sub-regional improvement projects and funding needs

- Bicyclists and pedestrians should always be included in general plan updates. SCAG also encourages the development of local Non-Motorized Plans. Also, Non-Motorized Plans that have been created or updated within the previous five years are eligible for bicycle transportation account (BTA) funds. SCAG can assist in the development of these plans through the Compass Blueprint Program
- Develop a Regional Non-Motorized Plan: SCAG will work with all counties and their cities to coordinate and integrate all Non-Motorized Plans from counties and jurisdictions in the SCAG Region in a collaborative process, including interested stakeholders

2.2.2 State of California

The State of California has recently passed several policies that affect bicycle planning in the South Bay, which are discussed in the following section.

2.2.2.1 AB 1358 - Complete Streets Act of 2008

California Assembly Bill (AB) 1358, also known as the Complete Streets Act of 2008, amended the California Government Code §65302 to require that all major revisions to a city or county's Circulation Element include provisions for the accommodation of all roadway users including bicyclists and pedestrians. Accommodations include bikeways, sidewalks, crosswalks, and curb extensions. The Government Code §65302 reads:

> (2)(A)Commencing January 1, 2011, upon any substantive revision of the circulation element, the legislative body shall modify the circulation element to plan for a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context of the general plan.
>
> (B)For purposes of this paragraph, "users of streets, roads, and highways" means bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.

The Complete Streets Act of 2008 amended the California Government Code to require that all major revisions to a city or county's Circulation Element include provisions for the accommodation of all roadway users including bicyclists and pedestrians.

2.2.2.2 Deputy Directive 64

The California Department of Transportation (Caltrans) adopted two policies in recent years relevant to bicycle planning initiatives such as this Bicycle Master Plan, namely, Deputy Directive 64 (DD-64-R1) and Traffic Operations Policy Directive 09-06.

Similar to AB 1358, Deputy Directive 64 (DD-64-R1) sets forth that Caltrans addresses the "safety and mobility needs of bicyclists, pedestrians, and transit users in all projects, regardless of funding."

2.2.2.3 Traffic Operations Policy Directive 09-06

In a more specific application of complete streets goals, Traffic Operations Policy Directive 09-06 presents bicycle detection requirements. For example, 09-06 requires that new and modified signal detectors provide bicyclist detection if they are to remain in operation. Further, the Policy Directive states that new and modified bicycle path approaches to signalized intersections must provide bicycle detection or a bicyclist pushbutton if detection is required.

2.2.2.4 SB 375 – Sustainable Communities

Senate Bill (SB) 375 serves to complement Assembly Bill (AB) 32: The Global Warming Solutions Act of 2006 and encourages local governments to reduce emissions through improved planning. Under SB 375, the California Air Resources Board (CARB) must establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations (MPOs). Each of California's MPOs must prepare a "Sustainable Communities Strategy (SCS)" that demonstrates how the region will meet its greenhouse gas (GHG) reduction target through integrated land use, housing and transportation planning. The Southern California Association of Governments (SCAG) is preparing the SCS for the County of Los Angeles.

One way to help meet the greenhouse gas emissions targets is to increase the bicycle mode share by substituting bicycle trips for automobile trips. When trips made by bicycle replace vehicle trips they reduce greenhouse gas emissions resulting from motorized transportation. The South Bay's efforts to encourage bicycling will contribute to the regional attainment of these targets.

One way to help meet the greenhouse gas emissions targets is to increase the bicycle mode share by substituting bicycle trips for automobile trips.

Chapter 3

El Segundo

3 El Segundo

This chapter presents El Segundo's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how El Segundo complies with Bicycle Transportation Account requirements. The chapter is organized into the following sections:

- Existing conditions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

3.1 Bicycle Transportation Account (BTA) Compliance

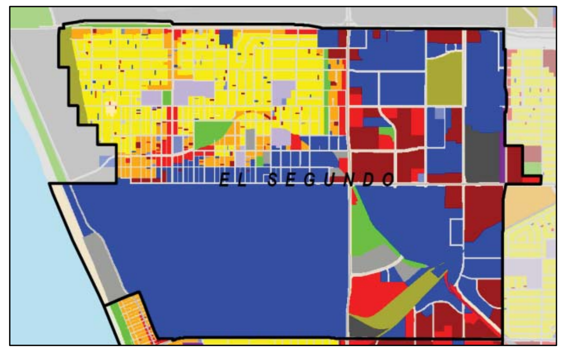
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for El Segundo to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

3.2 Existing Conditions

The City of El Segundo is located in the northwest portion of the South Bay region. It is bordered by the City of Los Angeles to the north, the County of Los Angeles to the east, the City of Manhattan Beach to the south, and the Pacific Ocean to the west. According to the 2000 census, El Segundo has a population of 15,970. The City was incorporated in 1917.

3.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land uses in El Segundo are shown at right. Industrial land uses comprise over half of the land area of the City, demonstrating that El Segundo is a key employment center in the region. Less than 20 percent of the City's land area consists of residential uses. Due to the disparity between acres of employment-producing land uses and acres of housing, it is likely that many



Existing Land Uses in El Segundo

(See Appendix A-3 for larger map)

- City Boundary
- Single Family Residential
- Multi-Family Residential
- Other Residential
- General Office
- Commercial and Services
- Public Facilities
- Education
- Military Installations
- Industrial
- Transportation, Communications, and Utilities
- Mixed Commercial and Industrial
- Mixed Urban
- Open Space and Recreation
- Agriculture
- Vacant
- Water
- Under Construction
- Undevelopable
- Unknown

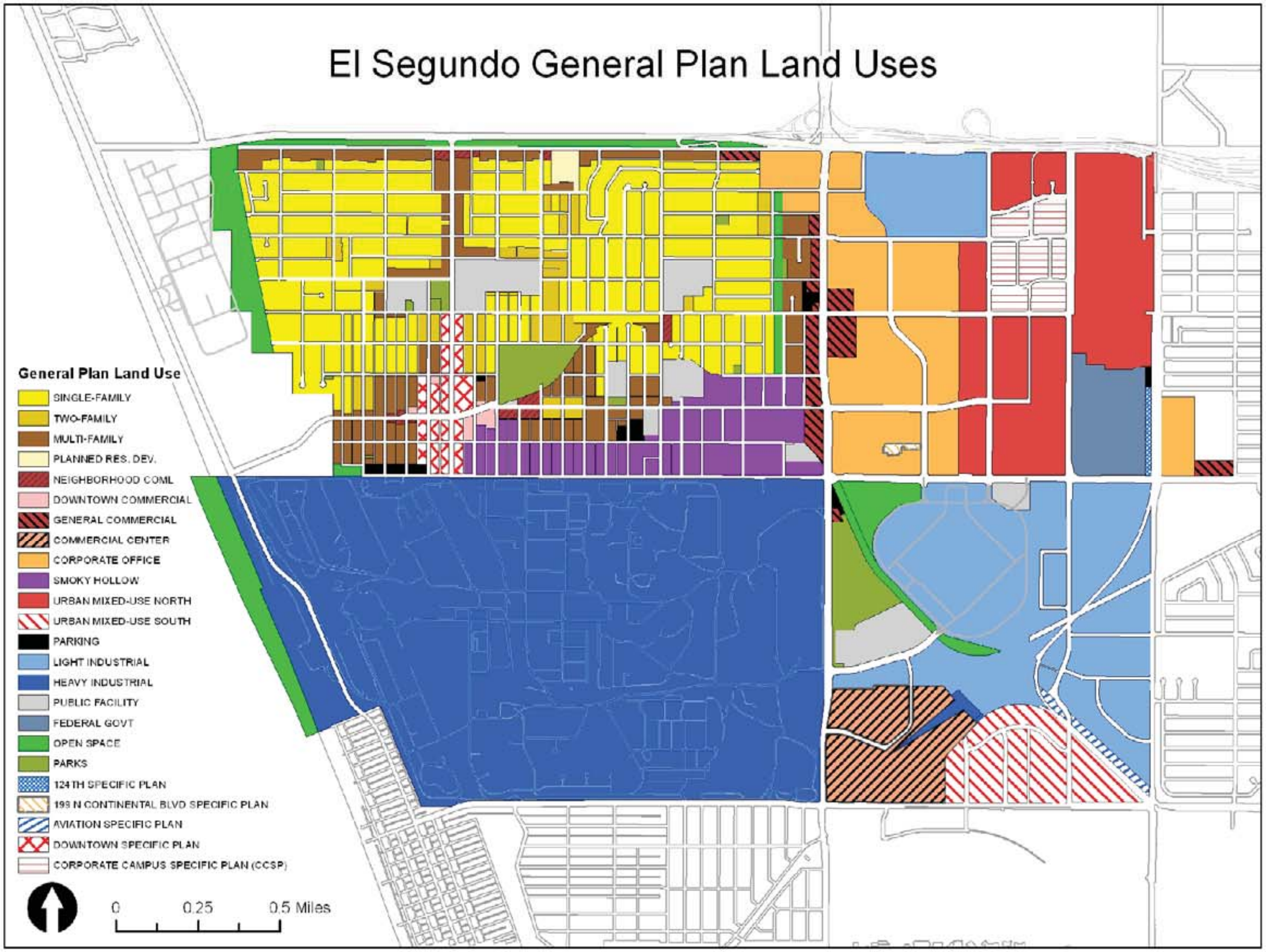


Figure 3-1: El Segundo General Plan Land Uses

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of El Segundo (1992)

persons working in El Segundo are commuting to work from outside of the City.

Figure 3-1 displays proposed land uses for El Segundo. As compared to the existing uses, the City plans to increase office space north of Mariposa Avenue, industrial uses in the southeastern quadrant of the city, and mixed use developments throughout El Segundo.

3.2.2 Bicycle Trip Generators

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high employment densities.

Appendix A-4 shows population density in El Segundo. Of the land area that is residential, most of it is single family, low density housing, with the exception of the Main Street area in Downtown El Segundo and R-3 multi-family zoned parcels. Low density units generally produce fewer trips as there are fewer persons per acre. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths. Low density areas present challenges to bicycling because there are not as many community services, such as restaurants or grocery stores nearby, so bicyclists must make longer trips to conduct their day-to-day activities.

Appendix A-5 displays employment density in El Segundo. El Segundo has over 50 percent of its land area dedicated to industrial uses, a land use which typically employs large amounts of people, and therefore produces many commute trips. As a major employment center in the region, El Segundo generates a high number of trips, and therefore has the potential to increase bicycle activity by providing facilities that could encourage commuters to switch to bicycling.

Appendix A-6, Appendix A-7, and **Appendix A-8** display the percent of zero-vehicle households, median annual household income, and percent transit commuters by census tract. Overall, households in El Segundo have median annual incomes between $55,001 and $75,000 (in 1999 dollars). Those in central and western

El Segundo have lower rates of vehicle ownership and higher rates of transit commuting. This part of the city has greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, El Segundo has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within El Segundo, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

3.2.3 Relevant Plans and Policies

Table 3-1 outlines information regarding bicycles from the City of El Segundo's Circulation Element, Bicycle Master Plan, Open Space and Recreation Element, Local Coastal Program, and Municipal Code.

Table 3-1: El Segundo Bicycle-Related Plans and Policies

Document	Description
General Plan Circulation Element (2004)	The Circulation Element was adopted in 1992 and most recently updated in 2004. It includes a goal to increase alternative transportation modes, with a corresponding objective to provide a city-wide bikeway system. Policies for implementation include: • Implement recommendations in the Bicycle Master Plan (below) • Encourage new development to provide bicycle parking, shower, and changing facilities • Develop off-street bicycle paths in appropriate corridors • Encourage bicycle trips to and from schools and public facilities • Coordinate bicycle planning/implementation with adjacent and regional agencies • Encourage design of new streets with Class I or Class II bikeways • Maintain Hillcrest Street link between Imperial Avenue and Imperial Highway • Evaluate bikeway system links with the Metro Green Line rail stations and improve access

Document	Description
Bicycle Master Plan (1992)	This plan was adopted in 1992 as part of the Circulation Element and left unchanged in the 2004 update. The 2004 update simply consists of a map (**Appendix F-1**) that outlines existing and proposed routes in the City of El Segundo, the City of Manhattan Beach, and the County of Los Angeles. Proposed routes are designated by possible facility. Some proposed routes are shown to be appropriate for either Class I, II, or III facilities, while others are designated as appropriate for just one Class.
General Plan Open Space and Recreation Element (1992)	The Open Space and Recreation Element discusses bikeways in the context of recreational facilities. This document identifies the County of Los Angeles-maintained beach bicycle path located west of the Chevron Refinery as the primary recreational bikeway in El Segundo. The beach bike path runs along the narrow shoreline and connects with the county paths in the City of Los Angeles to the north and to the community of El Porto to the south. The element also includes an objective to develop utility transmission corridors for active or passive open space and recreational use.
El Segundo Local Coastal Program (1978)	The El Segundo Local Coastal Program (LCP) consists of an Issue Identification and a Coastal Zone Specific Plan. The Issue Identification section summarizes coastal issues and the specific plan provides detailed land use proposals and implementing ordinances in the coastal zone. The program states that developments providing recreational opportunities are preferred in the Coastal Zone. Developments that provide recreational bikeways would satisfy this requirement. All other bikeways shall be in compliance with the policies in the LCP.
Municipal Code	Minimum parking requirements in El Segundo's Municipal Code are based on percent of required vehicle parking spaces. In 2010, the City of El Segundo adopted Ordinance 1444, which amended parking and loading requirements to include minimum bicycle parking space requirements for developments of varying sizes and land uses. Spaces shall be a minimum width of two feet and a minimum length of five feet. The City reviews these requirements in plan check by having the plans routed through the applicable departments. Developments of certain sizes are also required to provide information, such as bicycle maps, either on a bulletin board or in a display case or kiosk. Detailed bicycle parking information is presented in **Appendix G.** El Segundo's Municipal Code does not prohibit riding bicycles on the sidewalk in the city.

Figure 3-2: Existing Bicycle Facilities In El Segundo

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

3.2.4 Existing Bicycle Network

Figure 3-2 shows the existing bicycle facilities in El Segundo. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region as a whole. Bicycle facility types are discussed in **Section 1.3**. The City of El Segundo has approximately 6 total miles of bikeways. These include Class I, Class II, and Class III facilities, some of which continue outside the City limits. A portion of the Los Angeles County-maintained bike path that runs along the beach is part of the City's network. **Table 3-2** summarizes the classification and mileage of the existing network.

Table 3-2: El Segundo Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	1.0
Class II (Bike Lanes)	2.8
Class III (Bike Route)	2.0
Total Mileage	**5.8**

3.2.5 Existing End-of-Trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short- and long-term end-of-trip facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities.

The locations of existing bicycle parking in the South Bay are shown in **Appendix A-9**. Existing bicycle parking in El Segundo is shown at right. The City has existing bicycle racks located throughout the city, including at schools, civic facilities, and shopping centers. El Segundo does not provide any existing long-term, publicly-accessible end-of-trip bicycle facilities. Existing long-term bicycle storage at transit stops is discussed below.

Existing End-of-trip Facilities in El Segundo

(See Appendix A-9 for larger map)

● Existing Bike Racks
● Existing Bike Lockers

3.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. **Appendix A-10** shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of El Segundo. Metro operates several bus lines with routes through the

City. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis. Metro also operates the Green Line Light Rail, which has three stations in El Segundo. A fourth station at Aviation/LAX sits very near the eastern boundary of El Segundo. Bicycles are permitted on Metro Rail. The three stations in El Segundo are:

- Mariposa Avenue
- El Segundo Boulevard
- Douglas Street

LADOT operates the Commuter Express bus service. Line 438 connects the cities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance to Downtown Los Angeles. Line 574 connects El Segundo to the City of Encino. Most Commuter Express buses are equipped with bicycle racks, which are available on a first-come, first-served basis. Commuter Express route maps for lines 438 and 574 are shown in **Appendix A-11** and **Appendix A-12.**

Beach Cities Transit (BCT) Line 109, operated by the City of Redondo Beach, and Torrance Transit Line 8, operated by the City of Torrance, also serve the City of El Segundo. **Appendix A-13** shows the BCT System Map and **Appendix A-14** shows the Torrance Transit System Map. Buses are equipped with bike racks, which are available on a first-come, first-served basis.

Two of the three Metro Geen Line stations in El Segundo provide both bicycle racks and lockers.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. The Mariposa Avenue Metro Green Line Station provides bicycle racks and the other two stations provide both bicycle racks and lockers. Metro Green Line stations are shown in **Appendix A-10.** Existing bicycle parking facilities in the South Bay are shown in **Appendix A-9** and existing bicycle parking facilities in El Segundo are shown on page 29. Bicycle locker rentals are $24 for six months plus a $50 refundable security key deposit.

3.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. To promote safe bicycling, the City of El Segundo has in the past held "bicycle rodeos," in which they teach bicycle lessons and awareness during open houses at schools. Bicycle rodeos are not, however, a regular program. The El Segundo Police Department also provides pamphlets and bicycle safety information at all safety fairs, Ride Share Fairs, and booths it attends, which occur several times per year.

El Segundo police officers enforce all bicycle-related rules in the California Vehicle Code and issue citations when they observe violations.

3.2.8 Past Bicycle-Related Expenditures

The City of El Segundo incurred the following bicycle expenditure between 2000 and 2010:

- About $5,000 for bicycle racks at City Hall and signage on North Douglas and Nash Streets

3.3 Needs Analysis

This section describes the needs of bicyclists in El Segundo. First, it summarizes feedback collected from the online survey and public workshops. Second, the section provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. Finally, it analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

3.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and two rounds of public workshops. This section summarizes locations in El Segundo that the community identified as desirable for bikeways.

The public in El Segundo had the opportunity to provide input in the planning process through an online survey and two rounds of public workshops.

The most frequently identified locations for bicycle facilities include El Segundo Boulevard, Rosecrans Boulevard, and Douglas Street. El Segundo Boulevard and Rosecrans Boulevard are both major arterials. Other streets mentioned by the public as in need of bicycle facilities include Main Street, Grand Avenue, and Mariposa Avenue.

3.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in El Segundo by census tract. There is a higher percentage of bicycle commuters in the western portion of El Segundo than in the eastern part, which corresponds with low vehicle ownership rates and a higher percentage of transit users.

Table 3-3 presents commute to work data estimates reported by the 2000 US Census for El Segundo. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to the estimates, 0.59 percent of residents in El Segundo commute predominantly by bicycle. The percent of bicycle commuters in El Segundo is consistent with that of the County of Los Angeles. It is below that of California and above the United States as a whole. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in El Segundo for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. The percentage of commuters in El Segundo that commute by transit is much lower than that of those that drive alone.

In addition to bicycle commuters in El Segundo, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through El Segundo's bicycle network in **Section 3.4**.

Table 3-4 presents an estimate of current bicycling within El Segundo using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 3-5** presents the associated air quality benefits from bicycling.

Table 3-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	El Segundo
Bicycle	0.38%	0.83%	0.62%	0.59%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	85.37%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	6.27%
Transit	4.73%	5.07%	6.58%	1.18%

Mode	United States	California	Los Angeles County	El Segundo
Walked	2.93%	2.85%	2.93%	2.87%
Other Means	0.70%	0.79%	0.76%	0.35%
Worked at Home	3.26%	3.83%	3.49%	3.01%

Source: US Census 2000

Table 3-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	15,970	2000 US Census, P1
Existing employed population	9,092	2000 US Census, P30
Existing bike-to-work mode share	0.59%	2000 US Census, P30
Existing number of bike-to-work commuters	54	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	3.01%	2000 US Census, P30
Existing number of work-at-home bike commuters	27	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	1.18%	2000 US Census, P30
Existing transit bicycle commuters	27	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	1,899	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	38	School children population multiplied by school children bike mode share
Existing number of college students in study area	1,395	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute share at the University of California, Los Angeles
Existing college bike commuters	70	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	216	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	431	Total bicycle commuters x 2 (for round trips)

Table 3-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	130	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	33,978	Reduced number of weekday vehicle trips multiplied by 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	901	Assumes average round trip travel length of 8 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	235,048	Reduced number of weekday vehicle miles multiplied by 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	3	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	2	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	25	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	733	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	705	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	3	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	3	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	492	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	6,426	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	191,213	Yearly mileage reduction x 369 grams / mi

Source:
Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 3-6 presents projected year 2030 bicycling activity within El Segundo using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation.

Table 3-7 presents the associated year 2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 3-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	19,873	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050.
Future employed population	11,314	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050,
Future bike-to-work mode share	1.18%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	134	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	5.54%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	63	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	2.36%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	67	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	1,509	Calculated from CA Dept. of Finance, California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series.
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	60	School children population multiplied by school children bicycling mode share
Future number of college students in study area	1,736	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	122	College student population x college student bicycling mode share
Future total number of bike commuters	445	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	890	Total bike commuters x 2 (for round trips)

Table 3-7: Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	264	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	68,886	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	1,888	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	492,644	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	6	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	4	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	52	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	1,536	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	1,477	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	6	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	5	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	1,032	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	13,468	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO2 (lbs/yr)	400,768	Yearly mileage reduction x by 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of 430 to almost 900, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 1,000 pounds of smog forming N0X and roughly 400 thousand pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.

3.3.3 Bicycle Counts

To assess bicycling levels at different sites throughout El Segundo, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay.

3.3.3.1 Methodology

The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In El Segundo, volunteers were stationed at nine stations on Thursday and nine stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.

Weekday Bicycle Count Results in El Segundo

(See Appendix A-16 for a larger map and Appendix H for a list of count locations.)

499

100 - 152

50 - 86

30 - 46

13 - 29

Weekend Bicycle Count Results in El Segundo

(See Appendix A-17 for larger map and Appendix H for a list of count locations.)

385 - 922

114 - 384

43 - 113

21 - 38

1 - 17

3.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for El Segundo are shown at left. Detailed count data, including a list of count locations, is presented in **Appendix H**. On Thursday, the El Segundo station that experienced the highest volume was Douglas Street and the Green Line Station with 57 bicyclists during the three hour count period. The station with the most bicyclists on Saturday was Main Street and Grand Avenue with 65 bicyclists during the three hour count period.

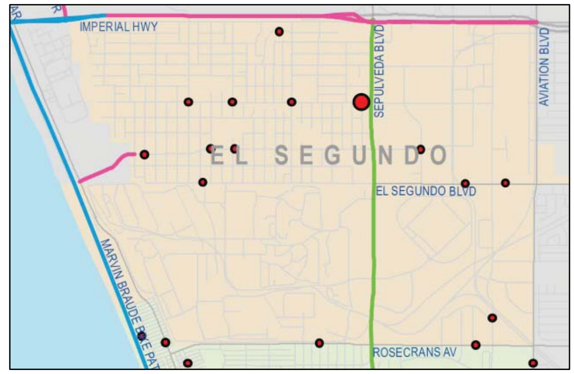
On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, approximately 83 percent of bicyclists were male. Approximately 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.

3.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to local and national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in El Segundo. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 3-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in El Segundo are shown at right. There were 15 total reported collisions involving bicyclists from 2007-2009 in the City of El Segundo. Two crashes occurred at the intersection of Mariposa Avenue and Indiana Street, one block west of Sepulveda Boulevard. The remaining 13 collisions in El Segundo occurred at disparate locations, although all occurred on major boulevards: there were five crashes on Mariposa Avenue, three on El Segundo Boulevard, and two on Rosecrans Avenue.



Bicycle Collisions in El Segundo 2007-2009

(See Appendix A-18 for larger map)

Table 3-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
15	15	13	1	0

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 40 percent of collisions involving bicycles (6 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in El Segundo. El Segundo Boulevard and Rosecrans Avenue, two corridors that experienced collisions involving bicyclists, carry large volumes of vehicular traffic traveling at high speeds. Neither street has existing bicycling facilities. Sepulveda Boulevard, Aviation Boulevard, and Imperial Highway also have high volumes of vehicles. Aviation Boulevard does not have bicycle facilities and Sepulveda Boulevard is a Class III bicycle route, requiring bicyclists to share the lanes with automobiles on these streets.

3.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of El Segundo, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are presented in **Section 1.3** and are shown in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in El Segundo, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through El Segundo to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

3.4.1 Proposed Bikeway Facilities

Opportunities and Constraints in El Segundo

(See Appendix I for larger map)

The proposed bicycle network for El Segundo consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is presented in **Figure 3-3**. El Segundo's network connects with the recommended network in Manhattan Beach and the County of Los Angeles bicycle system. Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 3-9**Table 3-9 lists the proposed bicycle paths, **Table 3-10** lists the proposed bicycle lanes, **Table 3-11** lists the proposed bicycle routes, and **Table 3-12** lists the proposed bicycle friendly streets. The proposed bicycle network for the South Bay region as a whole is presented in **Appendix A-19**.

There are several constraints to recommending new bicycle facilities in El Segundo. These are shown at left and are referenced by the numbers in **Appendix I**. **Appendix I** also presents opportunities and constraints in the South Bay region as a whole.

First, a proposed Class I bikeway east of the waste processing plant would require the City to gain approval from Los Angeles Department of Water and Power (LADWP) as this land is LADWP right-of-way. The facility would run underneath the right-of-way of high-tension power lines. An example of such a facility can be seen in Redondo Beach along the North Redondo Beach Bikeway.

Also, a proposed Class I in El Segundo between Walnut and Holly would require the City to gain similar approval as this land is LADWP right-of-way. The facility would also run underneath the right of way of high-tension power lines.

Table 3-9: Proposed Class I Bicycle Paths in El Segundo

Street	From	To	Miles
El Segundo	Sepulveda Blvd	Nash St	0.5
Washington Street	Walnut Avenue	Holly Avenue	0.7
Total Bicycle Path Mileage			**1.2**

Table 3-10: Proposed Class II Bicycle Lanes in El Segundo

Street	From	To	Miles
Aviation Boulevard	Imperial Highway	Rosecrans Avenue	2.0
Douglas Street	Imperial Highway	Park Place	2.1
El Segundo	Main St	Illinois St	1.0
El Segundo	Nast St	East City Limits	0.7
Mariposa Avenue	Sepulveda Boulevard	Douglas Street	0.7
Rosecrans Avenue	West City Limits	Aviation Boulevard	2.1
Total Bicycle Lane Mileage			**8.7**

Table 3-11: Proposed Class III Bicycle Routes in El Segundo

Street	From	To	Miles
Grand Avenue	West end of Street	Duley Road	2.1
El Segundo	Illinois	Sepulveda Boulevard	0.1
Nash Street	Imperial Highway	El Segundo Boulevard	1.0
Loma Vista Street - Binder Place - Whiting Street - El Segundo Boulevard	Grand Avenue	Main Street	0.5
Utah Avenue	Douglas Street	Aviation Boulevard	0.3
Main Street	Imperial Avenue	El Segundo Boulevard	1.0
Total Bicycle Route Mileage			**5.0**

Table 3-12: Proposed Bicycle-Friendly Streets in El Segundo

Street	From	To	Miles
Imperial Avenue	Hillcrest Street	East end of street	1.6
Mariposa Avenue	West end of Street	Sepulveda Boulevard	1.7
Loma Vista Street	Imperial Avenue	Grand Avenue	0.9
Sheldon Street - Pine Avenue - Eucalyptus Drive	Imperial Avenue	Grand Avenue	0.9
Center Street	Imperial Avenue	El Segundo Boulevard	1.0
Walnut Avenue	Center Street	Washington Street	0.4
Total Bicycle-Friendly Street Mileage			**6.4**

Figure 3-3: Proposed Bicycle Facilities in El Segundo

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

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3.4.2 Proposed End-of-Trip Bicycle Facilities

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

The El Segundo Municipal Code currently provides minimum bicycle parking standards. It also requires that all bicycle parking spaces be 2 feet wide by 5 feet long. The City should amend its Municipal Code to include requirements on types of short-term and long-term bicycle parking facility designs. Recommended designs are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a higher degree of security and support for the bicycle. This will more accurately address the bicycle demand at a given development. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles
- Lockable bicycle rooms with permanently anchored racks or
- Lockable, permanently anchored bicycle lockers

The City should amend its Municipal Code to include requirements on types of short-term and long-term bicycle parking facility designs.

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. El Segundo's Municipal Code should require all new mid-size and large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

Proposed end-of-trip bicycle facilities in El Segundo are shown in **Figure 3-4**.

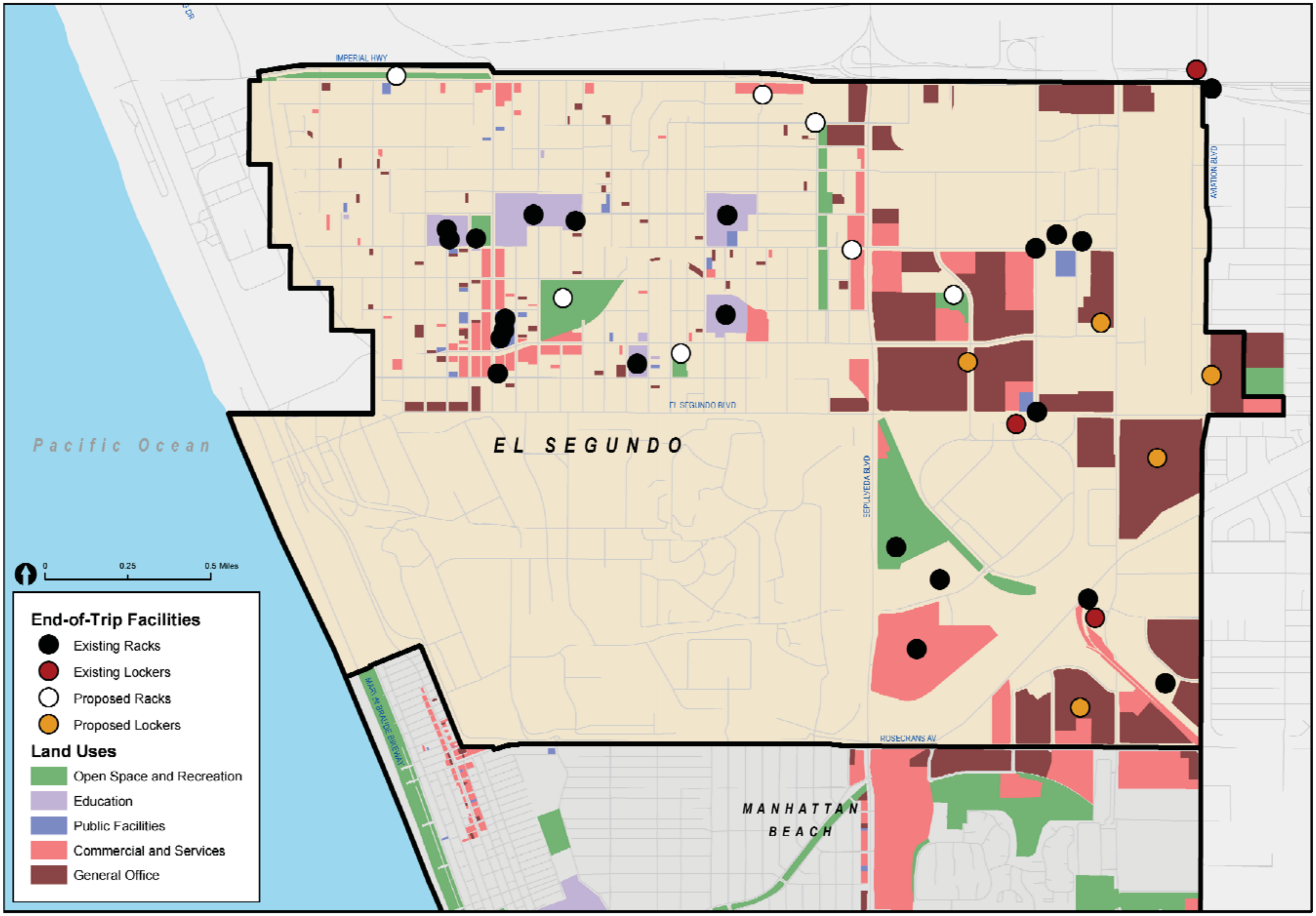

Figure 3-4: El Segundo Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

The City should ensure there is adequate short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at locations such as parks.

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

3.5 Project Costs

This section presents the cost to implement the proposed bicycle network in El Segundo.

3.5.1 Cost Estimates

Table 3-13 displays the planning-level capital cost assumptions for each facility type proposed in this plan and **Table 3-14** displays the cost to implement the proposed network in the City of El Segundo from the cost assumptions.[14] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 3.7**.

[14] **Table 3-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

Table 3-13: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[15]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

Table 3-14: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	1.2	$ 928,000
Bicycle Lane	$40,000	8.5	$ 339,000
Bicycle Route with sharrows	$25,000	5.2	$ 130,000
Bicycle-Friendly Street	$30,000	6.4	$ 192,000
Total		**21.3**	**$ 1,589,000**

3.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of El Segundo in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 3.4.1** is grouped into projects based on feasibility of implementation. **Table 3-15** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in El Segundo. The projects ranked the highest should be implemented first.

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[15] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 3-15:El Segundo Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BL	Douglas Street	Imperial Highway	Rosecrans Avenue	3	6	0	4	4	1	2	1	1	2	**24**
BL	Aviation Boulevard	Imperial Highway	Rosecrans Avenue	3	6	2	4	4	0	2	1	0	1	**23**
BR	Grand Avenue	West end of Street	Duley Road	3	6	0	4	2	2	2	1	1	2	**23**
BL-BR-BP-BL	El Segundo Blvd	Main St	East City Limits	0	0	2	4	4	2	2	1	2	2	**19**
BR	Nash Street	Imperial Highway	El Segundo Boulevard	3	6	0	0	4	0	1	0	2	2	**18**
BL	Mariposa Avenue	Sepulveda Boulevard	Douglas Street	0	3	0	4	4	0	2	0	1	2	**16**
BFS	Imperial Avenue	Hillcrest Street	East end of street	3	6	0	2	0	0	0	1	1	2	**15**
BFS	Mariposa Avenue	West end of Street	Sepulveda Boulevard	0	3	0	4	0	2	2	1	1	2	**15**
BR	Loma Vista Street - Binder Place - Whiting Street - El Segundo Boulevard	Grand Avenue	Main Street	3	6	0	0	0	0	0	1	2	2	**14**
BFS	Loma Vista Street	Imperial Avenue	Grand Avenue	3	6	0	0	0	0	0	1	1	2	**13**
BR	Utah Avenue	Douglas Street	Aviation Boulevard	0	0	0	4	2	0	0	0	2	2	**10**
BR	Main Street	Imperial Avenue	El Segundo Boulevard	0	0	0	2	0	1	1	1	2	2	**9**
BFS	Sheldon Street - Pine Avenue - Eucalyptus Drive	Imperial Avenue	Grand Avenue	0	0	0	4	0	1	0	1	1	2	**9**
BFS	Center Street	Imperial Avenue	El Segundo Boulevard	0	0	0	4	0	1	0	1	1	2	**9**
BP	Washington Street	Walnut Avenue	Holly Avenue	0	0	0	4	2	0	0	1	0	2	**9**
BFS	Walnut Avenue	Center Street	Washington Street	0	0	0	2	0	0	0	0	2	2	**6**
BL	Rosecrans Avenue	West City Limits	Aviation Boulevard	0	0	0	0	0	1	2	1	0	0	**4**

*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

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3.7 Project Sheets

The City of El Segundo selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

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El Segundo Project #1: Douglas Street (Imperial Highway to Rosecrans Ave)

Project Site

Douglas Street is a north-south arterial located on the eastern portion of the City of El Segundo. It connects to the Los Angeles International Airport (LAX) and bike lanes on Imperial Highway to the north and to the City of Manhattan Beach to the south. Douglas Street provides access to major employers, such as Northrop Grumman, as well as a Metro Green Line light rail station and a variety of commercial services. There is no on-street parking on Douglas Street.

From Imperial Highway to just south of El Segundo Boulevard, Douglas Street has three travel lanes in both directions of travel and a center turn lane. The roadway width ranges from 85 feet to 100 feet with a posted speed limit of 40 mph. From south of El Segundo Boulevard to Transit Center, Douglas Street drops to two travel lanes in each direction and a center turn lane. This segment has a roadway width of approximately 65 feet and a railroad crossing north of Utah Avenue. South of Transit Center, Douglas Street narrows to two lanes with a center median as it travels under the Metro Green Line bridge until Park Place. The roadway width drops to approximately 23 feet on either side of the center median. Pedestrian access is located above the road, under the bridge. South of Park Place, the road widens to 65 feet with two travel lanes in each direction and a center turn lane until the intersection with Rosecrans Avenue where it widens again to accommodate left and right turn pockets.

Project Challenges

Douglas Street has no existing bicycle facilities, thus bicyclists must share the road with relatively high volumes of vehicles traveling at high speeds. Bicyclists must cross at-grade, angled railroad tracks, which creates the potential for collisions as bicycle tires often get trapped in railroad tracks. When Douglas Street narrows as it travels beneath the Metro Green Line bridge, the road has a significant incline and the lanes become narrow, which can create conflicts due to the speed differential between bicyclists and vehicles. If bicyclists choose to ride on the above grade pedestrian path, they create potential conflicts with pedestrians as the path is not wide enough to accommodate both modes.

Proposed Improvements

- Stripe 1 mile of Class II Bike Lanes
- Add bicycle detectors and pavement markings at all signalized intersections
- Widen the pedestrian path under the Metro Green Line bridge to accommodate both bicyclists and pedestrians
- Realign the bicycle lanes to allow bicyclists to cross perpendicular to the at-grade train tracks

Estimated Cost

$350,000

Photos

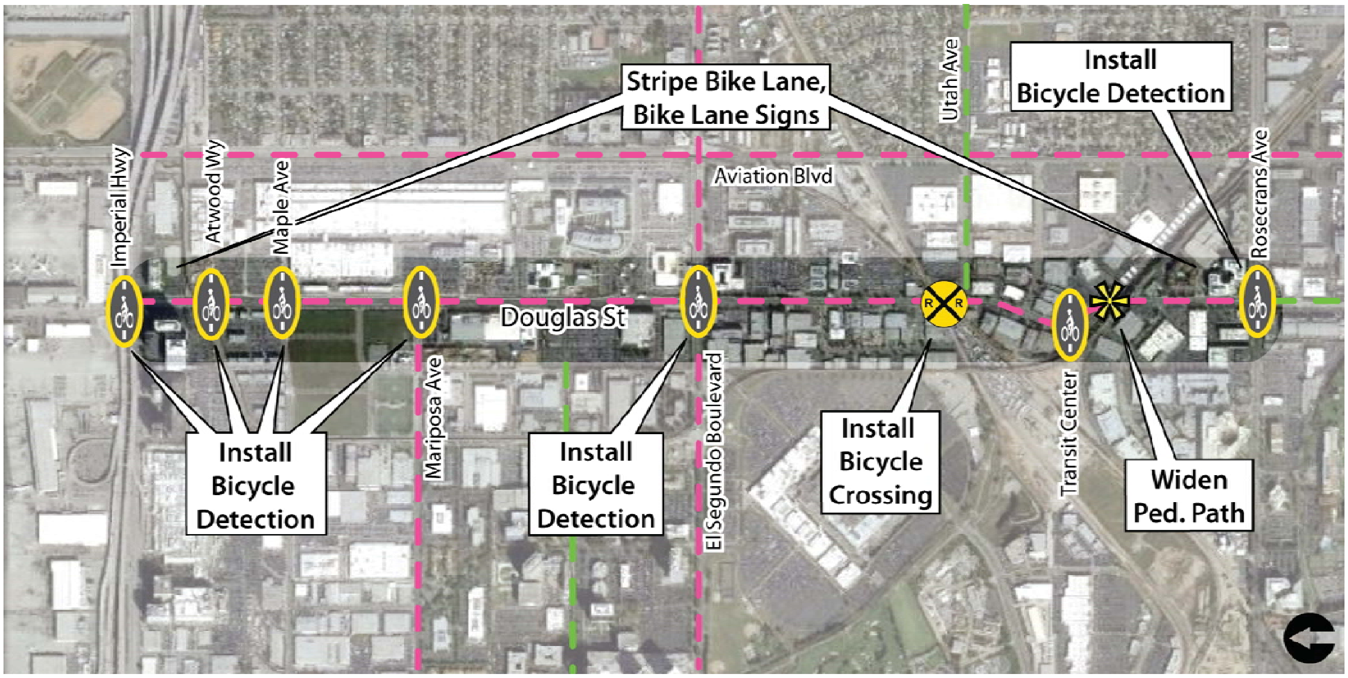
Looking south on Douglas Street. The northern portion of Douglas Street has wide lanes that could be narrowed to accommodate bicycle lanes.

Travel lanes narrow beneath the Metro Green Line bridge.

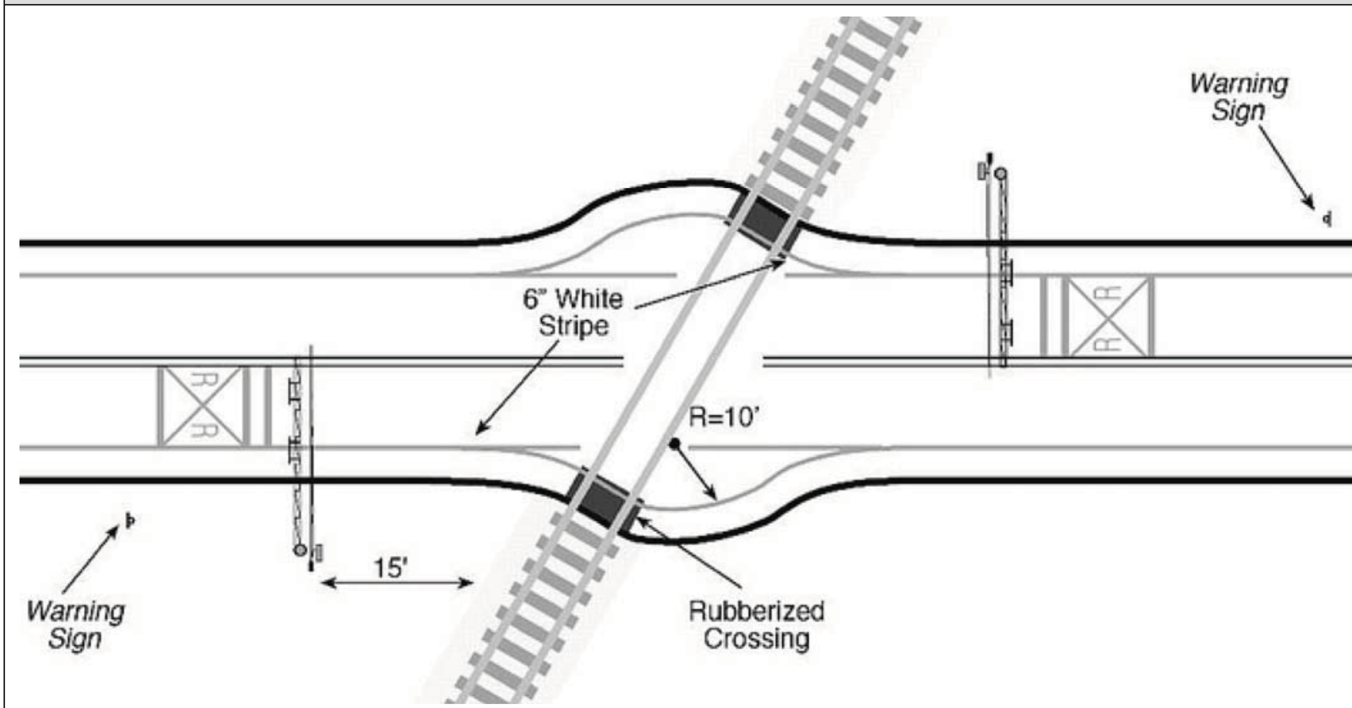
The angle of the existing at-grade railroad tracks is challenging for bicyclists to cross.

Aerial Map and Concept Graphics: Douglas Street

Douglas Street (Imperial Highway to Rosecrans Ave)



Example Bicycle Lane Crossing Railroad Tracks Design



El Segundo Project #2: El Segundo Boulevard (Main Street to Douglas Street)

Project Site

El Segundo Boulevard is an east-west road located in the center of the City of El Segundo. It connects to the County of Los Angeles to the east and provides secondary connectivity to the Marvin Braude Bikeway to the west. East of Aviation Boulevard, El Segundo Boulevard shares jurisdiction with the County of Los Angeles. El Segundo Boulevard provides access to major employers, such as the Chevron Refinery, as well as a variety of commercial services, residential uses, and Downtown El Segundo. There is no on-street parking on El Segundo Boulevard.

From Main Street to Illinois Street, El Segundo Boulevard has two travel lanes in each direction. The roadway width ranges from approximately 50 to 54 feet and has striped edgelines on the north side of the street. The posted speed limit is 35 mph. This segment of El Segundo Boulevard has rolling hills with fairly steep inclines. From Illinois Street to Sepulveda Boulevard the roadway widens to approximately 86 feet to accommodate turn pockets. Between Sepulveda Boulevard and Douglas Street, El Segundo Boulevard has center medians with three travel lanes and turn pockets in each direction. The roadway width (not including turn pockets) is approximately 35 feet on each side of the center median.

Project Challenges

El Segundo Boulevard has no existing bicycle facilities, thus bicyclists must share the road with vehicles traveling at high speeds on the eastern portion, as well as trucks accessing the Chevron Refinery on the western segment. Steep inclines and declines create potential conflicts between bicyclists and motorists due to the speed differential between the two modes. Between Illinois Street and Sepulveda Boulevard, the roadway width is constrained due to turn pockets. East of Nash Street, the roadway width is also constrained and the City has no current potential for a property easement.

Proposed Improvements

- Stripe 1.2 miles of Class II Bike Lanes
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Install 0.2 miles Class III Bike Route
- Remove 1.2 miles of eastbound curb and landscaping to accommodate bike lanes in City right-of-way (no existing sidewalk)
- Widen westbound sidewalk to comply with ADA standards
- Install 0.5 miles of bi-directional cycle track
- Add bicycle signal phases at entrances/exits to cycle track to be actuated by the presence of bicyclists
- Stripe intersection crossing markings to guide bicyclists through the intersections and increase their visibility
- Install wayfinding signage to direct bicyclists onto proposed bike lanes on Douglas Street

Estimated Cost

$175,000

Photos

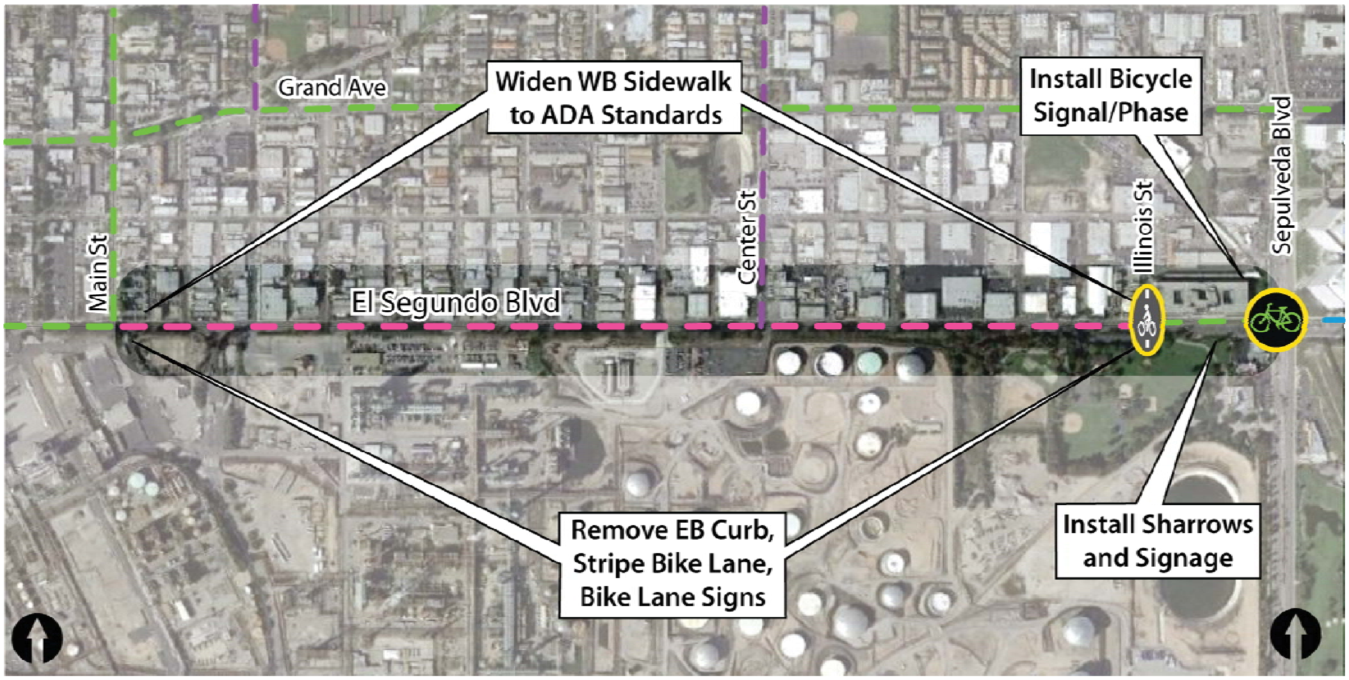
Looking east on El Segundo Boulevard. The curb and landscaping on the eastbound side could be removed to accommodate bicycle lanes.

East of Sepulveda Boulevard, El Segundo Boulevard has six travel lanes and high volumes of vehicular traffic. A cycle track will provide protection for bicyclists.

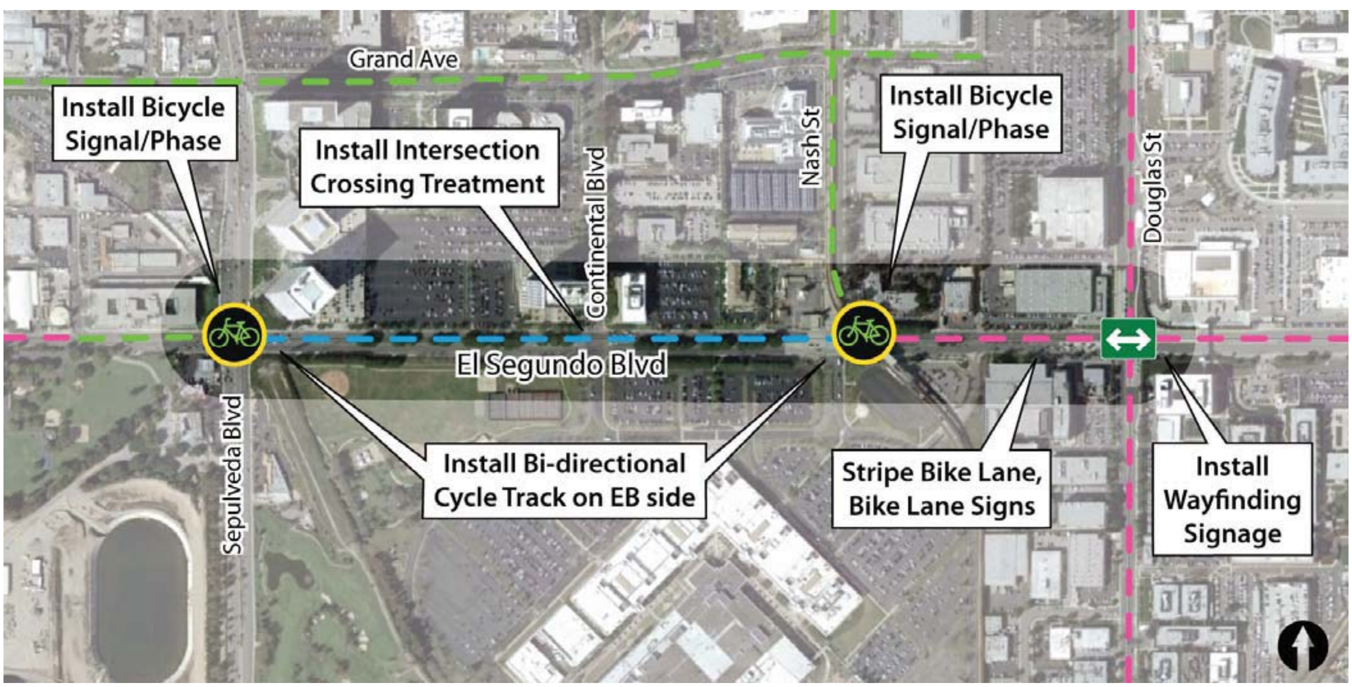
Steep inclines on El Segundo Boulevard can create potential conflicts between bicyclists and motorists due to the speed differential between the two modes.

Aerial Map and Concept Graphics: El Segundo Boulevard

El Segundo Boulevard (Main Street to Sepulveda Boulevard)



El Segundo Boulevard (Sepulveda Boulevard to Douglas Street)



Aerial Map and Concept Graphics: El Segundo Boulevard

Bi-directional Cycle Track and Cycle Track Intersection Crossing Markings

Bicycle-Only Signals

Chapter 4

Gardena

4 Gardena

This chapter presents Gardena's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how Gardena complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions
- City-specific goals, policies, and implementation actions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

4.1 Bicycle Transportation Account (BTA) Compliance

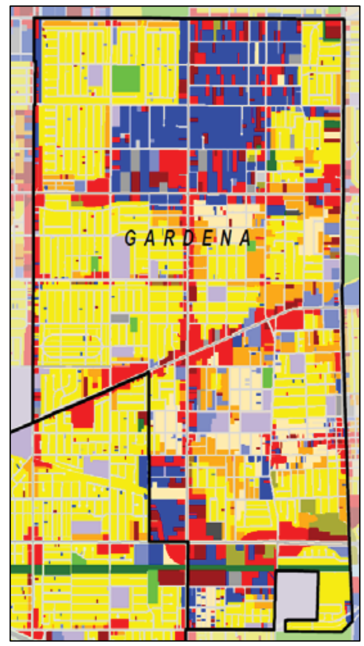
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Gardena to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The tables include "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

4.2 Existing Conditions

The City of Gardena is located in the northeast portion of the South Bay. It is bordered by the City of Hawthorne and the County of Los Angeles to the north and west, the City of Torrance to the south, and the City of Los Angeles to the east. According to the 2000 census, Gardena has a population of 57,818. The city was incorporated in 1930.

4.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land uses in Gardena are shown at right. Over half of the City's land area is comprised of residential land uses, most of which is single family. Industrial, commercial, and general office uses make up approximately 30 percent of the land area, which suggests that there are more people living in Gardena than there are jobs available.



Existing Land Uses in Gardena
(See Appendix A-3 for larger map)

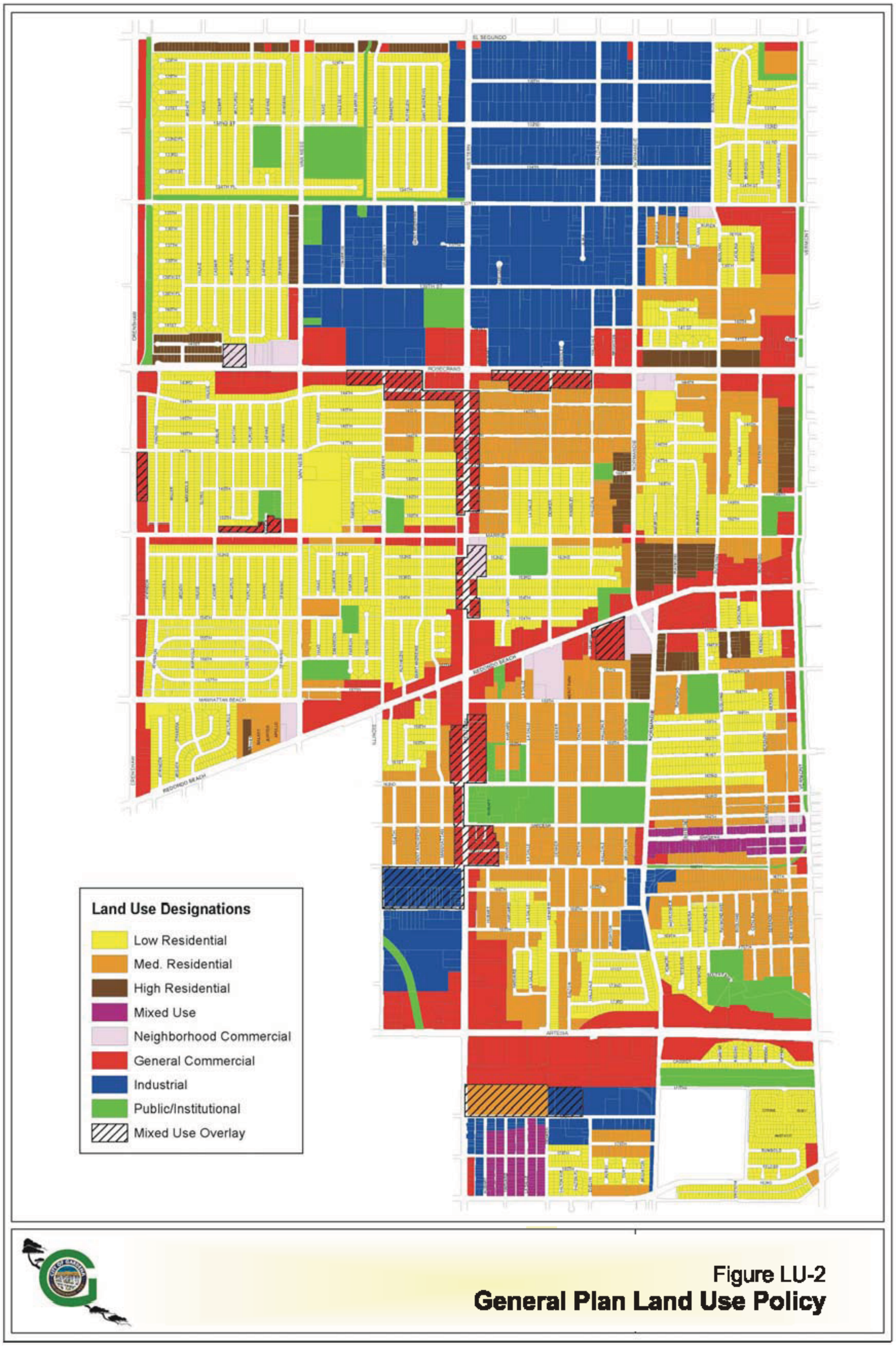


Figure 4-1: Gardena General Plan Land Uses

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Gardena (2006)

Figure 4-1 illustrates proposed land uses. As compared to existing land uses, the City plans to increase the residential densities in the southern portion of Gardena east of Normandie Avenue. It also intends on creating mixed use developments along 161st Street and 182nd Street.

4.2.2 Bicycle Trip Generators

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Appendix A-4 shows population density in Gardena. 70 percent of the residential land area in the City is single family, low density housing. Low density units generally produce fewer trips as there are fewer persons per acre. They also present challenges to bicycling because there are not as many community services, such as restaurants or grocery stores nearby, so bicyclists must make longer trips to conduct their day-to-day activities. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths. The highest population densities in Gardena are in the central and eastern portions of the city.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities.

Appendix A-5 displays employment density in Gardena. The City has high employment densities along major corridors, such as Redondo Beach Boulevard, Western Avenue, and 166th Street. The land uses along Redondo Beach Boulevard are mainly commercial and services, while the land use along Western Avenue is industrial. 166th Street has a mix of industrial, and commercial and services. These sites have the potential to generate bicycle activity, as they are located in environments with a variety of land uses where trips between uses can be shorter.

Appendix A-6, Appendix A-7, and **Appendix A-8** display the number and percent of zero-vehicle households, median annual income, and percent transit commuters by census tract. Throughout most of Gardena, households have median annual incomes below $35,000 (in 1999 dollars) and at least five percent of households do not own a vehicle. The City also has high percentages of transit commuters. This increases the potential for bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, Gardena has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Gardena, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

4.2.3 Relevant Plans and Policies

Table 4-1 outlines information regarding bicycles from the City of Gardena's Circulation Element.

Table 4-1: Gardena Bicycle-Related Plans and Policies

Document	Description
General Plan Circulation Plan (2006)	The City of Gardena most recently updated its General Plan in 2006. The Circulation Plan, which is part of the Community Development Element, is included in this update. The Circulation Plan contains the Bikeways Map (**Appendix F-2**), which displays where the existing Class I and Class III bicycle facilities are located in the city. There are no proposed facilities shown on the map. The Circulation Plan also addresses bicycling in its goal to promote safe, efficient, and accessible alternative transportation modes. To do so, the City will maintain a citywide bicycle route and maintenance plan that is integrated with MTA's regional bicycle system.
Municipal Code	The City's Municipal Code requires all bicycles to be registered with the police department and the owner to obtain a bicycle license. Riding bicycles on the sidewalk is prohibited in business districts and prohibited outside of business districts unless roadway conditions are hazardous or unsafe.

4.2.4 Existing Bicycle Network

Figure 4-2 shows a map of the existing bicycle facilities in Gardena. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**. The City of Gardena has approximately 16 total miles of bikeways, 80 percent of which make up an extensive network of Class III bike routes. **Table 4-2** summarizes the classification and mileage of the existing network.

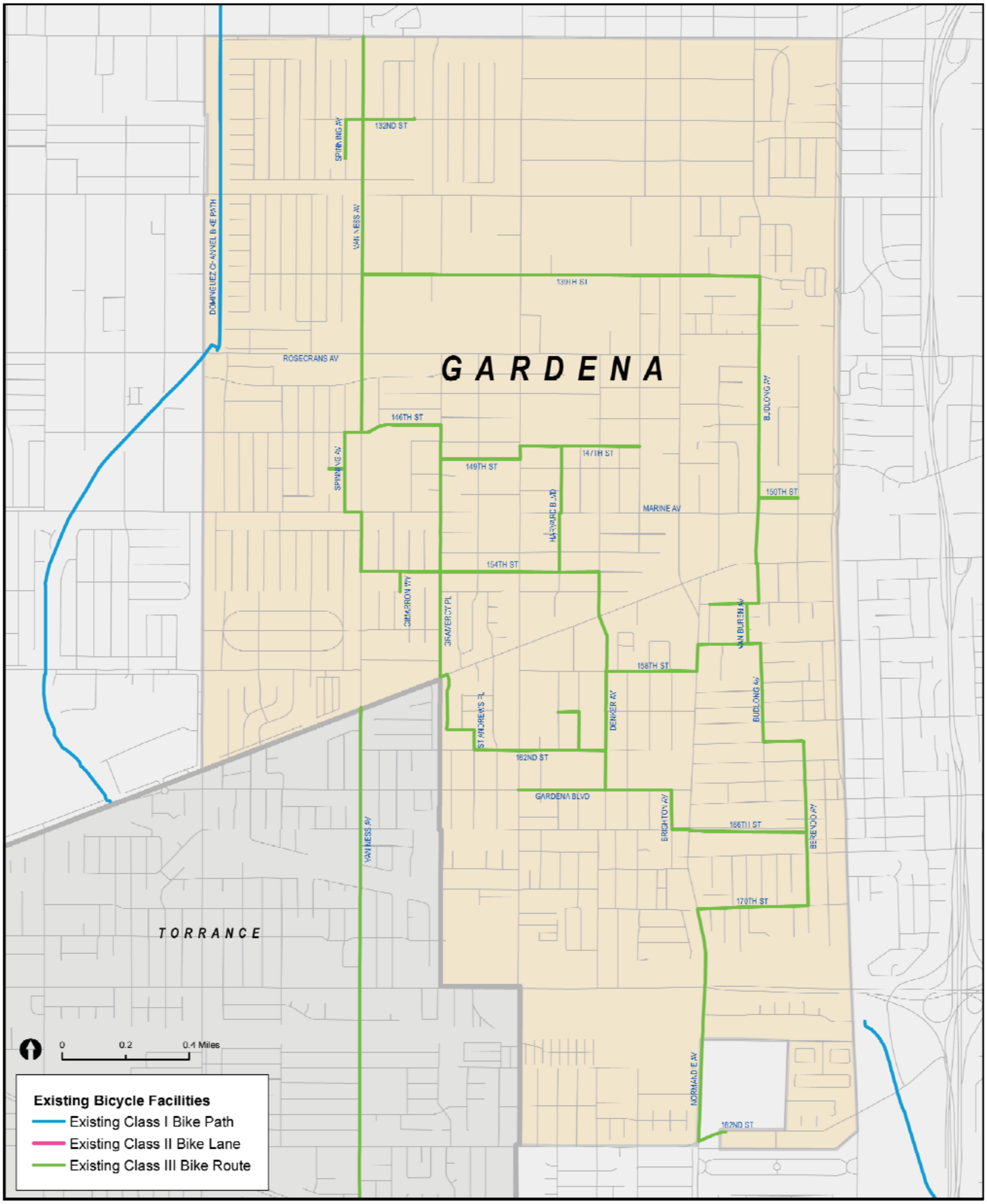


Figure 4-2: Existing Bicycle Facilities in Gardena

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Table 4-2: Gardena Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	1.1
Class II (Bike Lanes)	1.9
Class III (Bike Route)	12.7
Total Mileage	**15.7**

4.2.5 Existing End-of-Trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. Gardena does not currently provide any publicly-accessible end-of-trip bicycle facilities within its jurisdiction.

4.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. **Appendix A-10** shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Gardena. Metro operates several bus lines with routes through the City. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis. The northern and southern portions of the City are served by bus routes, while the center of the City is left underserved. This requires those commuting to and from the interior of Gardena to travel longer distances to access transit, trips that would be made easier by bicycle given adequate bicycle facilities.

Torrance Transit Lines 1, 2, and 5, operated by the City of Torrance, also serve Gardena. **Appendix A-14** shows the Torrance Transit System Map. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. Gardena does not currently provide any intermodal end-of-trip bicycle facilities within its jurisdiction.

4.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. Gardena does not currently provide any education or enforcement programs that promote bicycle safety.

4.2.8 Past Bicycle-Related Expenditures

Between 2000 and 2010 the City of Gardena has not incurred any bicycle-related expenditure.

4.3 Needs Analysis

This section describes the needs of bicyclists in Gardena. It first summarizes feedback collected from the online survey and public workshops. The section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

4.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Gardena that the community identified as desirable for bikeways and bicycle support facilities.

The most commonly identified locations for bicycle facilities in Gardena were residential streets, such as 139th Street, 146th Street, and 147th Street. The public also frequently mentioned arterial and collector streets, including Budlong Avenue, Normandie Avenue, Western Avenue, and Van Ness Avenue.

The community noted that additional bicycle parking facilities are desirable along transit routes.

4.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Gardena by census tract. The highest percentages of bicycle commuters are located in central Gardena, followed by the northern portion of the City.

Table 4-3 presents commute to work data estimates reported by the 2000 US Census for Gardena. For comparative purposes, the table includes commute to work data for the United States,

The highest percentage of bicycle commuters in Gardena are located in the central portion of the city.

California, and County of Los Angeles. According to the estimates, 0.9 percent of residents in Gardena commute predominantly by bicycle. The percent of bicycle commuters in Gardena is higher than that of the County of Los Angeles. It is comparable to that of California and above the United States as a whole. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in Gardena for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip.

The percentage of commuters in Gardena that commute by transit is lower than that of those that drive alone. Gardena also has a high percentage of carpooling, but a low percentage of walking.

In addition to bicycle commuters in Gardena, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Gardena's bicycle network in **Section 4.4**.

Table 4-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Gardena
Bicycle	0.38%	0.83%	0.62%	0.90%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	75.21%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	15.31%
Transit	4.73%	5.07%	6.58%	4.07%
Walked	2.93%	2.85%	2.93%	1.90%
Other Means	0.70%	0.79%	0.76%	0.55%
Worked at Home	3.26%	3.83%	3.49%	1.90%

Source: US Census 2000

Table 4-4 presents an estimate of current bicycling within Gardena using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 4-5** presents the associated air quality benefits from bicycling.

Table 4-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	57,818	2000 US Census, P1
Existing employed population	23,363	2000 US Census, P30
Existing bike-to-work mode share	0.90%	2000 US Census, P30
Existing number of bike-to-work commuters	210	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	1.90%	2000 US Census, P30
Existing number of work-at-home bike commuters	44	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	4.07%	2000 US Census, P30
Existing transit bicycle commuters	238	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	7,714	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	154	School children population multiplied by school children bike mode share
Existing number of college students in study area	4,431	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute share at the University of California, Los Angeles
Existing college bike commuters	222	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	868	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	1,736	Total bicycle commuters x 2 (for round trips)

Table 4-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	429	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	112,073	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	2,863	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	747,195	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	9	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	6	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	78	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	2,329	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	2,240	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	9	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	8	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	1,565	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	20,426	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	607,847	Yearly mileage reduction x 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 4-6 presents projected year 2030 bicycling activity within Gardena using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. **Table 4-7** presents the associated year

2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 4-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	71,950	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	29,073	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	1.80%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	523	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	2.58%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	75	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	8.14%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	592	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	6,130	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series.*
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	245	School children population multiplied by school children bicycling mode share
Future number of college students in study area	5,514	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	Equal to existing condition assumption from "Review of bicycle commute share in seven university communities" (Source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995).
Future college bike commuters	386	College student population x college student bicycling mode share
Future total number of bike commuters	1,821	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	3,642	Total bike commuters x 2 (for round trips)

Table 4-7 Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	848	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	221,450	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	5,878	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	1,534,186	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	18	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	12	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	161	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	4,782	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	4,600	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	18	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	17	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	3,213	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	41,941	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	1,248,069	Yearly mileage reduction x by 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of approximately 1,700 to roughly 3,600, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 3,200 pounds of smog forming N0X and approximately 1.2

million pounds of CO_2, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.

4.3.3 Bicycle Counts

To assess bicycling levels at different sites throughout Gardena, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

4.3.3.1 Methodology

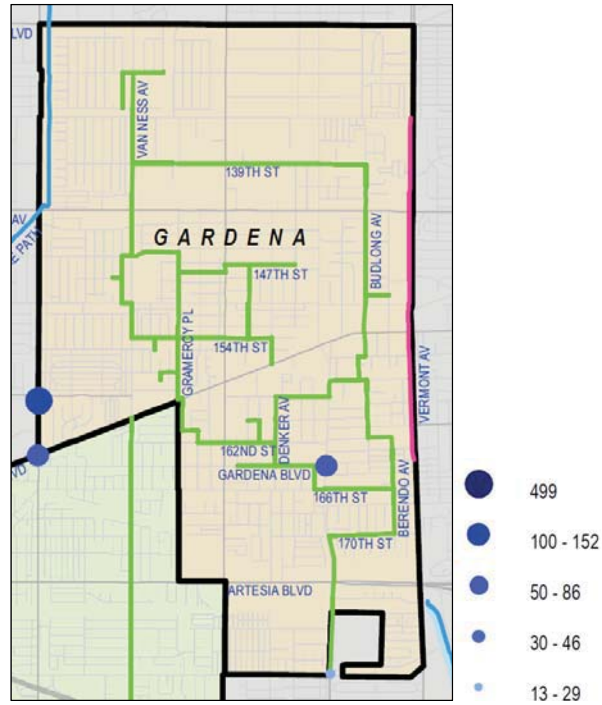
The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Gardena, volunteers were stationed at four stations on Thursday and three stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.

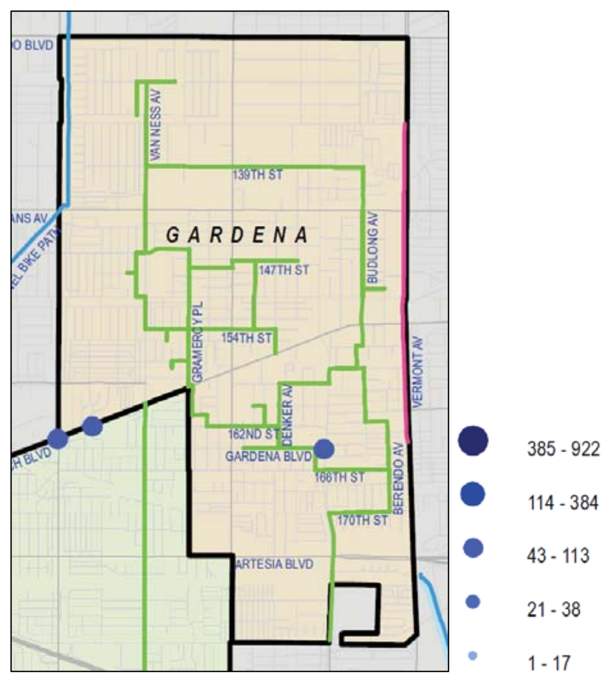
4.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Gardena are shown at



Weekday Bicycle Count Results in Gardena

(See Appendix A-16 for larger map and Appendix H for a list of count locations.)



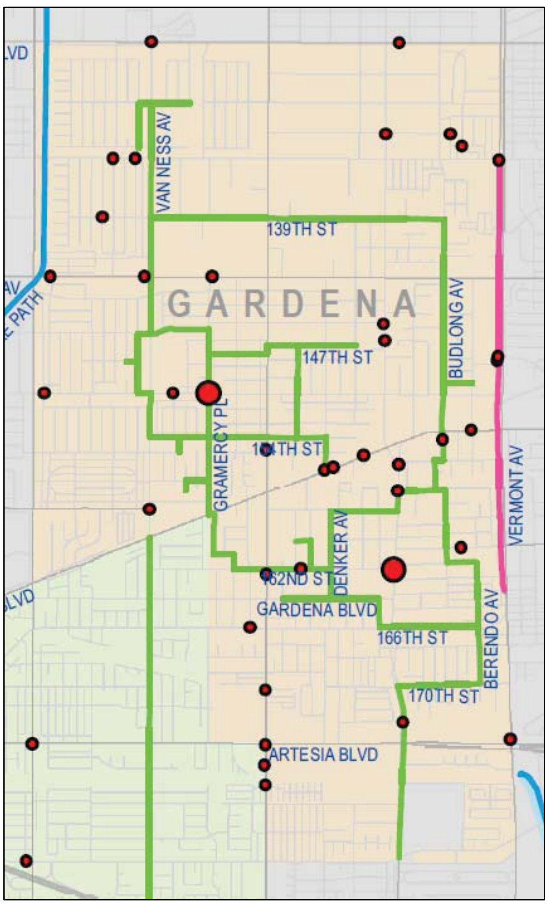
Weekend Bicycle Count Results in Gardena

(See Appendix A-17 for larger map and Appendix H for a list of count locations.)

right. Detailed count data, including a list of count locations, is presented in **Appendix H**. On Thursday, the Gardena station that experienced the highest volume was Crenshaw Boulevard and Manhattan Beach Boulevard with 106 bicyclists during the three hour counting period. The station with the highest number of bicyclists on Saturday was Crenshaw Boulevard and Redondo Beach Boulevard, which had 56 bicyclists during the three hour counting period.

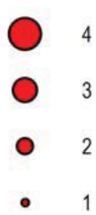
On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, approximately 83 percent of bicyclists were male. About 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.



Bicycle Collisions in Gardena 2007-2009

(See Appendix A-18 for larger map)



4.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Gardena. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 4-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Gardena are shown on the preceding page. There were 40 total reported collisions involving bicyclists in the City of Gardena from 2007-2009. Most of the crashes in Gardena were dispersed throughout the city, though the intersection of 162nd Street and Normandie Avenue and the intersection of Marine Avenue and Gramercy Place both experienced two collisions. Four collisions involving bicyclists occurred along Redondo Beach Boulevard in the eastern portion of the city. Likewise, six collisions involving bicyclists occurred on Western Avenue in the southern half of the city.

Table 4-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
40	40	40	0	0

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 58 percent of collisions involving bicycles (23 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in the participating cities. There is no data available for Gardena.

4.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Gardena, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and shown in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Gardena, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Gardena to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

The proposed bicycle network for the City of Gardena consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets.

4.4.1 Proposed Bikeway Facilities

The proposed bicycle network for the City of Gardena consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 4-3**. Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 4-9** lists the proposed bicycle paths, **Table 4-10** lists the proposed bicycle lanes, **Table 4-11** lists the proposed bicycle routes, and **Table 4-12** lists the proposed bicycle-friendly streets. The proposed bicycle network for the South Bay region as a whole is presented in **Appendix A-19**. The proposed bicycle network in Gardena connects with the recommended networks in Torrance and Lawndale, as well as the Los Angeles County bicycle system.

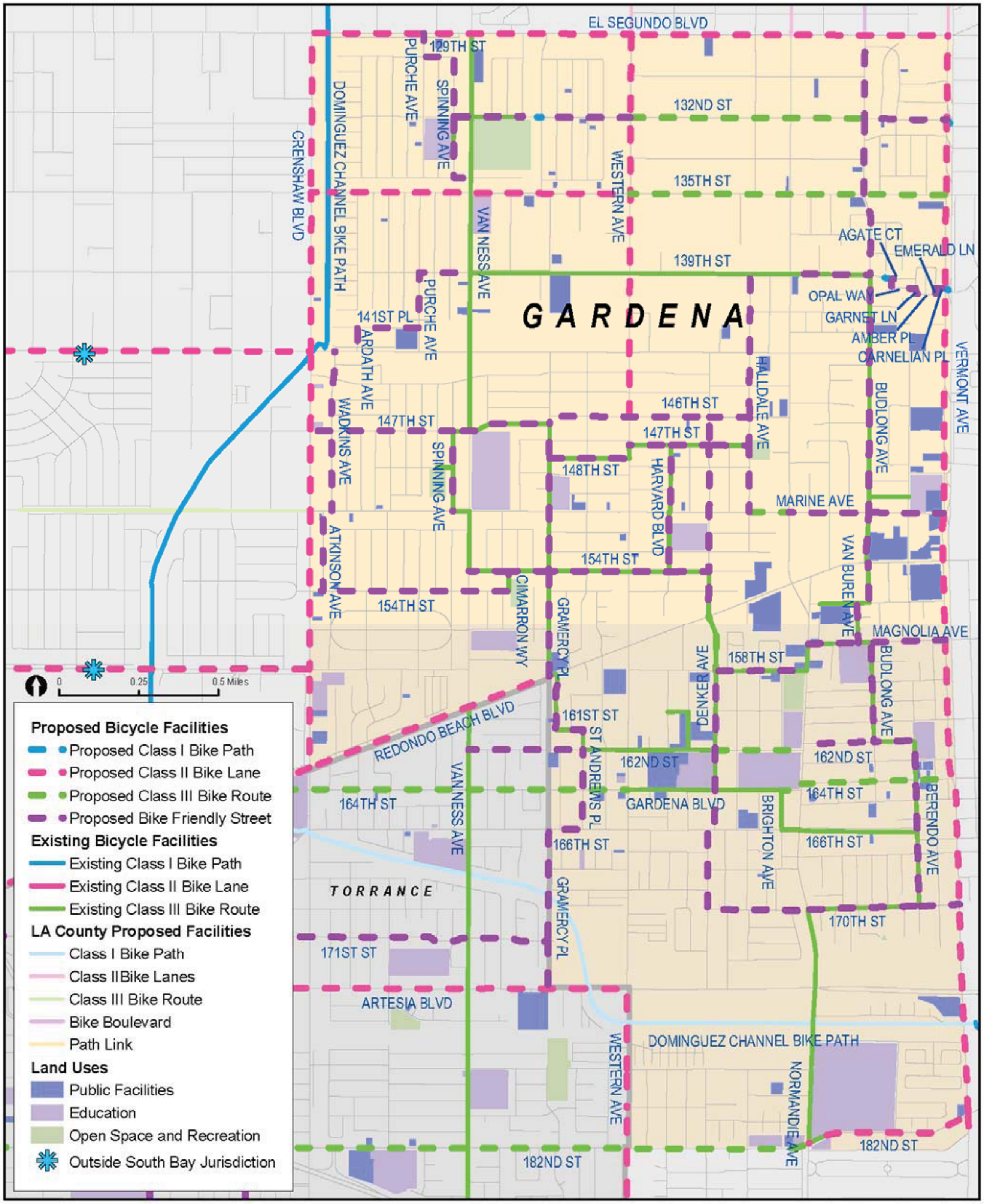


Figure 4-3: Proposed Bicycle Facilities in Gardena

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Table 4-9: Proposed Class I Bicycle Paths in Gardena

Street	From	To	Miles
132nd Street	Cimarron	Wilton	0.06
139th St Extension	Budlong Avenue	Agate Ct	0.07
Carnelian Place Extension	W side of Vermont Ave	E side of Vermont Ave	0.03
132nd Street Extension	W side of Vermont Ave	E side of Vermont Ave	0.03
Total Bicycle Path Mileage			**0.2**

Table 4-10: Proposed Class II Bicycle Lanes in Gardena

Street	From	To	Miles
Western Avenue	El Segundo Boulevard	146th Street	1.2
Crenshaw Boulevard	El Segundo Boulevard	Redondo Beach Boulevard	2.3
El Segundo Boulevard	Crenshaw Boulevard	Vermont Avenue	2.0
Vermont Avenue	El Segundo Boulevard	Electric Street	3.5
182nd Street	Normandie Avenue	Vermont Avenue	0.4
135th Street	Crenshaw Boulevard	Western Avenue	1.0
Total Bicycle Lane Mileage			**10.4**

Table 4-11: Proposed Class III Bicycle Routes in Gardena

Street	From	To	Miles
Denker Avenue	154th	158th	0.3
Gardena Boulevard - 164th Street	Brighton Avenue	Vermont Avenue	0.6
Gardena Boulevard	West City Limits	Western Avenue	0.2
182nd Street	Western Avenue	Normandie Avenue	0.7
132nd St	Western Avenue	Budlong Ave	0.7
135th Street	Western Avenue	Vermont Avenue	1.0
Marine Avenue	Halldale Avenue	Normandie Avenue	0.1
162nd Street	Denker Ave	Normandie Avenue	0.3
Total Bicycle Route Mileage			**3.9**

Table 4-12: Proposed Bicycle-Friendly Streets in Gardena

Street	From	To	Miles
Budlong Avenue - 155th Street - Van Buren Avenue - Magnolia Avenue - Budlong Avenue	El Segundo Boulevard	162nd Street	2.3
132nd Street	Spinning Avenue	Western Avenue (excluding BP from Cimarron to Wilton)	0.5
154th Street	Van Ness Avenue	Denker Avenue	0.8

Street	From	To	Miles
Berendo Avenue	162nd Street	170th Street	0.5
Harvard Boulevard	147th Street	154th Street	0.4
154th Street - 154th Place - Cimarron Way	Crenshaw Boulevard	154th Street	0.7
Denker Avenue	146th St	154th Street	0.5
Denker Avenue - 166th Street - Denker Avenue	158th St	170th Street	0.8
Purch Avenue - 129th Street - Spinning Avenue - 134th Place	El Segundo Boulevard	Van Ness Avenue	0.6
158th St	Denker Ave	Normandie Ave	0.3
Magnolia Ave	Normandie Ave	Vermont Ave	0.4
139th St	Normandie Ave	Budlong Ave	0.3
Agate Court - Opal Way - Garnet Lane - Amber Place - Emerald Lane - Carnelian Place	139th St Extension	Vermont Avenue	0.2
139th Street - Purche Avenue - 141st Place - Ardath Avenue	Van Ness Avenue	Rosecrans Avenue	0.6
Gramercy Place - Redondo Beach Boulevard - 161st Street - St Andrews Place	147th St	Gardena Boulevard	1.3
St Andrews Place - 166th St - Gramercy Place	Gardena Boulevard	Artesia Blvd	0.7
162nd Street	Normandie Avenue	Berendo Avenue	0.4
170th St	Denker Ave	Vermont Avenue	0.8
Spinning Avenue	147th Street	Marine Avenue	0.3
Marine Avenue	Normandie Avenue	Vermont Avenue	0.5
147th Street - 146th Place - Gramercy Place - 146th Street	Crenshaw Boulevard	Halldale Avenue	1.4
148th Street - Western Avenue - 147th Street	Marine Avenue	Halldale Avenue	0.7
Wadkins Avenue - Marine Avenue - Atkinson Avenue	Rosecrans Avenue	154th Street	0.8
132nd Street	Budlong Avenue	Vermont Avenue	0.3
Halldale Avenue	139th St	Marine Avenue	0.8
Gardena Boulevard	West City Limits	Western Avenue	0.3
Total Bicycle-Friendly Street Mileage			**16.8**

4.4.2 Proposed End-of-Trip Bicycle Facilities

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

The Gardena Municipal Code currently does not provide bicycle parking standards. The City should amend its Municipal Code to include requirements on the quantity and type of bicycle parking to be provided at new and retrofitted multi-family residential, commercial, office, and mixed-use land uses of all sizes. Quantity of bicycle parking should be based on square footage of developments or by number of employees/residents to adequately address the bicycle demand at each development.

The City should also amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles;
- Lockable bicycle rooms with permanently anchored racks; or
- Lockable, permanently anchored bicycle lockers.

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Gardena's Municipal Code should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

The City should also amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs.

Figure 4-4 displays proposed short- and long-term bicycle parking locations in Gardena. The City should ensure there is adequate short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

High-activity locations such as transit stations, offices, and major commercial districts, should provide more secure, long-term bicycle parking options, such as bicycle lockers.

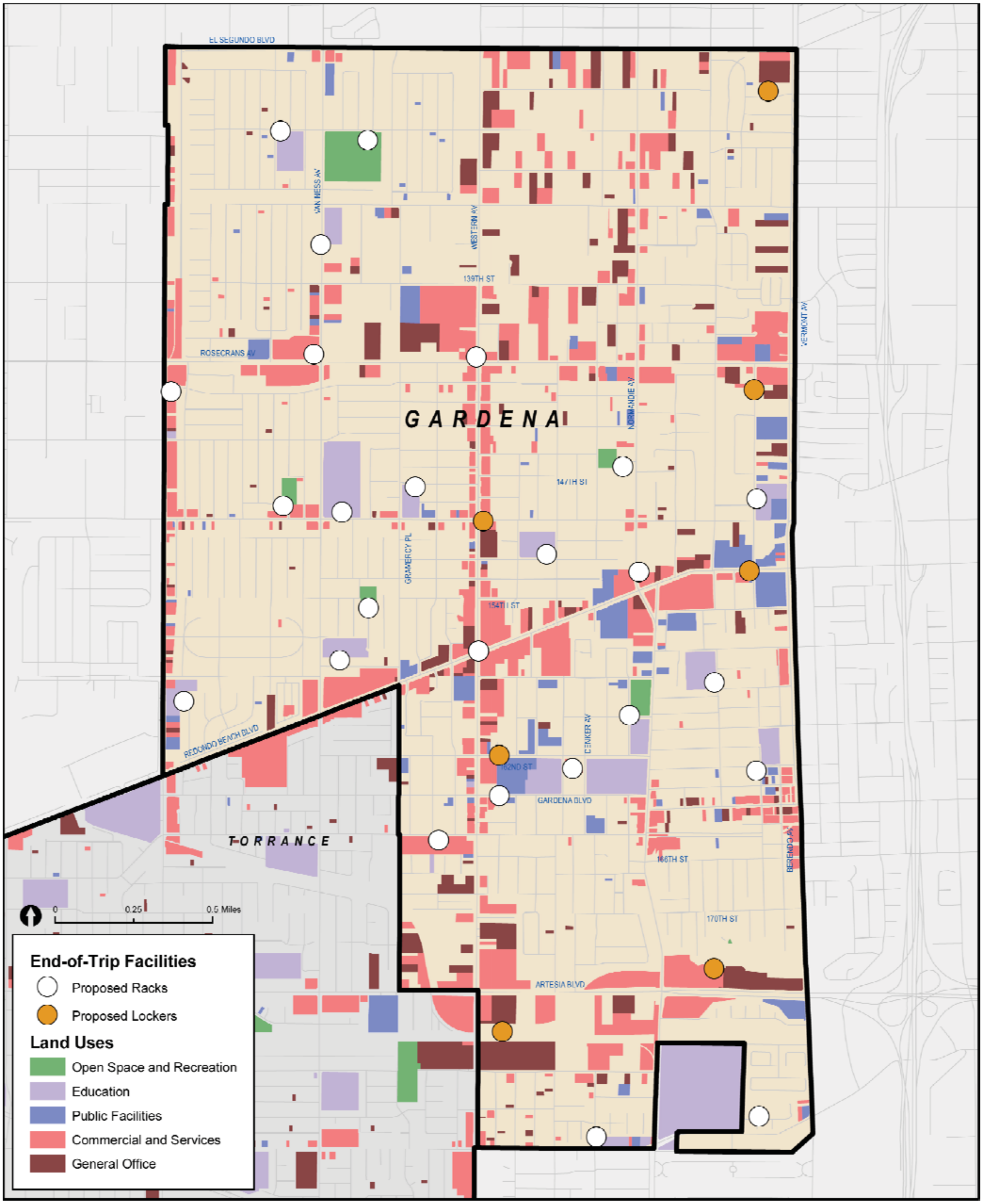


Figure 4-4: Gardena Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

4.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Gardena.

4.5.1 Cost Estimates

Table 4-13 displays the planning-level capital cost assumptions for each facility type proposed in this plan and **Table 4-14** displays the cost to implement the proposed network in the City of Gardena from the cost assumptions.[16] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 4.7**.

Table 4-13: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[17]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

[16] **Table 4-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

[17] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 4-14: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.2	$ 152,000
Bicycle Lane	$40,000	10.4	$ 416,000
Bicycle Route with sharrows	$25,000	3.9	$ 97,000
Bicycle-Friendly Street	$30,000	16.8	$ 505,000
Total		**31.3**	**$ 1,170,000**

4.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Gardena in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 4.4.1** is grouped into projects based on feasibility of implementation. **Table 4-15** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Gardena. The projects ranked the highest should be implemented first.

Table 4-15: Gardena Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS	Budlong Avenue - 155th Street - Van Buren Avenue - Magnolia Avenue - Budlong Avenue	El Segundo Boulevard	162nd Street	3	6	2	2	0	1	2	2	1	2	**21**
BFS	154th Street	Van Ness Avenue	Denker Avenue	6	6	0	0	0	0	0	2	2	2	**18**
BFS	Berendo Avenue	162nd Street	170th Street	6	6	0	0	0	0	0	2	2	2	**18**
BFS	Harvard Boulevard	147th Street	154th Street	6	6	0	0	0	0	0	2	2	2	**18**
BFS	158th St	Denker Ave	Normandie Ave	6	6	0	2	0	0	0	2	2	0	**18**
BFS	Magnolia Ave	Normandie Ave	Vermont Ave	6	6	0	2	0	0	0	2	2	0	**18**
BFS	154th Street - 154th Place - Cimarron Way	Crenshaw Boulevard	154th Street	3	6	1	2	0	0	0	1	2	2	**17**
BFS	Denker Avenue	146th St	154th Street	3	6	0	2	0	0	0	2	2	2	**17**
BR	Denker Avenue	154th	158th	3	6	0	2	0	0	0	2	2	2	**17**
BFS	Denker Avenue - 166th Street - Denker Avenue	158th St	170th Street	3	6	0	2	0	0	1	2	1	2	**17**
BL	Western Avenue	El Segundo Boulevard	146th Street	0	6	2	2	0	0	2	2	1	1	**16**
BFS	Purch Avenue - 129th Street - Spinning Avenue - 134th Place	El Segundo Boulevard	Van Ness Avenue	3	6	0	2	0	0	0	1	2	2	**16**
BL	Crenshaw Boulevard	El Segundo Boulevard	Redondo Beach Boulevard	0	6	0	4	0	0	2	2	0	2	**16**
BR	Gardena Boulevard - 164th Street	Brighton Avenue	Vermont Avenue	3	6	0	0	0	0	1	2	2	2	**16**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS - BP - BFS - BP	139th Street - Agate Court - Opal Way - Garnet Lane - Amber Place - Emerald Lane - Carnelian Place	Normandie Ave	Vermont Ave	3	6	0	0	0	2	1	2	0	2	**16**
BFS - BP - BFS	132nd Street	Spinning Avenue	Western Avenue	3	3	0	4	0	0	0	2	1	2	**15**
BL	El Segundo Boulevard	Crenshaw Boulevard	Vermont Avenue	0	6	0	2	0	1	2	2	0	2	**15**
BFS	139th Street - Purche Avenue - 141st Place - Ardath Avenue	Van Ness Avenue	Rosecrans Avenue	3	6	0	0	0	0	1	1	2	2	**15**
BL	Vermont Avenue	El Segundo Boulevard	Electric Street	0	6	2	0	0	2	2	2	0	1	**15**
BFS	146th St - Gramercy Place - Redondo Beach Boulevard - 161st Street - St Andrews Place - 166th St - Gramercy Place	147th St	Artesia Blvd	0	6	0	2	0	1	2	1	1	2	**15**
BFS	162nd Street	Normandie Avenue	Berendo Avenue	6	3	0	0	0	2	1	1	1	1	**15**
BFS	170th St	Denker Ave	Vermont Avenue	6	3	0	0	0	0	0	2	1	2	**14**
BFS	Marine Avenue	Normandie Avenue	Vermont Avenue	3	3	0	0	0	0	2	2	2	2	**14**
BR	Gardena Boulevard	West City Limits	Western Avenue	3	3	0	0	0	0	1	1	2	2	**12**
BFS	147th Street	Crenshaw Boulevard	Western Avenue	3	3	0	0	0	0	1	2	1	2	**12**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS	148th Street - Western Avenue - 147th Street	Gramercy Pl	Halldale Avenue	3	3	0	0	0	0	1	2	1	2	**12**
BFS	Spinning Avenue	147th Street	Marine Avenue	3	3	0	0	0	0	0	1	2	2	**11**
BFS	Wadkins Avenue - Marine Avenue - Atkinson Avenue	Rosecrans Avenue	154th Street	3	3	0	0	0	1	0	1	1	2	**11**
BR - BL	182nd Street	Western Avenue	Vermont Avenue	0	3	0	2	0	0	1	2	1	1	**10**
BR	Marine Avenue	Halldale Avenue	Normandie Avenue	0	0	0	2	0	2	2	2	2	0	**10**
BFS	Gardena Boulevard	West City Limits	Western Avenue	3	0	0	2	0	0	1	2	2	0	**10**
BFS - BP	132nd Street	Budlong Avenue	Vermont Avenue	3	0	1	0	0	0	0	2	1	2	**9**
BR	132nd St	Western Avenue	Budlong Ave	3	0	1	0	0	0	0	2	1	2	**9**
BFS	Halldale Avenue	139th St	Marine Avenue	3	0	0	2	0	0	0	2	2	0	**9**
BL	135th Street	Crenshaw Boulevard	Western Avenue	3	0	0	0	0	1	1	2	0	1	**8**
BR	135th Street	Western Avenue	Vermont Avenue	0	0	1	2	0	2	0	2	1	0	**8**
BR	162nd Street	Denker Ave	Normandie Avenue	0	0	0	2	0	0	0	2	2	0	**6**

*BP=Bike Path, BL=-Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

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4.7 Project Sheets

The City of Gardena selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Gardena Project #1: Western Avenue (El Segundo Boulevard to 146^{th} Street)

Project Site

Western Avenue is a north-south arterial located in the center of the City of Gardena. It connects to the County of Los Angeles to the north and the City of Torrance to the South. Western Avenue provides access to a wide variety of commercial and industrial services. There is existing on-street parallel parking along the entire street.

Western Avenue has two travel lanes in each direction, a center turn lane, and a posted speed limit of 35 mph. From El Segundo Boulevard to 139^{th} Street, Western Avenue has a roadway width of approximately 78 to 80 feet. There are center medians north and south of the intersection of 135^{th} Street with 32 feet of roadway width on each side. South of 139^{th} Street, the roadway width of Western Avenue drops to 75 feet. There is a center median north of Rosecrans with a roadway width of approximately 30 to 31 feet on each side. On the northbound side of the median there are three travel lanes. The third travel lane terminates after the median ends.

Project Challenges

Western Avenue has no existing bicycle facilities, thus bicyclists must share the road with high volumes of vehicles traveling at high speeds on an arterial street. Center medians and on-street parking reduce the available space for bicycle facilities.

Proposed Improvements

- Stripe 1.2 miles of Class II Bike Lanes
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Remove approximately 25 on-street parking spaces and the third northbound travel lane at the center median north of Rosecrans Avenue
- Install wayfinding signage after the implementation of the bike friendly street on 146^{th} Street to guide bicyclists from Western Avenue to bike friendly street

Estimated Cost

$100,000

Photos

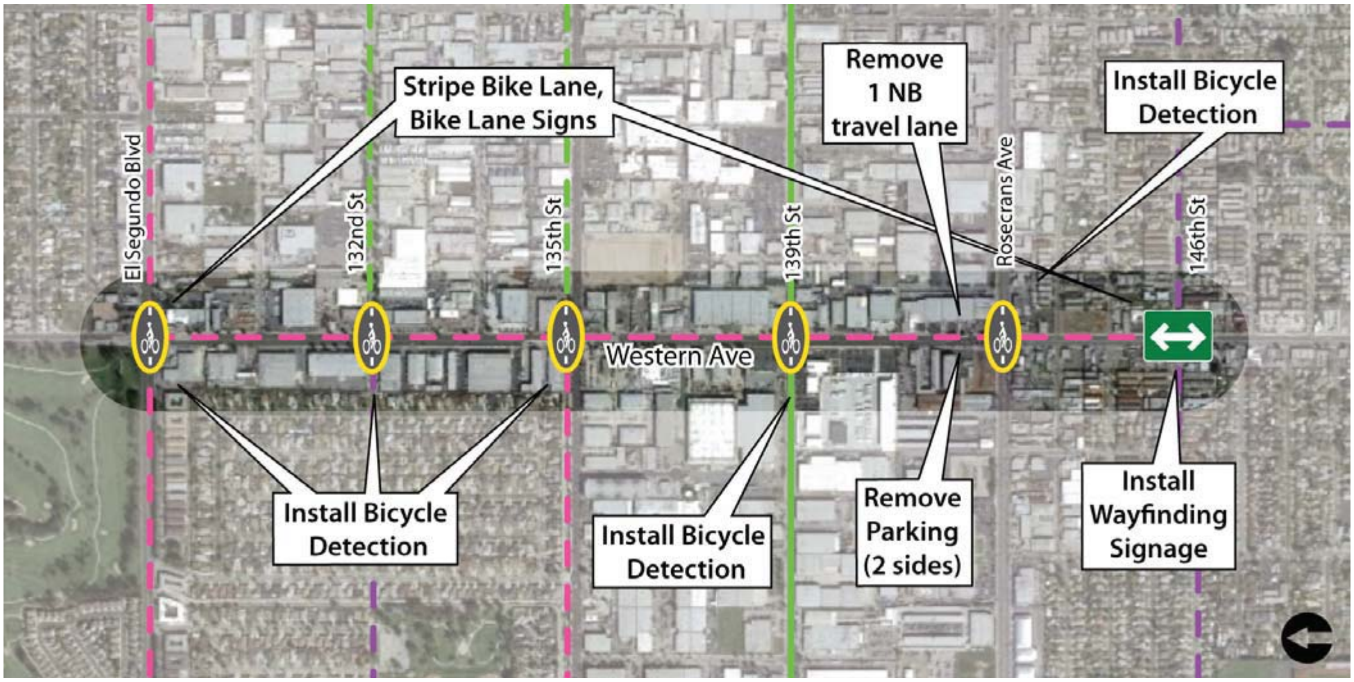
Looking north on Western Avenue. Bicyclists must share the road with high volumes of motorized vehicles.

A third northbound travel lane along the center median at Rosecrans Avenue does not provide adequate roadway width for a bicycle lane.

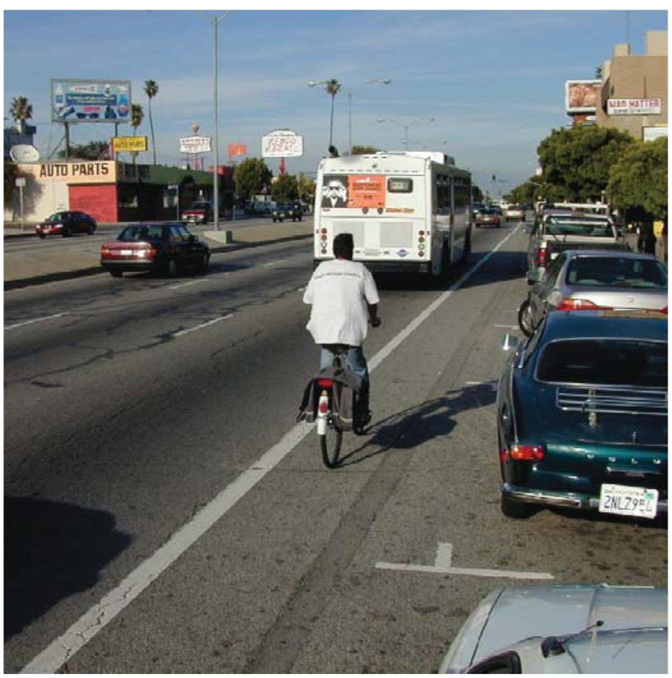
Bicycle detectors at signalized intersections will position bicyclists to trigger the signal when no vehicles are present.

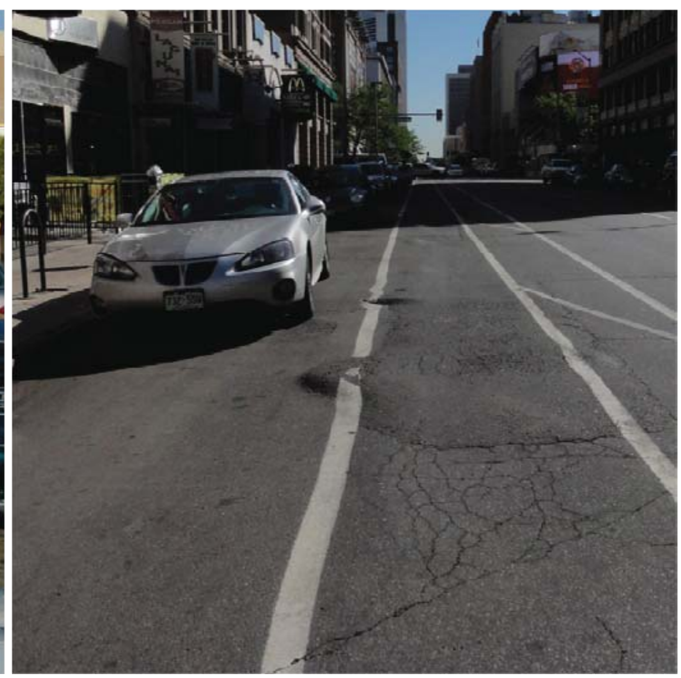
Aerial Map and Concept Graphics: Western Avenue

Western Avenue (El Segundo Boulevard to 146th Street)



Bike Lanes Next to On-street Parking and Bike Lane with Buffer





Gardena Project #2: 146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place (Western Avenue to Artesia Boulevard)

Project Site

146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place is a series of primarily residential streets in the center of the City of Gardena. It connects to proposed bike lanes on Western Avenue to the north and connects to Artesia Boulevard to the south. This segment provides access to Chapman Elementary School and several industrial uses. There is on-street parallel parking along most of this segment.

146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place has two travel lanes in each direction. Gramercy Place – 161st Street – St. Andrews Place from Redondo Beach Boulevard to 162nd Street has a striped center lane. There is a signalized intersection at Gramercy Place and Redondo Beach Boulevard, and many stop controlled intersections throughout the segment.

Project Challenges

While 146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place consists of primarily quiet residential streets, the streets jog from one to the other and lack connectivity making it difficult to navigate by bicycle. Intersections with Western Avenue and Artesia Boulevard are stop controlled on the minor street which makes it challenging for bicyclists to cross the arterials and initiate left turns. South of 166th Street, Gramercy Place has several industrial services which potentially attract vehicular traffic.

Proposed Improvements

- Install signage and stripe pavement markings, such as sharrows or bike friendly street stencils
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Install wayfinding signage at locations where the bike route curves
- Stripe bike left turn lanes on 166th Street at St. Andrews Place and 166th Street at Gramercy Place
- Install High Intensity Activated Crosswalks (HAWKs) across Artesia Boulevard and Western Avenue
- Construct speed humps on Gramercy Place south of 166th Street

Estimated Cost

$200,000

Photos

A HAWK across Artesia Boulevard will allow bicyclists and pedestrians to safely cross busy arterials.

A HAWK across Western Avenue will allow bicyclists and pedestrians to safely cross busy arterials.

A bike left turn pocket on 166th Street at Gramercy Place will provide bicyclists a protected place to queue.

Aerial Map and Concept Graphics: 146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place (Western Avenue to Artesia Boulevard)

146th Street – Gramercy Place – 161st Street – St. Andrews Place – 166th Street – Gramercy Place (Western Avenue to Artesia Boulevard)

Example Bike Left Turn Pocket and HAWK

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Chapter 5

Hermosa Beach

5 Hermosa Beach

This chapter presents the Hermosa Beach sections of the South Bay Bicycle Master Plan. It begins with a table that identifies how Hermosa Beach complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions
- City-specific goals, policies, and implementation actions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

5.1 Bicycle Transportation Account (BTA) Compliance

The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Hermosa Beach to qualify for BTA funds, the South B ay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

5.2 Existing Conditions

Hermosa Beach is located in the western portion of the South Bay region. It is bordered by the City of Manhattan Beach to the north, the City of Redondo Beach to the east and south, and the Pacific Ocean to the west. According to the 2000 Census, Hermosa Beach has a population of 18,442. The city was incorporated in 1907.

5.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land uses in Hermosa Beach are shown at right. The largest land use is residential: approximately 40 percent of Hermosa Beach's land area is single family and 21 percent is other residential. The City also is comprised of about 15 percent open space.

Existing Land Uses in Hermosa Beach

(See Appendix A-3 for larger map)

- City Boundary
- Single Family Residential
- Multi-Family Residential
- Other Residential
- General Office
- Commercial and Services
- Public Facilities
- Education
- Military Installations
- Industrial
- Transportation, Communications, and Utilities
- Mixed Commercial and Industrial
- Mixed Urban
- Open Space and Recreation
- Agriculture
- Vacant
- Water
- Under Construction
- Undevelopable
- Unknown

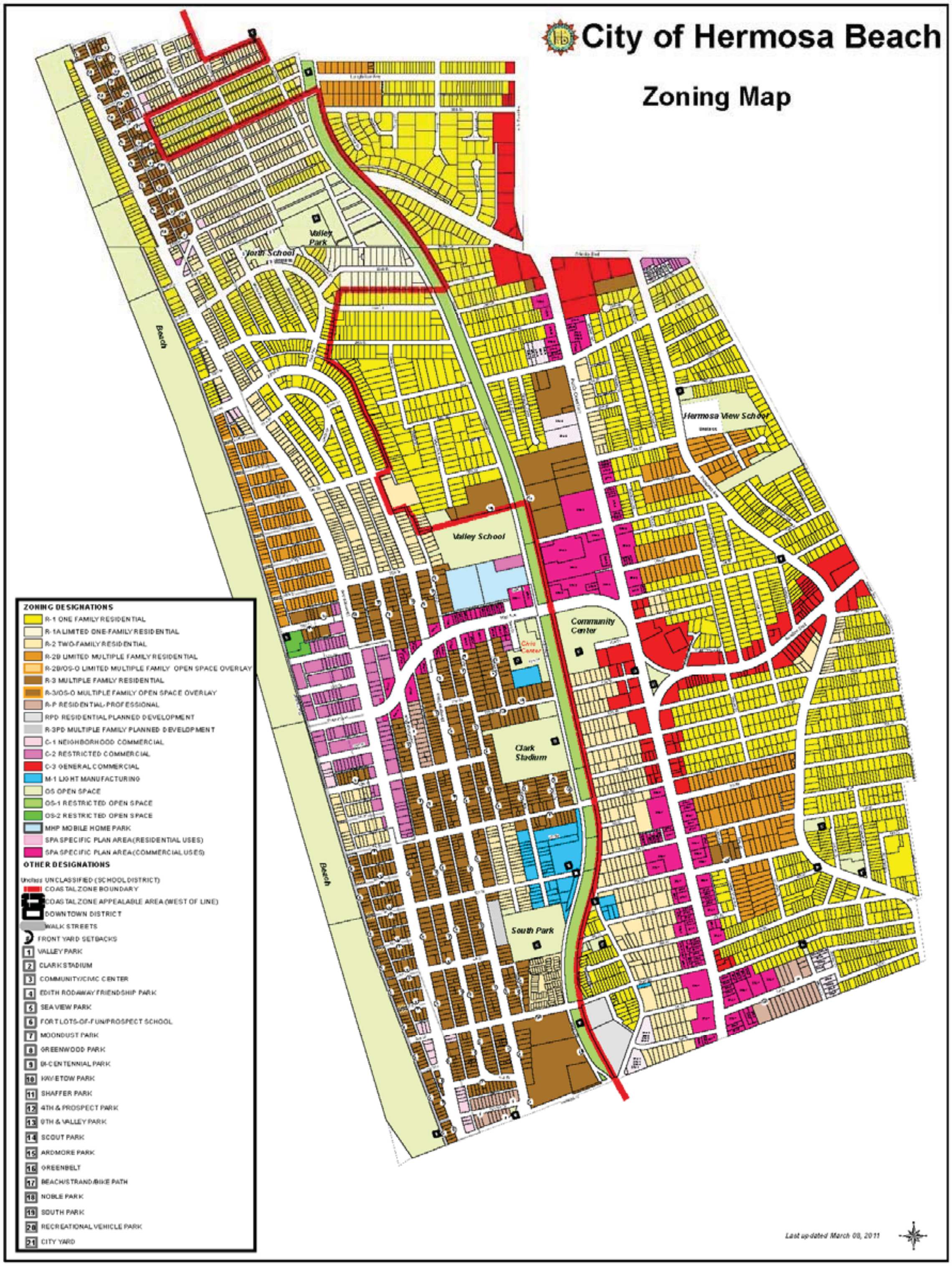


Figure 5-1: City of Hermosa Beach Zoning Map

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Hermosa Beach (2011)

Figure 5-1 displays the proposed land uses for Hermosa Beach. Existing land uses are generally consistent with use types and densities on the zoning map. There is limited potential for increased densities such that future development will be largely comprised of infill on the City's small lots with negligible increases in density.

5.2.2 Bicycle Trip Generators

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as certain sub-populations, such as transit commuters.

Appendix A-4 shows population density in Hermosa Beach. Areas of high population density are distributed uniformly throughout the city. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths.

Appendix A-5 displays employment density in Hermosa Beach. The City has the highest employment densities along Pier Avenue. Though not as high as Pier Avenue, Pacific Coast Highway also has high employment densities. While the City's zoning code provides very limited opportunity to develop new mixed residential-commercial land uses, the close proximity of the employment corridors to housing facilitates short trips between a variety of land uses and the potential to generate bicycle activity.

Appendix A-6, Appendix A-7, and **Appendix A-8** display the number and percent of zero-vehicle households, median annual income, and percent transit commuters by census tract. Throughout Hermosa Beach, households have median annual incomes between $75,001 and $95,000 (in 1999 dollars). There are high percentages of households that own a vehicle in most of the City, though percentages of household vehicle ownership are lower in the northeastern portion on the border of Manhattan Beach and North Redondo Beach. The northeastern and southwestern parts of Hermosa Beach have higher percentages of transit commuters. These parts of the city have greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, Hermosa Beach has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Hermosa Beach, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

5.2.3 Relevant Plans and Policies

Table 5-1 outlines information regarding bicycles from the City of Hermosa Beach's Circulation, Transportation, and Parking Element; Proposed Bicycle Master Plan; and Municipal Code.

Table 5-1: Hermosa Beach Bicycle-Related Plans and Policies

Document	Description
General Plan Circulation, Transportation, and Parking Element (1990)	The General Plan Circulation, Transportation, and Parking Element contains a map outlining the existing bicycle facilities, as well as key bicycle traffic generating locations, such as the Pier. This map was superseded by the Proposed Bicycle Master Plan (below). The element states that there are no streets in Hermosa Beach that could accommodate properly designed bicycle facilities. This is due to right-of-way constraints, heavy traffic volumes, and conflicts with curb parking. In order to install properly designed facilities, the City would need to widen streets and purchase right-of-ways. For this reason it does not propose any additional bicycle facilities. The Proposed Bicycle Master Plan, however, identifies proposed Class II bike lanes and shared roadways. To implement the overall goal of providing a safe, efficient, and balanced transportation system, the element outlines the following objectives and policies: • Maximize the use of alternative transportation modes • Encourage bicycle travel city-wide • Provide for the transport of bicycles on public transit vehicles wherever possible • Maintain the surfaces of bike paths to maximize safety and ease of travel • Require new developments to accommodate parking consistent with TDM programs
Proposed Bicycle Master Plan (2009)	The Hermosa Beach Bicycle Master Plan consists of a map (**Appendix F-3**) that displays existing and proposed bicycle facilities. Existing facilities include two bicycle routes in the City of Hermosa Beach. Those routes are along the Strand from the southerly City boundary to 24th Street connecting to the route on Hermosa Avenue from 24th Street to the north City boundary. The Strand is largely recreational as it is shared with pedestrians and roller-skaters. At various times due to high traffic volumes and the wide variety of users this is not a truly viable connector. The bike route connects to a bike path to the north in Manhattan Beach. The path is a designated bike route in Manhattan Beach which runs north along the beach into the cities of El Segundo, Los Angeles, and Santa Monica. To the south the Strand connects to a designated bike route in Redondo Beach along Harbor Drive. Proposed Class II bike lanes are on Artesia Boulevard from Ardmore Avenue to Prospect Avenue and Herondo Street from Hermosa Avenue to the southern City limits. Proposed shared roadways are on Hermosa Avenue, 22nd Street, Monterey Boulevard, Valley Drive, Ardmore Avenue, Pier Avenue, and Prospect Avenue. To date, sharrows on Hermosa Avenue have been implemented.
Municipal Code	The Municipal Code includes bicycle parking requirements that vary by the size of the development and type of land use as part of its transportation demand and trip reduction measures; however, virtually all projects developed are too small to be subject to these regulations. Minimum parking requirements are based on square footage of the development. Specific Plan Area No. 11 (along a portion of Pier Avenue) has a separate bicycle parking requirement in which minimum requirements can be based on either square footage or number of employees and shall be in the form of bike rack, fully enclosed spaces or lockers or other secure parking. The SPA-11 Zone also provides for an in-lieu fee when it is not practical to place bike racks on the property. The Municipal Code provides that vehicle parking for any development may be reduced with a Parking Plan approved by the planning commission based on various factors including bicycle and foot traffic. Bicycle parking is reviewed during the planning process by the planner. The code does not provide any other form of guidance. Detailed bicycle parking information is presented in **Appendix G**. The Municipal Code does not prohibit riding bicycles on the sidewalk, though there is not exact language stating this.

Figure 5-2: Existing Bicycle Facilities in Hermosa Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

5.2.4 Existing Bicycle Network

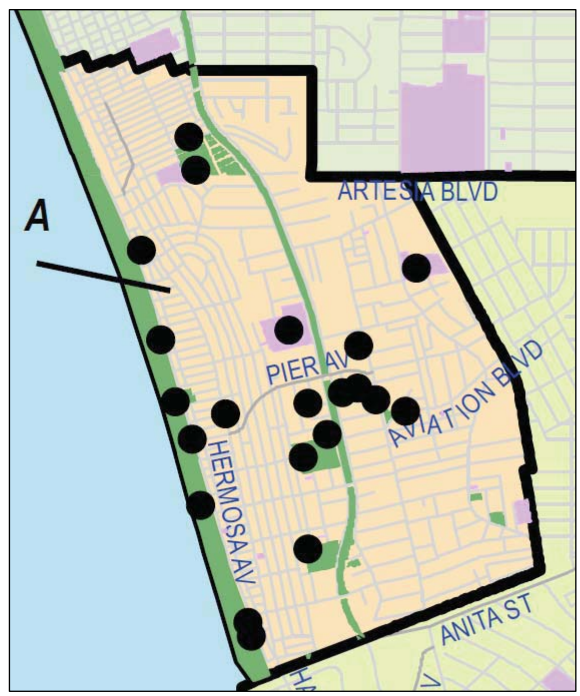
Figure 5-2 shows the existing bicycle network in Hermosa Beach. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**. The City of Hermosa Beach has a bicycle network that consists of approximately 5 miles of bicycle facilities. This includes Class I, Class II, and Class III facilities. Its Class I bike path is a portion of the Los Angeles County-maintained bicycle path that runs along the Strand. **Table 5-2** summarizes the classification and mileage of the existing network.

Table 5-2: Hermosa Beach Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	1.8
Class II (Bike Lanes)	0.5
Class III (Bike Route)	2.8
Total Mileage	**5.1**

5.2.5 Existing End-of-Trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. **Appendix A-9** presents the locations of existing end-of-trip bicycle facilities in the South Bay. Existing bicycle parking in Hermosa Beach is shown at right. Bicycle racks are located in commercial shopping centers, in the Downtown, and along the Strand. Hermosa Beach does have any existing changing or showering facilities.



Existing End-of-trip Facilities in Hermosa Beach

(See Appendix A-9 for larger map)

● Existing Bike Racks
● Existing Bike Lockers

5.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. **Appendix A-10** shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Hermosa Beach. Metro operates several bus lines with routes through the City that connect Hermosa Beach to its neighboring communities and key activity centers. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis.

LADOT operates the Commuter Express bus service. Line 438 connects the cities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance to Downtown Los Angeles. Most Commuter Express buses are equipped with bicycle racks, which are available on a first-come, first-served basis. The Commuter Express Line 438 route map is shown in **Appendix A-11**.

Beach Cities Transit (BCT) Line 109, operated by the City of Redondo Beach, and Torrance Transit Line 8, operated by the City of Torrance, also serve the City of Hermosa Beach. **Appendix A-13** shows the BCT System Map and **Appendix A-14** shows the Torrance Transit System Map. Buses are equipped with bike racks, which are available on a first-come, first-served basis.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. Hermosa Beach does not currently provide any intermodal end-of-trip bicycle facilities within its jurisdiction.

Increased enforcment in Hermosa Beach has led to more citations to bicyclists for stop sign and signal violations.

5.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. To promote safe bicycling, the Hermosa Beach Public Works Commission and Police Department put together a "Share the Road" Pamphlet that has been distributed to all the bicycle shops and at bicycle events. This pamphlet could be made available to all participating South Bay cities. Hermosa Beach has also held three bicycle safety events at Valley Park in May 2009, 2010, and 2011.

The Hermosa Beach Police Department began conducting increased bicycle enforcement in May 2010. To date, this has resulted in thirty citations issued to bicyclists for stop sign and signal violations.

5.2.8 Past Bicycle-Related Expenditures

Between 2000 and 2010 the City of Hermosa Beach incurred the following bicycle-related expenditure:

- $803,000 for shared lane markings and improvements on the Strand

5.3 Needs Analysis

This section describes the needs of bicyclists in Hermosa Beach. It first summarizes feedback collected from the online survey and public workshops. This section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

5.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Hermosa Beach that the community identified as desirable for bikeways.

The locations that the community mentioned the most frequently as in need of bikeways are Valley Drive /Ardmore Avenue and Pier Avenue. The community also noted that it would like to see bicycle facilities on major north-south and east-west routes, including Aviation Boulevard and Hermosa Avenue.

The community noted that it would like to see bicycle facilities on major north-south and east-west routes, including Aviation Boulevard and Hermosa Avenue.

5.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Hermosa Beach by census tract. There are no bicycle commuters throughout most of Hermosa Beach. The highest percentages of bicycle commuters are located in the southwest portion, which corresponds with higher percentages of transit commuters.

Table 5-3 presents commute to work data estimates reported by the 2000 US Census for Hermosa Beach. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to the estimates, 0.22 percent of residents in Hermosa Beach commute primarily by bicycle. This is lower than the percentage of bicycle commuters in Los Angeles County, California, and the U.S. as a whole. Hermosa Beach also has low rates of carpooling and transit riding, which suggests that the city's high median incomes and high car ownership rates are a primary influence on mode split. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in Hermosa Beach for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. The percentage of commuters in Hermosa Beach that commute by transit is much lower than that of those that drive alone. Hermosa Beach also has a low percentage of carpooling.

In addition to bicycle commuters in Hermosa Beach, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Hermosa Beach's bicycle network in **Section 5.4**.

Table 5-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Hermosa Beach
Bicycle	0.38%	0.83%	0.62%	0.22%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	82.61%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	6.61%
Transit	4.73%	5.07%	6.58%	0.95%
Walked	2.93%	2.85%	2.93%	2.42%
Other Means	0.70%	0.79%	0.76%	0.71%
Worked at Home	3.26%	3.83%	3.49%	5.98%

Source: US Census 2000

Table 5-4 presents an estimate of current bicycling within Hermosa Beach using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 5-5** presents the associated air quality benefits from bicycling.

Table 5-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	18,442	2000 US Census, P1
Existing employed population	12,784	2000 US Census, P30
Existing bike-to-work mode share	0.22%	2000 US Census, P30
Existing number of bike-to-work commuters	28	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	5.98%	2000 US Census, P30
Existing number of work-at-home bike commuters	76	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	0.950%	2000 US Census, P30
Existing transit bicycle commuters	30	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	992	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	20	School children population multiplied by school children bike mode share
Existing number of college students in study area	1,495	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute share at the University of California, Los Angeles
Existing college bike commuters	75	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	230	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	459	Total bicycle commuters x 2 (for round trips)

Table 5-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	141	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	36,911	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	1,058	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	276,076	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	3	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	2	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	29	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	860	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	828	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	3	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	3	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	578	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	7,547	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	224,589	Yearly mileage reduction x 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 5-6 presents projected year 2030 bicycling activity within Hermosa Beach using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. Table 5-7 presents the associated year

2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 5-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	22,950	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	15,909	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	0.4%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	70	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	10.8%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	172	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	1.9%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	76	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	788	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series.*
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	32	School children population multiplied by school children bicycling mode share
Future number of college students in study area	1,860	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	130	College student population x college student bicycling mode share
Future total number of bike commuters	480	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	959	Total bike commuters x 2 (for round trips)

Table 5-7: Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	289	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	75,357	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	2,193	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	572,327	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	7	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	5	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	60	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	1,784	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	1,716	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	7	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	6	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	1,199	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	15,646	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	465,591	Yearly mileage reduction x by 369 grams / mi

Source:
Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of 460 to 960, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 1,200 pounds of smog forming N0X and roughly 500 thousand pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.

5.3.3 Bicycle Counts

To assess bicycling levels at different sites throughout Hermosa Beach, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

5.3.3.1 Methodology

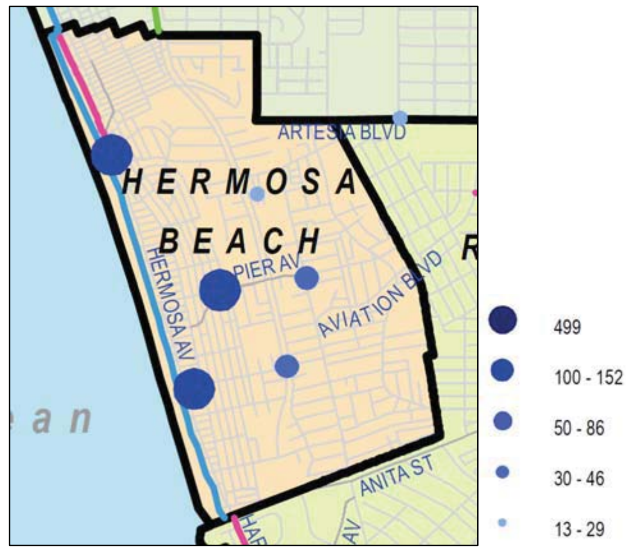
The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Hermosa Beach, volunteers were stationed at six stations on Thursday and seven stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.

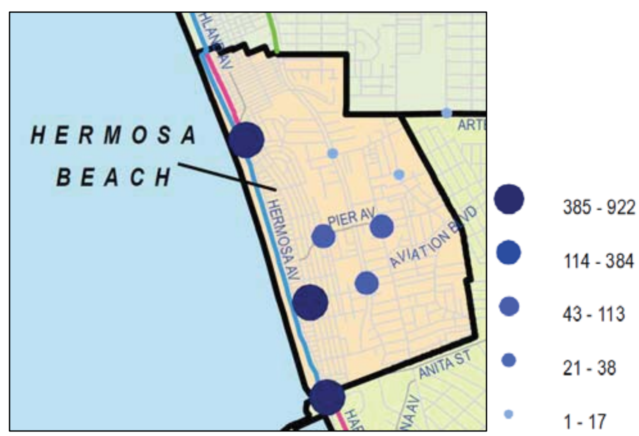
5.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Hermosa Beach are shown at right. Detailed count data, including a list of count locations, is



Weekday Bicycle Count Results in Hermosa Beach

(See Appendix A-16 for larger map and Appendix H for a list of count locations.)



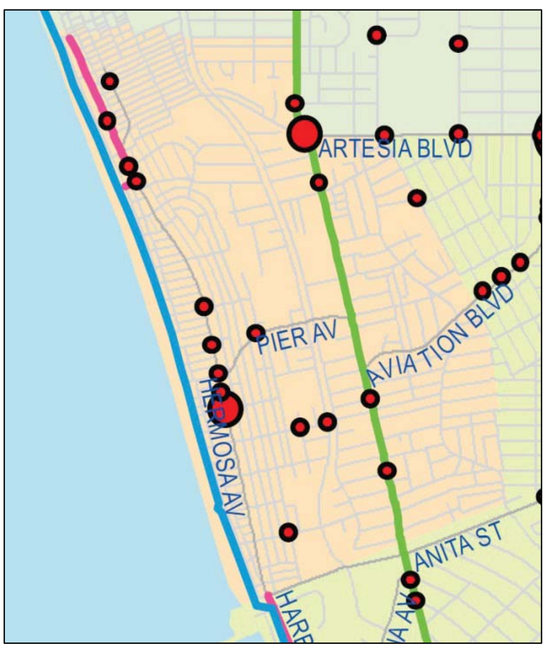
Weekend Bicycle Count Results in Hermosa Beach

(See Appendix A-17 for larger map and Appendix H for a list of count locations.)

presented in **Appendix H**. On Thursday, the Hermosa Beach station that experienced the highest volume was Hermosa Avenue and 8th Street with 152 bicyclists during the three hour count period. The station with the most bicyclists on Saturday was Hermosa Avenue and 24th Street with 922 bicyclists during the three hour count period.

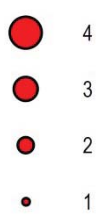
On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, approximately 83 percent of bicyclists were male. About 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.



Bicycle Collisions in Hermosa Beach 2007-2009

(See Appendix A-18 for larger map)



5.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Hermosa Beach. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 5-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Hermosa Beach are shown at right. There were 21 total reported collisions involving bicyclists from 2007-2009 in the City of Hermosa Beach. Most of the crashes occurred on Hermosa Avenue: three occurred in the northern portion of the city, and six occurred on Hermosa Avenue between 16th Street and 10th Street in the area surrounding the pier. These locations have high employment densities and recreational attractions, which correlate with bicycling activity. There were also two crashes at the intersection of Pacific Coast Highway and Artesia Blvd in the northeast portion of the city along the border with Manhattan Beach. These streets carry large volumes of vehicular traffic traveling at high speeds and intersect at a non-right angle, which creates situations that can produce conflicts between bicycles and automobiles.

Table 5-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
19	21	18	3	0

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 74 percent of collisions involving bicyclists (14 crashes).

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in the participating cities. There is no data available for Hermosa Beach.

5.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Hermosa Beach, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and presented in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Hermosa Beach, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Hermosa Beach to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

5.4.1 Proposed Bikeway Facilities

The proposed bicycle network in the City of Hermosa Beach consists of Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets.

The proposed bicycle network in the City of Hermosa Beach consists of Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 5-3.** The proposed bicycle network in Hermosa Beach connects with the recommended networks in Manhattan Beach and Redondo Beach. **Figure 5-3** includes a blue asterisk at the steps between Hermosa Beach and Manhattan Beach indicating that this is outside the jurisdiction of this Plan, but the connection between the two cities is a supported improvement. The proposed bicycle network for the South Bay region as a whole is presented in **Appendix A-19**.

Three tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility in Hermosa Beach. **Table 5-9** lists the proposed bicycle lanes, **Table 5-10** lists the proposed bicycle routes, and **Table 5-11** lists the proposed bicycle-friendly streets.

Table 5-9: Proposed Class II Bicycle Lanes in Hermosa Beach

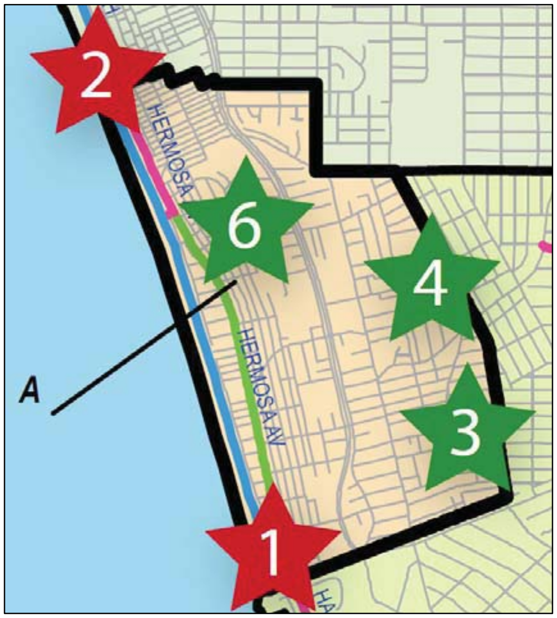
Facility Type	Street	From	To	Miles
BL	Herondo Street	Hermosa Avenue	Valley Drive	0.3
BL	Aviation Boulevard	Pacific Coast Highway	Harper Avenue	0.4
BL	Artesia Boulevard	Pacific Coast Highway	Harper Avenue	0.2
Total Bicycle Lane Mileage				**0.9**

Table 5-10: Proposed Class III Bicycle Routes in Hermosa Beach

Street	From	To	Miles
Pier Avenue	Hermosa Avenue	Ardmore Avenue	0.4
27th Street - Gould Avenue	Hermosa Avenue	Pacific Coast Highway	0.6
Longfellow Avenue	Hermosa Avenue	Valley Drive	0.3
Valley Drive	Longfellow Avenue	Herondo Street	1.8
Ardmore Avenue	North City Limits	Pier Avenue	1.0
Highland Avenue	35th Street	Longfellow Avenue	0.2
10th Street	Ardmore Avenue	Pacific Coast Highway	0.1
Hermosa Avenue	35th Street	24th St	0.5
Total Bicycle Route Mileage			**4.7**

Table 5-11: Proposed Bicycle-Friendly Streets in Hermosa Beach

Street	From	To	Miles
8th Street	Hermosa Avenue	Prospect Avenue	0.7
1st Street	Manhattan Avenue	The Strand	0.1
22nd Street - Monterey Boulevard	The Strand	Herondo Street	1.4
35th Street - Palm Drive	Hermosa Avenue	1st Street	0.1
21st Street	Ardmore Avenue	Prospect Avenue	0.3
Prospect Avenue	Artesia Boulevard	South City Limits	1.3
Total Bicycle-Friendly Street Mileage			**3.8**



Opportunities and Constraints in Hermosa Beach

(See Appendix I for larger map)

There are several opportunities and constraints to recommending new bicycle facilities in Hermosa Beach. These are shown at left and are referenced by the numbers in **Appendix I**. **Appendix I** also presents opportunities and constraints in the South Bay region as a whole.

One opportunity is for a proposed Bike Friendly Street on Prospect Avenue in Hermosa Beach as this is also being proposed by Vitality City. See Vitality City's Livability Plan for further detail.

Another opportunity is for a proposed Class II on Aviation Boulevard. Hermosa Beach's section of Aviation Boulevard is particularly rich with retail and commercial uses. Bike facilities could greatly improve the area's visibility and access. See Vitality City's Livability Plan for further detail.

Finally, there is the opportunity for a proposed Class III bikeway on Valley Drive/Ardmore Avenue. While this plan recommends a Class III route, the Vitality City Livability Plan recommends additional options. See the Vitality City Livability Plan for further detail and opportunities.

Constraints to implementing the proposed bicycle facilities first include "The Wall" on the Strand at the border of Hermosa Beach and Redondo Beach. This wall severs the Marvin Braude Bikeway at the Hermosa Beach-Redondo Beach border. South-bound bicyclists are forced to make a sharp 90-degree turn and are led out to the bike lanes on Harbor Drive. This plan recommends the removal of the wall and that parking lot 13 in Redondo Beach be partially utilized to accommodate a short extension of the Class I facility that will lead to Harbor Drive in a safer and more navigable way.

Another constraint is the stairs on the Strand between Hermosa Beach and Manhattan Beach. This constraint is also noted as being

Figure 5-3: Proposed Bicycle Facilities in Hermosa Beach

South Bay Bicycle Master Plan
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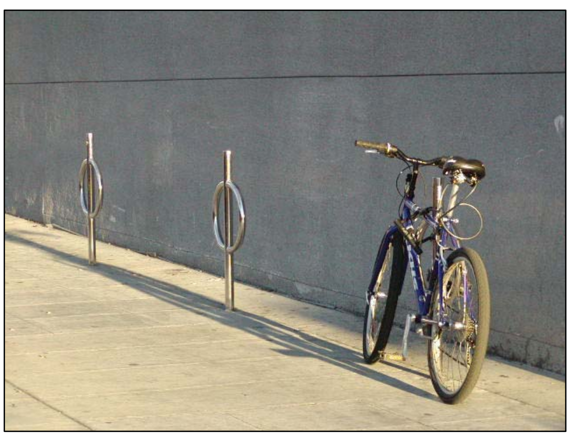
outside this plan's jurisdiction because those stairs (along with the rest of the Strand with the exception of Hermosa Beach) are operated by the State and maintained by the County of Los Angeles. However, this plan urges the cities to remedy the disruption caused by the stairs. This remedy could come in several forms ranging from a bike-friendly ramp that connects the two sections of the Strand to signage that warns cyclists of the disruption and safely guides them to facilities along Hermosa Avenue.

5.4.2 Proposed End-of-Trip Bicycle Facilities

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.



The City should amend its Municipal Code to includebicycle parking design types.

The Hermosa Beach Municipal Code currently provides bicycle parking requirements in its Specific Plan Area No. 11 Zone and at large non-residential developments (although the threshold far exceeds the scale of various developments in the City and therefore these transportation management and demand regulations have no effect). The City should amend its Municipal Code to include requirements on the quantity of bicycle parking to be provided at new and retrofitted multi-family residential, commercial, office, and mixed-use developments of all sizes, as well as bicycle parking design types. Quantity of bicycle parking should be based on square footage of developments or by number of residents to adequately address the bicycle demand at each development.

The City should also amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles

- Lockable bicycle rooms with permanently anchored racks or
- Lockable, permanently anchored bicycle lockers

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Hermosa Beach's Municipal Code should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

Proposed end-of-trip bicycle facilities in Hermosa Beach are shown in **Figure 5-4.** The City should continue to provide short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs, and ensure that an adequate supply is available. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at locations, such as parks and commercial areas.

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

Figure 5-4: Hermosa Beach Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan

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5.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Hermosa Beach.

5.5.1 Cost Estimates

Table 5-12 displays the planning-level capital cost assumptions for each facility type proposed in this plan, and **Table 5-13** displays the cost to implement the proposed network in the City of Hermosa Beach from the cost assumptions.[18] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 5.7**.

Table 5-12: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[19]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

[18] **Table 5-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

[19] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 5-13: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.0	$ -
Bicycle Lane	$40,000	0.9	$ 36,000
Bicycle Route with sharrows	$25,000	4.8	$119,000
Bicycle-Friendly Street	$30,000	3.8	$114,000
Total		**9.5**	**$ 269,000**

5.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Hermosa Beach in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 5.4.1** is grouped into projects based on feasibility of implementation. **Table 5-14** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Hermosa Beach. The projects ranked the highest should be implemented first.

Table 5-14: Hermosa Beach Prioritized Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR	Pier Avenue	Hermosa Avenue	Ardmore Avenue	3	6	0	4	0	1	2	0	2	2	**20**
BFS	8th Street	Hermosa Avenue	Prospect Avenue	3	6	0	4	0	2	0	0	2	2	**19**
BR	27th Street - Gould Avenue	Hermosa Avenue	Pacific Coast Highway	3	6	0	4	0	0	0	1	2	2	**18**
BFS	1st Street	Manhattan Avenue	The Strand	3	6	0	4	0	0	0	1	2	2	**18**
BFS	22nd Street - Monterey Boulevard	The Strand	Herondo Street	3	6	0	4	0	1	1	0	1	2	**18**
BR	Longfellow Avenue	Hermosa Avenue	Valley Drive	3	6	0	4	0	0	0	0	2	2	**17**
BL	Herondo Street	Hermosa Avenue	Valley Drive	3	6	0	2	0	0	0	1	2	2	**16**
BFS	35th Street - Palm Drive	Hermosa Avenue	1st Street	3	6	0	2	0	0	0	0	2	2	**15**
BR	Valley Drive	Longfellow Avenue	Herondo Street	0	3	0	4	0	1	2	1	1	2	**14**
BR	Ardmore Avenue	North City Limits	Pier Avenue	0	3	0	4	0	0	2	1	2	2	**14**
BR	Highland Avenue	35th Street	Longfellow Avenue	0	3	0	0	0	0	2	1	2	2	**10**
BFS	21st Street	Ardmore Avenue	Prospect Avenue	0	0	0	4	0	1	0	1	2	2	**10**
BL	Artesia Boulevard	Pacific Coast Highway	Harper Avenue	0	0	0	2	0	2	2	1	2	0	**9**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR - BL	10th Street - Aviation Boulevard	Ardmore Avenue	Harper Avenue	0	0	0	2	0	0	2	0	2	1	**7**
BFS	Prospect Avenue	Artesia Boulevard	South City Limits	0	0	0	2	0	0	0	1	1	2	**6**
*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street														

5.7 Project Sheets

The City of Hermosa Beach selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Hermosa Beach Project #1: Prospect Avenue (Artesia Boulevard to Anita Street)

Project Site

Prospect Avenue is a north-south primarily residential road located in the eastern portion of the City of Hermosa Beach. It connects to the City of Manhattan Beach to the north and the City of Redondo Beach to the south. Prospect Avenue provides access to Hermosa View Elementary School, Rodaway Park, and scattered commercial services. There is on-street parking along most of Prospect Avenue and a posted speed limit of 25 mph.

From Artesia Boulevard to 21st Street, Prospect Avenue has two travel lanes in each direction. South of 21st Street, the road drops to one travel lane in each direction. There are many striped crosswalks throughout the segment at intersections and midblock. There is no existing on-street parking south of Aviation Boulevard on the west side of the street.

Project Challenges

Prospect Avenue has no existing bicycle facilities, thus bicyclists must share the road with vehicular traffic. Bicyclists must cross arterials that carry high volumes of vehicles traveling at high speeds. There are few existing treatments to create a safe bicycling environment for children riding to school.

Proposed Improvements

- Install signage and stripe pavement markings, such as sharrows or bike friendly street stencils
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Stripe intersection crossing markings to guide bicyclists through the intersections and increase their visibility
- Construct bulbouts with high visibility crosswalks
- Install roundabout at Artesia Boulevard to reduce vehicle speeds

Estimated Cost

$3,000,000

Photos

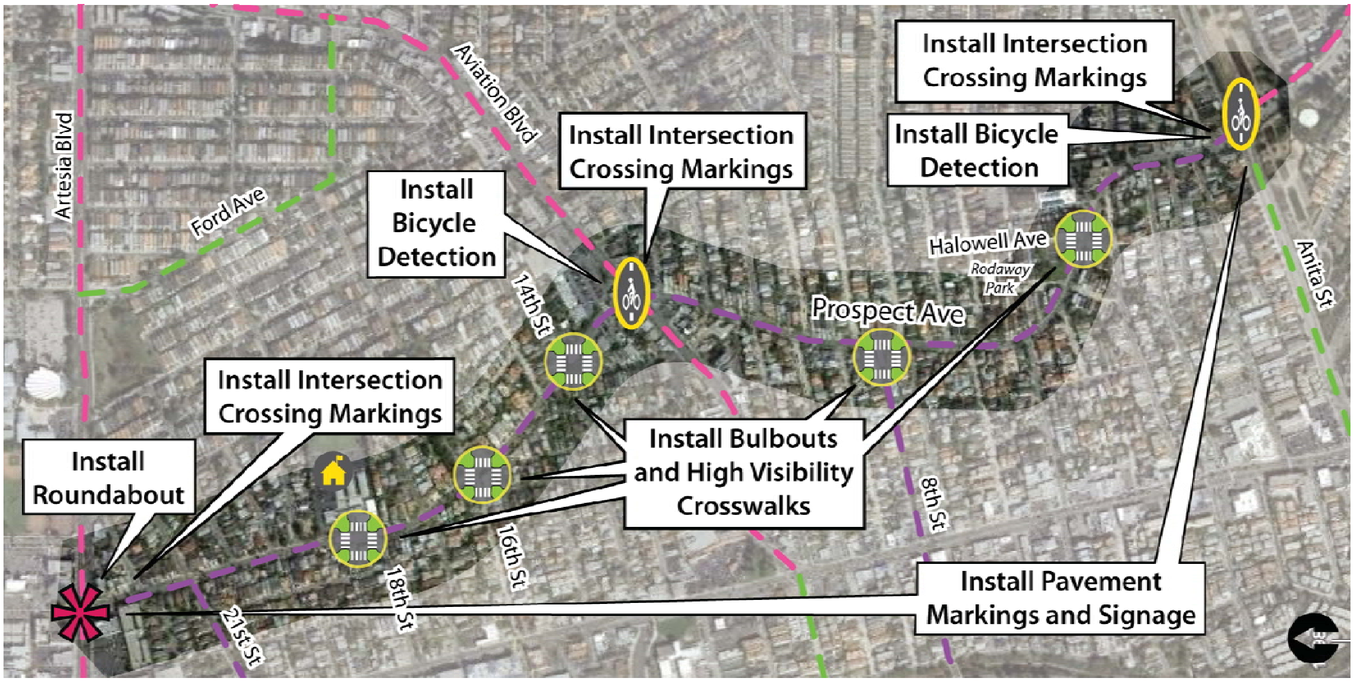
Bulbouts and high visibility crosswalks at intersection will visually narrow the road and reduce vehicle speeds.

Sharrows on Prospect Avenue will alert motorists to the presence of bicyclists and help bicyclists with proper lane positioning.

Intersection crossing markings will help guide bicyclists through the intersections and increase their visibility.

Aerial Map and Concept Graphics: Prospect Avenue

Prospect Avenue (Artesia Boulevard to Anita Street)



Example Intersection Crossing Markings Designs (Source: NACTO.org)

Hermosa Beach Project #2: Longfellow Avenue (Hermosa Avenue to Valley Drive)

Project Site

Longfellow Avenue is an east-west residential street located in the northern portion of the City of Hermosa Beach. It connects to the Hermosa Valley Greenbelt to the east and an existing cycle track that leads to the beach on Hermosa Avenue to the west. Longfellow Avenue provides secondary access to restaurants and commercial services on Hermosa Avenue and Manhattan Avenue. There is metered parallel parking along most of Longfellow Avenue and a posted speed limit of 25 mph.

Longfellow Avenue has one travel lane in each direction with a striped center line. There are stop controlled intersections at most intersections.

Project Challenges

Longfellow Avenue is a popular route to the beach for both bicyclists and vehicles. Because it is highly utilized by both bicyclists and motorists, there is the potential for conflicts between the two modes.

Proposed Improvements

- Stripe sharrows and install "Share the Road" signage
- Install wayfinding signage at intersections with existing bicycle facilities (and future facilities once implemented)

Estimated Cost

$10,000

Photos

Sharrows on Longfellow Avenue will help bicyclists with lane positioning so they ride outside of the door zone of parked cars.

Hermosa Avenue is highly utilized by both bicyclists and vehicles; therefore, there is the potential for conflicts between the two modes.

Wayfinding signage at intersections with other bicycle facilities, such as the Hermosa Ave cycle track shown above, will help bicyclists to navigate through the network.

Aerial Map and Concept Graphics: Longfellow Avenue

Longfellow Avenue (Hermosa Avenue to Valley Drive)

Example Signage and Sharrows

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Chapter 6

Lawndale

6 Lawndale

This chapter presents Lawndale's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how Lawndale complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions
- City-specific goals, policies, and implementation actions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

6.1 Bicycle Transportation Account (BTA) Compliance

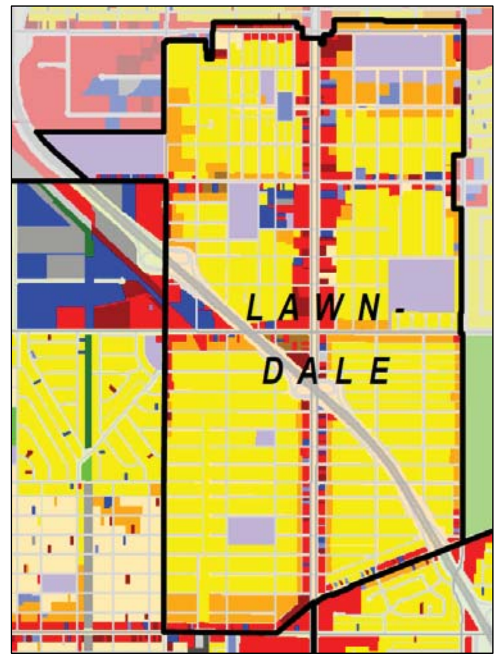
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Lawndale to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

6.2 Existing Conditions

Lawndale is located in the northern portion of the South Bay region. It is bordered by the City of Hawthorne to the north, the County of Los Angeles to the east, the City of Redondo Beach to the west, and the City of Torrance to the south. According to the 2000 Census, Lawndale has a population of 31,729. The city was incorporated in 1959.

6.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land uses in Lawndale are shown at right. Almost 60 percent of the City's land area consists of single family residential and another 12 percent is multi-family residential. Lawndale also consists of approximately 12 percent educational uses, a land use that is associated with producing jobs. Having adequate bicycle



Existing Land Uses in Lawndale

(See Appendix A-3 for larger map)

- City Boundary
- Single Family Residential
- Multi-Family Residential
- Other Residential
- General Office
- Commercial and Services
- Public Facilities
- Education
- Military Installations
- Industrial
- Transportation, Communications, and Utilities
- Mixed Commercial and Industrial
- Mixed Urban
- Open Space and Recreation
- Agriculture
- Vacant
- Water
- Under Construction
- Undevelopable
- Unknown

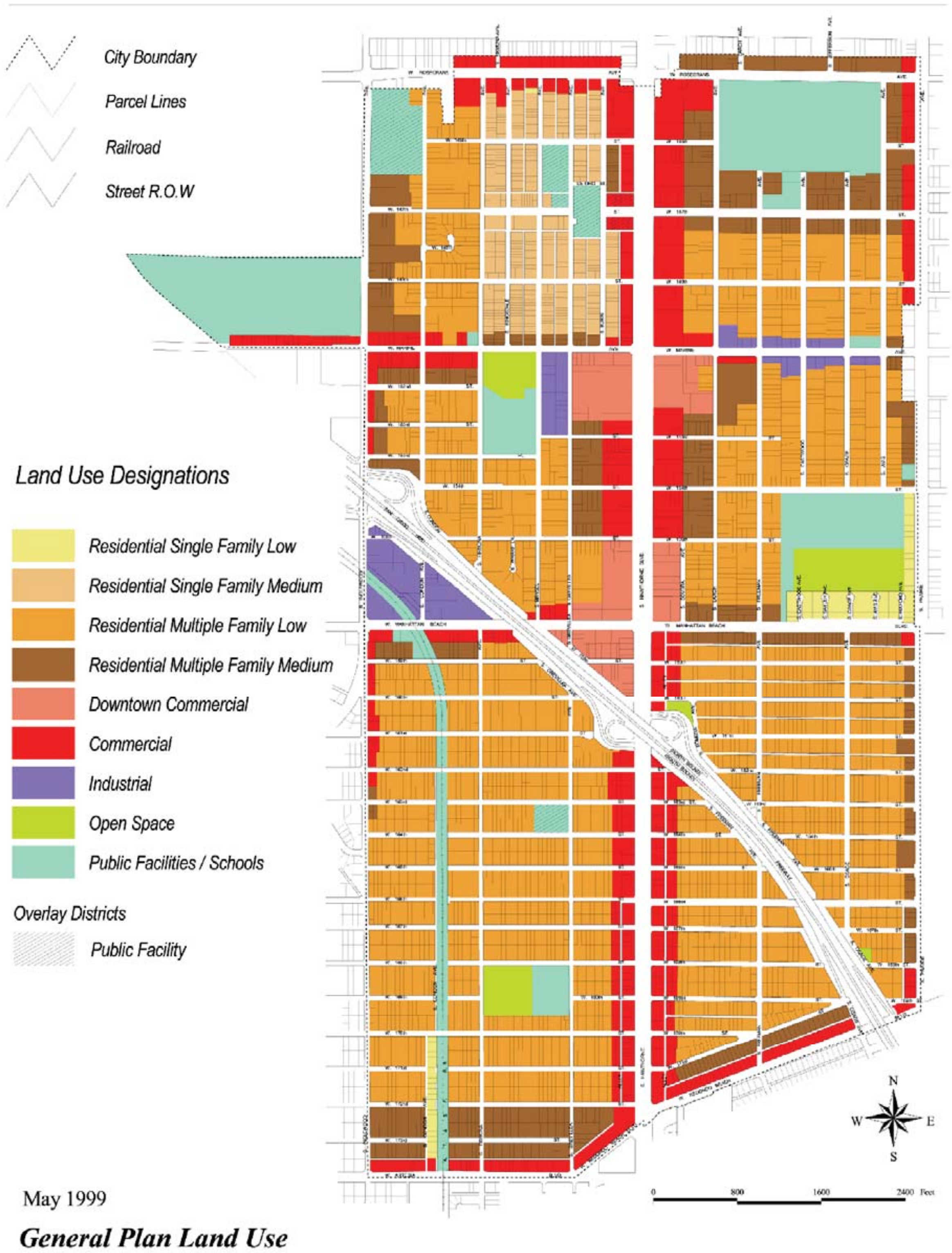


Figure 6-1: City of Lawndale General Plan Land Use Map

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Lawndale (1999)

facilities could influence commuters to bicycle rather than drive and encourage parents to let their children ride to school.

Figure 6-1 displays allowed land uses in Lawndale. Most of the city's residential areas are zoned "Multi-family low" a land use designation that allows the development of low density multifamily housing; though, the residential area along 152nd street are zoned "Multi-Family Medium Density" a land use designation that allow medium density residential developments.

6.2.2 Bicycle Trip Generators

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as certain sub-populations, like transit commuters or zero-vehicle households.

Appendix A-4 shows population density in Lawndale. The City has high population density due in part to its large proportion of multi-family housing. This type of housing has the potential to produce more bicycle trips as it has more persons per acre and is generally located nearer to community services, such as restaurants or grocery stores. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths.

Appendix A-5 displays employment density in Lawndale. The highest employment density in Lawndale is along Hawthorne Boulevard. The land uses on this corridor are primarily commercial and services, though there are also some general office and industrial uses. These sites have the potential to generate bicycle activity, as they are located in environments with a variety of land uses where trips between uses can be shorter.

Appendix A-6, Appendix A-7 and Appendix A-8 display the percent of zero-vehicle households, median annual income, and percent transit commuters by census tract in the City of Lawndale. Household median annual incomes throughout the city are below $35,000 (in 1999 dollars). Lawndale has high percentages of households without vehicles and high percentages of transit commuters, especially in the northwestern portion. This part of the city has greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, Lawndale has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Lawndale, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

6.2.3 Relevant Plans and Policies

Table 6-1 outlines information regarding bicycles from the City of Lawndale's Circulation Element and Municipal Code.

Table 6-1: Lawndale Bicycle-Related Plans and Policies

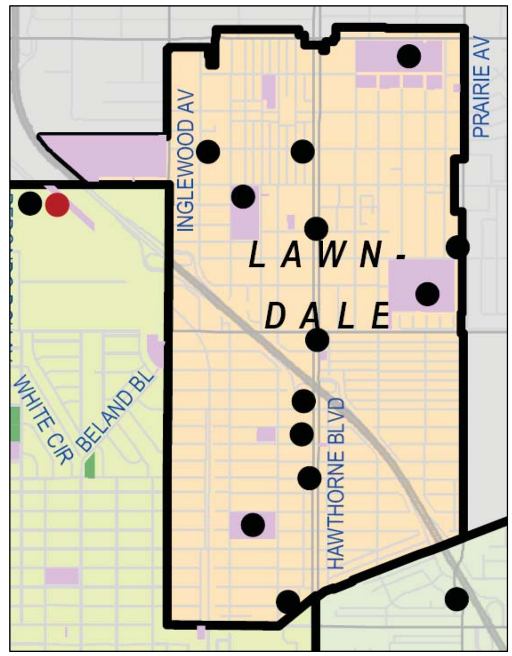
Document	Description
General Plan Circulation Element (1992)	The City of Lawndale's Circulation Element has an overall goal to consider all modes of transportation. Other goals and policies include: • Implement a safe, efficient, and accessible transportation system • Provide bikeways throughout the City to encourage bicycle usage • Consider the use of bicycle lanes where feasible during the design and improvement of the street system • Update and maintain a bikeway plan with recommended routes that connect residential areas to public facilities and employment centers • Provide an integrated system of bicycle and pedestrian networks with associated facilities • Plan Class II bikeways into all major highways and collector streets • Development shall provide short-term bicycle parking and long term bicycle storage facilities • Development shall provide bicycle access to high activity land uses • Continue seeking funds at the private, local, and federal levels for bicycle circulation system expansion • Develop and distribute a bicycle map to employers and existing/future residents • Conduct a citywide bikeway study and develop a bikeway master plan (not completed as of December 2010)
Municipal Code	Bicycle parking requirements in the City's Municipal Code vary by the size and land use of the development as part of the City's transportation demand and trip reduction measures. Parking shall be in the form of bicycle racks, fully enclosed spaces or lockers, or other secure parking. The City also has requirements for the bicycle parking at video arcades and requires developments of certain sizes to provide information, such as bicycle maps. For developments that are required to have bicycle parking, the bicycle storage areas and total number of bikes that can be stored must be indicated on architectural plans. Once the project is near completion, staff inspects the site and makes sure that requirements are met. Detailed bicycle parking information is presented in **Appendix G**. Lawndale's Municipal Code does not prohibit riding bicycles on the sidewalk, though there is not exact language stating this.

6.2.4 Existing Bicycle Network

Figure 6-2 shows the existing bicycle facilities in Lawndale. The City of Lawndale has no existing Class I, Class II, or Class III facilities. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**.

6.2.5 Existing End-of-trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. Existing end-of-trip bicycle facilities in the South Bay are displayed in **Appendix A-9**. The locations of existing bicycle racks in Lawndale are shown at right. These locations include parks, schools, and shopping centers. The City does not provide any long-term bicycle parking within its jurisdiction.



Existing End-of-trip Facilities in Lawndale

See Appendix A-9 for larger map

Existing Bike Racks
Existing Bike Lockers

6.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. Appendix A-10 shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Lawndale. Metro operates several bus lines with routes through the City, which makes it relatively well-served by transit. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis.

Lawndale also operates the Lawndale Beat transit service, which operates two routes through Lawndale. **Appendix A-20** displays the Lawndale Beat bus routes. Both routes connect to the Metro Green Line station to the west on Marine Avenue in Redondo Beach.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. Lawndale does not currently provide any end-of-trip

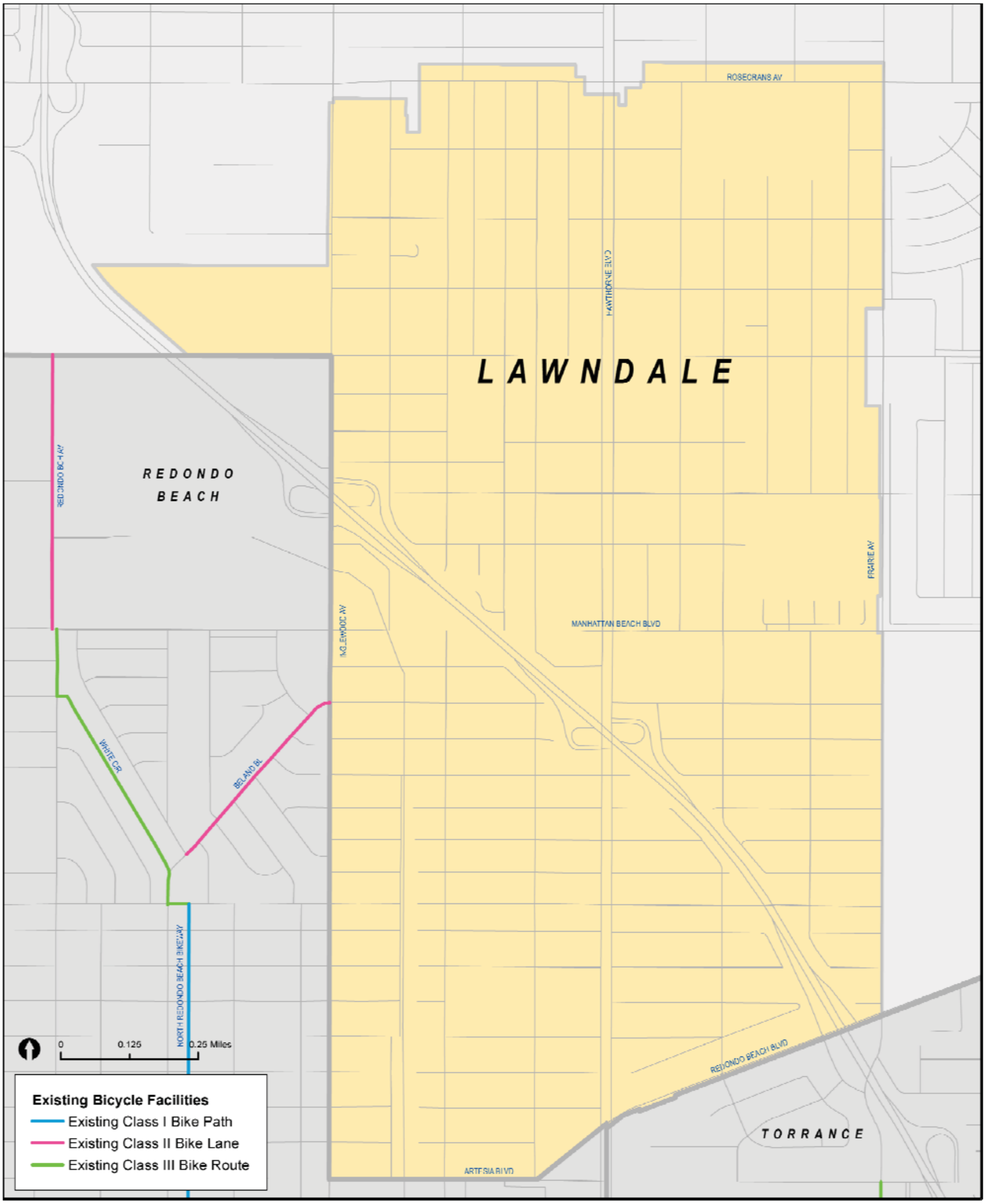


Figure 6-2: Existing Bicycle Facilities in Lawndale

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

facilities at the Lawndale Beat bus stops within the City or any other intermodal end-of-trip facilities within its jurisdiction.

6.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. Lawndale does not currently provide any education or enforcement strategies to promote bicycle safety in the City.

6.2.8 Past Bicycle-Related Expenditures

Between 2000 and 2010, the City of Lawndale incurred the following bicycle expenditures:

- 2007: $423.11 for bicycle racks
- 2010: $11,000 for artistic bicycle racks in Jane Adams Park

6.3 Needs Analysis

This section describes the needs of bicyclists in Lawndale. It first summarizes feedback collected from the online survey and public workshops. The section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

6.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Lawndale that the community identified as desirable for bikeways.

The public overall identified major arterials, including Manhattan Beach Boulevard, Hawthorne Boulevard, and Marine Avenue, as desirable for bicycle facilities. The community also mentioned that it would like to see bikeways on streets that lead to schools, such as Firmona Avenue and Mansel Avenue.

The community also mentioned that it would like to see bikeways on streets that lead to schools, such as Firmona Avenue and Mansel Avenue.

6.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Lawndale by census tract. Lawndale has high percentages of bicycle commuters throughout the city, especially in the northwest portion. This correlates with the high percentages of households without vehicles and high percentages of transit commuters in that area.

Table 6-2 presents commute to work data estimates reported by the 2000 US Census for Lawndale. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to the estimates, 1.6 percent of residents in Lawndale commute predominantly by bicycle. The percent of bicycle commuters in Lawndale is nearly double that of California. Lawndale also has comparatively high rates of carpooling and low rates of driving alone, which could in part be due to low rates of vehicle ownership. Moreover, it is important to note that this figure likely underestimates the true amount of bicycling that occurs in Lawndale for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. This is especially important to note as Lawndale has a low percentage of drive alone commuters and high percentage of transit commuters. It also has a high percentage of carpoolers.

In addition to bicycle commuters in Lawndale, bicyclists from neighboring communities use the city's network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Lawndale's bicycle network in **Section 6.4**.

Table 6-2: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Lawndale
Bicycle	0.38%	0.83%	0.62%	1.58%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	66.95%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	20.39%
Transit	4.73%	5.07%	6.58%	6.89%
Walked	2.93%	2.85%	2.93%	2.30%
Other Means	0.70%	0.79%	0.76%	0.42%
Worked at Home	3.26%	3.83%	3.49%	1.16%

Source: US Census 2000

Table 6-3 presents an estimate of current bicycling within Lawndale using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 6-4** presents the associated air quality benefits from bicycling.

Table 6-3: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	31,729	2000 US Census, P1
Existing employed population	12,839	2000 US Census, P30
Existing bike-to-work mode share	1.6%	2000 US Census, P30
Existing number of bike-to-work commuters	203	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	1.2%	2000 US Census, P30
Existing number of work-at-home bike commuters	15	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	6.9%	2000 US Census, P30
Existing transit bicycle commuters	221	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	5,226	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	105	School children population multiplied by school children bike mode share
Existing number of college students in study area	2,201	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute share at the University of California, Los Angeles.
Existing college bike commuters	110	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	654	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	1,308	Total bicycle commuters x 2 (for round trips)

Table 6-4: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	295	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	77,012	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	1,973	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	514,886	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	6	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	4	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	54	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	1,605	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	1,544	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	6	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	6	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	1,078	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	14,076	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	418,863	Yearly mileage reduction x 369 grams / mi

Source: Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks*. 2005.

Table 6-5 presents projected year 2030 bicycling activity within Lawndale using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. **Table 6-6** presents the associated year

2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 6-5: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	39,484	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	15,977	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	3.2%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	505	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	0.76%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	61	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	13.8%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	550	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	4,153	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series.*
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	166	School children population multiplied by school children bicycling mode share
Future number of college students in study area	2,739	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	192	College student population x college student bicycling mode share
Future total number of bike commuters	1,474	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	2,947	Total bike commuters x 2 (for round trips)

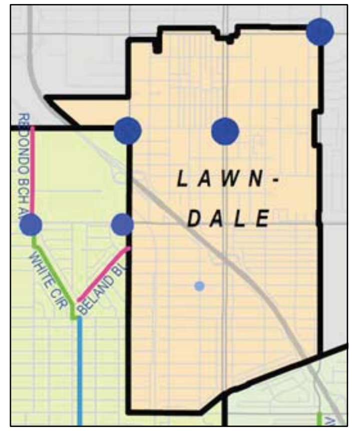
Table 6-6: Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	641	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	167,238	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	4,510	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	1,177,058	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	14	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	9	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	123	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	3,669	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	3,529	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	13	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	13	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	2,465	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	32,178	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	957,544	Yearly mileage reduction x by 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of approximately 1,300 to just under 3,000, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 2,500 pounds of smog forming N0X and roughly one million pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.



Weekday Bicycle Count Results in Lawndale

(See Appendix A-16 for larger map and Appendix H for a list of count locations.)

6.3.3 Bicycle Counts

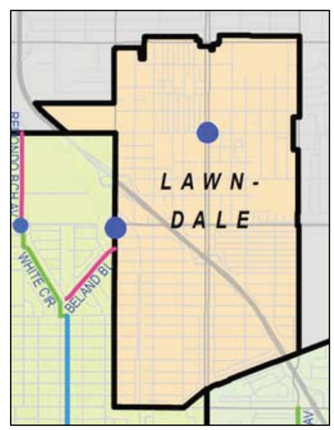
To assess bicycling levels at different sites throughout Lawndale, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

6.3.3.1 Methodology

The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

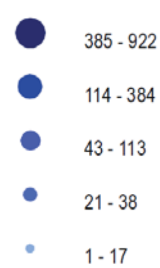
Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Lawndale, volunteers were stationed at five stations on Thursday and two stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.



Weekend Bicycle Count Results in Lawndale

(See Appendix A-17 for larger map and Appendix H for a list of count locations.)

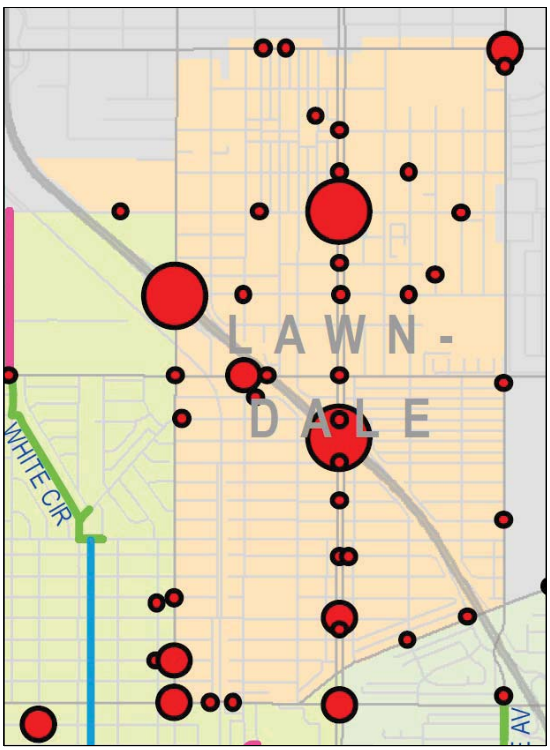


6.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Lawndale are shown at right. Detailed count data, including a list of count locations, is presented in **Appendix H**. On Thursday, the Lawndale station that experienced the highest volume was Marine Avenue and Hawthorne Boulevard with 134 bicyclists during the three hour count period. The station with the most bicyclists on Saturday was also Marine Avenue and Hawthorne Boulevard with 86 bicyclists during the three hour count period.

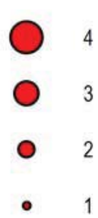
On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, approximately 83 percent of bicyclists were male. About 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.



Bicycle Collisions in Lawndale 2007-2009

(See Appendix A-18 for larger map)



6.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Lawndale. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 6-7 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Lawndale are shown on the preceding page. There were 55 total reported collisions involving bicyclists from 2007-2009 in the City of Lawndale. Three locations in Lawndale each experienced four collisions involving bicyclists. These were the intersections of Inglewood Avenue and Interstate 405, Hawthorne Boulevard and Interstate 405, and Hawthorne Boulevard and Marine Avenue.

A total of 21 crashes involving bicyclists occurred on Hawthorne Boulevard alone. Both high employment and population densities lie along Hawthorne north of the 405, which likely generate many bicycle trips. Hawthorne Boulevard also carries large volumes of automobiles traveling at high speeds, producing potential conflicts between vehicles and bicycles. The on- and off-ramps from the 405 are challenging for bicyclists due to channelized turning lanes with large turning radii, as well as poor lighting and visibility in the underpasses.

Table 6-7: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
55	55	47	4	1

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 86 percent of collisions involving bicycles (47 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and

2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in Lawndale. Hawthorne Boulevard has the highest volumes of traffic, followed by Rosecrans Avenue, Artesia Boulevard, Prairie Avenue, and Inglewood Avenue. Each of these streets experienced collisions involving bicyclists in 2007-2009. Because Lawndale has such high percentages of bicycle commuters, installing bicycle facilities, especially on major arterials, could reduce the number and severity of collisions involving bicyclists.

6.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Lawndale, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and shown in **Figure 1-3** and **Figure 1-4. Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Lawndale, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Lawndale to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

6.4.1 Proposed Bikeway Facilities

The proposed bicycle network in the City of Lawndale includes Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 6-3**. The proposed bicycle network in Lawndale connects with the recommended networks in Redondo Beach and Torrance, as well as the Los Angeles County bicycle system. **Figure 6-3** shows a blue asterisk at the proposed bike lanes on Marine Avenue and on the proposed path along the Metro right-of-way as they are outside the jurisdiction of this plan, but are supported improvements.

Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 6-8** lists the proposed bicycle paths, **Table 6-9** lists the proposed bicycle lanes, **Table 6-10** lists the proposed bicycle routes, and **Table 6-11** lists the proposed bicycle-friendly streets. The proposed bicycle network in the South Bay region as a whole is presented in **Appendix A-19**.

Table 6-8: Proposed Class I Bicycle Paths in Lawndale

Street	From	To	Miles
Metro Right-of-Way Bike Path	163rd St	170th St	0.4
Total Bicycle Path Mileage			**0.4**

Table 6-9: Proposed Class II Bicycle Lanes in Lawndale

Street	From	To	Miles
Artesia Boulevard	Inglewood Avenue	Grivellea Avenue	0.4
Marine Avenue	Inglewood Avenue	Prairie Avenue	1.0
Manhattan Beach Boulevard	Inglewood Avenue	Prairie Avenue	1.0
Hawthorne Boulevard	Rosecrans Avenue	Redondo Beach Boulevard	1.9
Redondo Beach Boulevard	Grivellea Avenue	Prairie Avenue	0.7
Inglewood Avenue	Rosecrans Avenue	Artesia Boulevard	2.0
Prairie Avenue	Rosecrans Avenue	Redondo Beach Boulevard	1.7
Rosecrans Avenue	Inglewood Avenue	Prairie Avenue	1.0
Total Bicycle Lane Mileage			**9.7**

Table 6-10: Proposed Class III Bicycle Routes in Lawndale

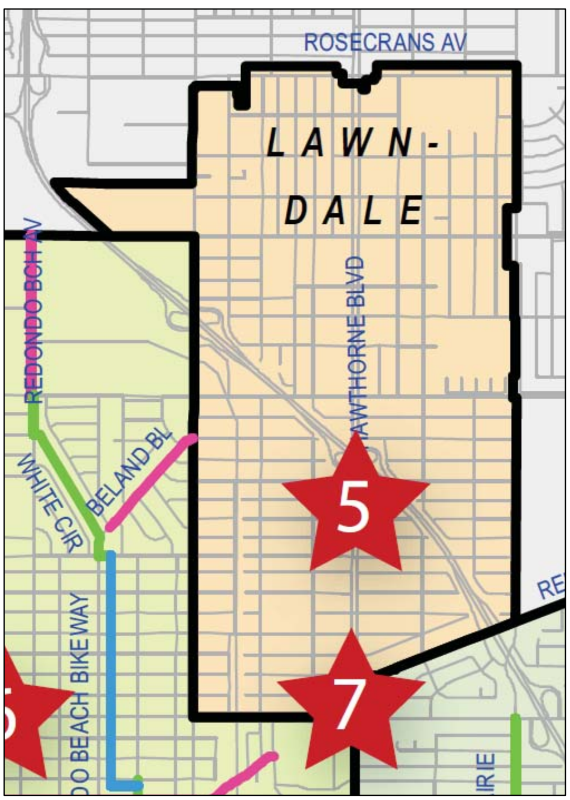
Street	From	To	Miles
Condon Avenue (South Bound only)	163rd St	170th St	0.4
Total Bicycle Route Mileage			**0.4**

Table 6-11: Proposed Bicycle-Friendly Streets in Lawndale

Street	From	To	Miles
160th Street	Inglewood Avenue	Firmona Avenue	0.2
154th Street	Condon Avenue	Prairie Avenue	0.9
Freeman Avenue - 164th Street	147th Street	Prairie Avenue	1.4
Mansel Avenue	Rosecrans Avenue	Manhattan Beach Boulevard	1.0
Firmona Avenue	Manhattan Beach Boulevard	Artesia Boulevard	1.0
149th Street - Burin Avenue - 147th Street	Mansel Avenue	Prairie Avenue	0.8

Street	From	To	Miles
Condon Avenue	Rosecrans Avenue	154th Street	0.8
163rd Street	Inglewood Avenue	Prairie Avenue	1.0

Street	From	To	Miles
147th Street	Inglewood Avenue	Mansel Avenue	0.3
164th Street	Green Line Extension Bike Path	Hawthorne Boulevard	0.3
170th Street	Inglewood Avenue	Hawthorne Boulevard	0.5
166th Street	Inglewood Avenue	Green Line Extension Bike Path	0.1
166th Street - Osage Avenue	Firmona Avenue	164th Street	0.8
Total Bicycle-Friendly Street Mileage			**9.2**



Opportunities and Constraints in Lawndale

(See Appendix I for larger map)

There are several constraints to recommending new bicycle facilities in Lawndale. These are shown on the next page and are referenced by the numbers in **Appendix I**. **Appendix I** also presents opportunities and constraints in the South Bay region as a whole.

One constraint is a proposed Class II bikeway along Hawthorne Boulevard. This facility poses some unique constraints in terms of space availability. This is a busy thoroughfare that is dense with commercial and retail uses. This Plan recommends the consideration of a Class II facility along Hawthorne Boulevard to the extent feasible. One option to consider would be to utilize the necessary space along the center parking landscaped median rather than removing on street parking or travel lanes.

A second constraint is a proposed Class II bikeway along Redondo Beach Boulevard from Hawthorne Boulevard to Artesia Boulevard in Lawndale/Redondo Beach. This segment experiences high traffic volumes due to the South Bay Galleria, which creates a challenging environment for bicyclists. Upon plan implementation, Lawndale and Redondo Beach should work together to design a facility that provides safety for bicyclists.

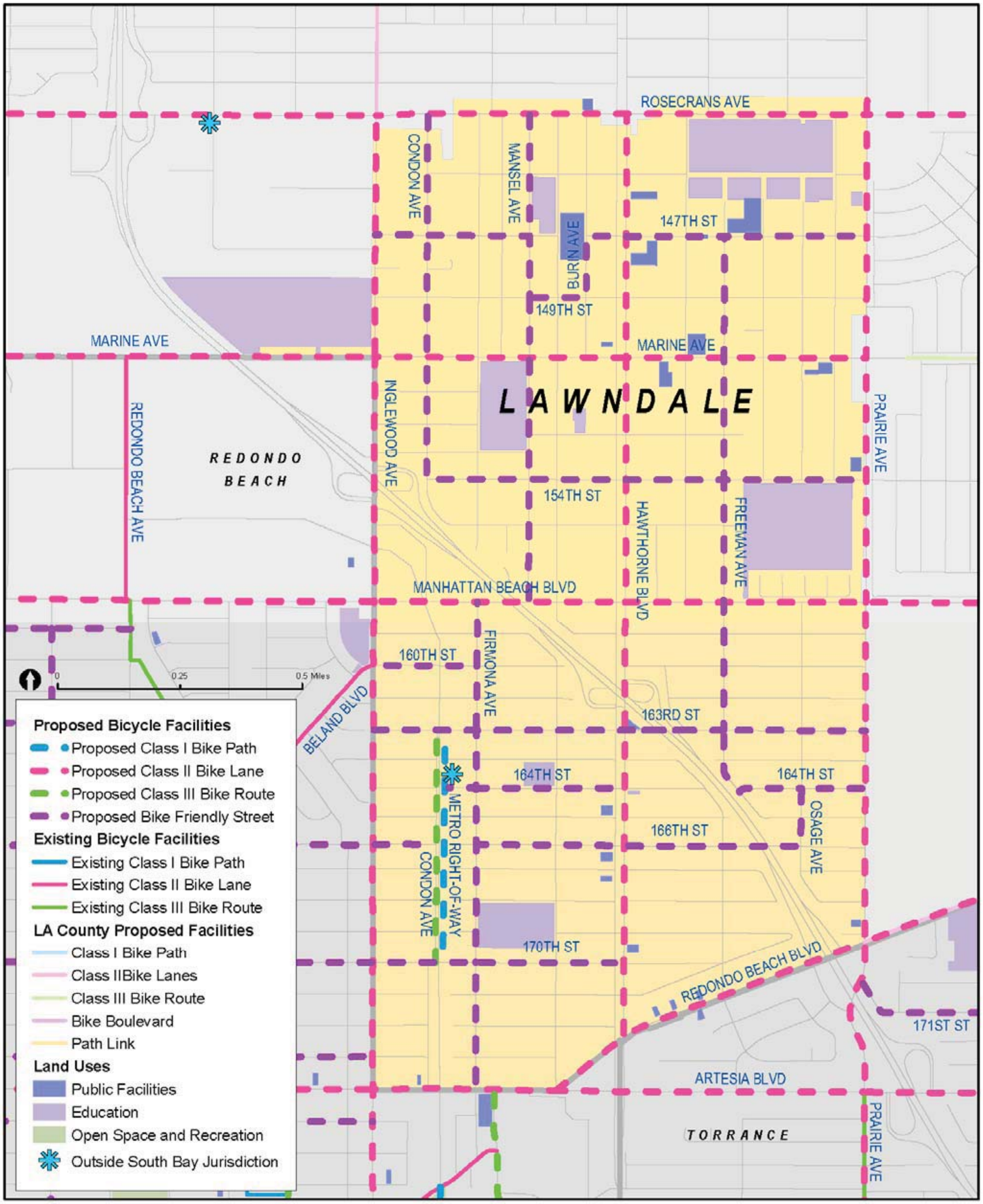


Figure 6-3: Proposed Bicycle Facilities in Lawndale

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

6.4.2 Proposed End-of-Trip Bicycle Facilities

Bicycle lockers are appropriate end-of-trip facilities for civic activity centers and transit hubs.

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

The Lawndale Municipal Code currently provides bicycle parking requirements at video arcades and non-residential developments. The Municipal Code should be amended to remove the section on video arcades and expand the requirements to include quantity of bicycle parking at new and retrofitted multi-family residential, commercial, office, and mixed-use developments of all sizes. Quantity of bicycle parking should be based on square footage of developments or by number of employees/residents to adequately address the bicycle demand at each development.

The City should also amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles;
- Lockable bicycle rooms with permanently anchored racks; or
- Lockable, permanently anchored bicycle lockers.

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Lawndale should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging

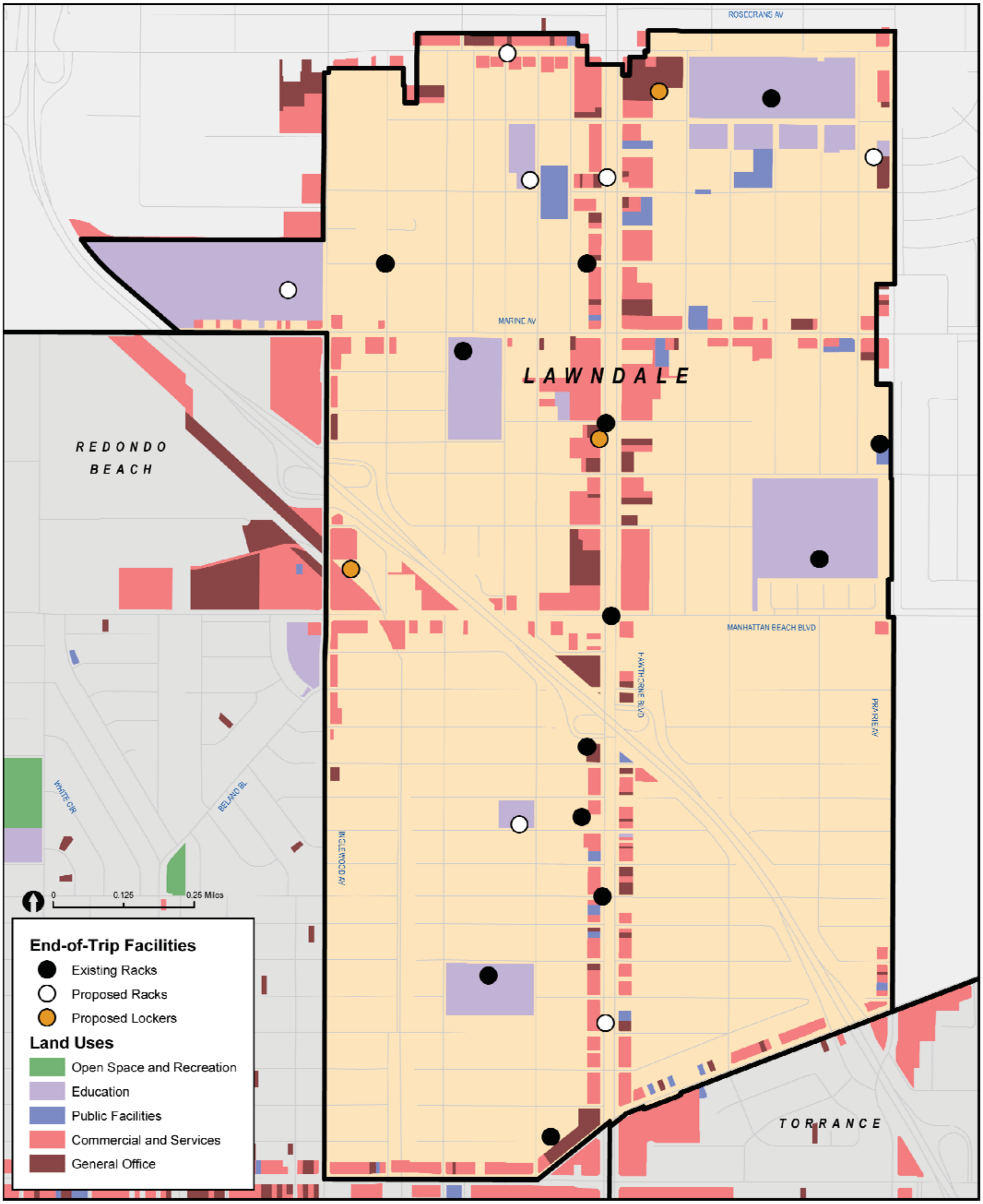


Figure 6-4: Lawndale Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

agreements with nearby recreation centers to allow commuters to use their facilities.

The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at locations, such as schools.

Proposed end-of-trip bicycle facilities in Lawndale are shown in **Figure 6-4**. The City should continue to provide short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs, and ensure that an adequate supply is available. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

6.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Lawndale.

6.5.1 Cost Estimates

Table 6-12 displays the planning-level capital cost assumptions for each facility type proposed in this plan and **Table 6-13** displays the cost to implement the proposed network in the City of Lawndale from the cost assumptions.[20] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as

[20] **Table 6-13** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 6.7**.

Table 6-12: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[21]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

Table 6-13: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.4	$ 336,000
Bicycle Lane	$40,000	9.7	$ 386,000
Bicycle Route with sharrows	$25,000	0.4	$ 11,000
Bicycle-Friendly Street	$30,000	9.2	$ 275,000
Total		**19.7**	**$ 1,008,000**

6.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Lawndale in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 6.4.1** is grouped into projects based on feasibility of implementation. **Table 6-14** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Lawndale. The projects ranked the highest should be implemented first.

[21] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 6-14: Lawndale Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS	160th Street	Inglewood Avenue	Firmona Avenue	3	6	0	0	0	1	0	1	2	2	**15**
BL	Artesia Boulevard	Inglewood Avenue	Grivellea Avenue	0	0	0	4	4	2	2	1	2	0	**15**
BL	Marine Avenue	Inglewood Avenue	Prairie Avenue	0	0	1	4	2	2	2	2	1	0	**14**
BL	Manhattan Beach Boulevard	Inglewood Avenue	Prairie Avenue	0	0	0	4	0	2	2	2	1	2	**13**
BL	Hawthorne Boulevard	Rosecrans Avenue	Redondo Beach Boulevard	0	0	0	4	2	2	2	2	0	1	**13**
BL	Redondo Beach Boulevard	Grivellea Avenue	Prairie Avenue	0	0	0	4	2	1	2	2	1	1	**13**
BL	Inglewood Avenue	Rosecrans Avenue	Artesia Boulevard	0	0	2	2	2	2	2	2	0	1	**13**
BFS	154th Street	Condon Avenue	Prairie Avenue	0	0	0	4	0	2	1	2	1	2	**12**
BL	Prairie Avenue	Rosecrans Avenue	Redondo Beach Boulevard	0	3	0	2	0	2	2	2	1	0	**12**
BFS	Freeman Avenue - 164th Street	147th Street	Prairie Avenue	0	0	0	4	0	1	0	2	1	2	**10**
BFS	Mansel Avenue	Rosecrans Avenue	Manhattan Beach Boulevard	0	0	0	4	0	0	1	2	1	2	**10**
BFS	Firmona Avenue	Manhattan Beach Boulevard	Artesia Boulevard	0	0	0	2	2	1	1	1	1	2	**10**
BFS	149th Street - Burin Avenue - 147th Street	Mansel Avenue	Prairie Avenue	0	0	0	0	0	1	1	2	2	2	**8**
BFS	Condon Avenue	Rosecrans Avenue	154th Street	0	0	0	2	0	0	0	2	2	2	**8**
BFS	162nd Street	Inglewood Avenue	Prairie Avenue	0	3	0	0	0	0	0	1	2	2	**8**
BL	Rosecrans Avenue	Inglewood Avenue	Prairie Avenue	0	0	0	0	0	2	2	2	1	0	**7**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS	Condon Avenue	Green Line Extension Bike Path	164th Street	0	0	0	0	0	0	1	2	2	2	**7**
BFS	170th Street	Inglewood Avenue	Hawthorne Boulevard	0	0	0	0	0	1	0	1	2	2	**6**
BFS	166th Street	Inglewood Avenue	Green Line Extension Bike Path	0	0	0	0	0	0	1	1	2	2	**6**
BFS	166th Street - Osage Avenue	Firmona Avenue	164th Street	0	0	0	0	0	0	1	1	2	2	**6**
BFS	164th Street	Green Line Extension Bike Path	Hawthorne Boulevard	0	0	0	0	0	0	0	1	2	2	**5**
BR	Condon Avenue (Southbound Only)	162nd Street	170th St	0	0	0	0	0	0	0	2	2	0	**4**
BP	Metro Right-of-Way Bike Path	162nd Street	170th St	0	0	0	0	0	0	1	2	0	0	**3**

*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

6.7 Project Sheets

The City of Lawndale selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Lawndale Project #1: Mansel Avenue (Rosecrans Avenue to Manhattan Beach Boulevard)

Project Site

Mansel Avenue is north-south residential street located in the western portion of the City of Lawndale. It connects to the City of Hawthorne to the north and Manhattan Beach Boulevard in Lawndale to the south. Mansel Avenue provides access to Lucille J. Smith Elementary School and Jane Addams Park. There is parallel on-street parking along most of Mansel Avenue and a posted speed limit of 25 mph.

Mansel Avenue has one travel lane in each direction. There are stop controlled intersections at all intersections, except Marine Avenue where there is a traffic signal. Traffic does not stop on Rosecrans Avenue and Manhattan Beach Boulevard.

Project Challenges

Mansel Avenue has no existing bicycle facilities thus bicyclists and motor vehicles must share the road. There are few existing treatments to create a safe bicycling environment for children riding to school. Left turns from Mansel Avenue onto Manhattan Beach Boulevard and Rosecrans Avenue are difficult by bicycle because both roads are busy arterials on which through traffic does not stop.

Proposed Improvements

- Install signage and stripe pavement markings, such as sharrows or bike friendly street stencils,
- Install wayfinding signage at intersections with other bicycle facilities once implemented, especially other bike friendly streets
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Stripe a High-intensity Activated Crosswalk (HAWK) at the intersection of Mansel Avenue and Rosecrans Avenue
- Construct a median refuge island at the intersection of Mansel Avenue and Manhattan Beach Boulevard

Estimated Cost

$130,000

Photos

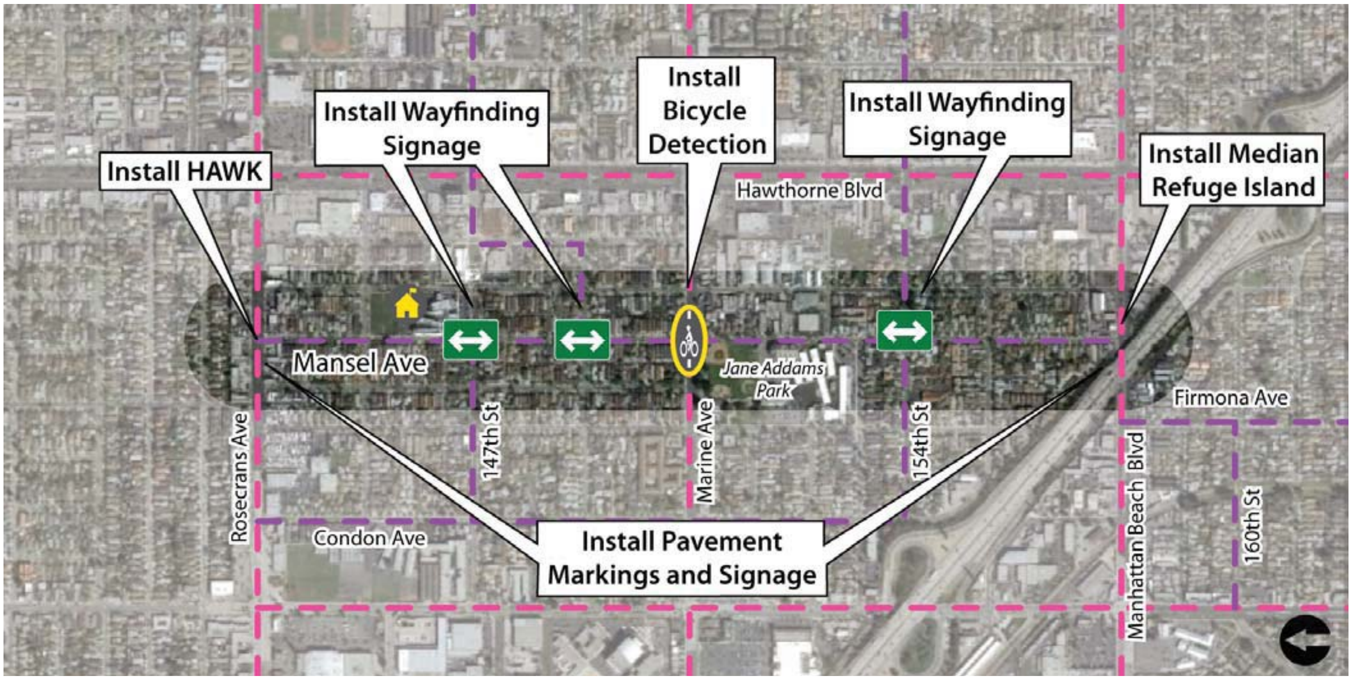
A median refuge island on Manhattan Beach Boulevard will help bicyclists turning left onto and off of Mansel Avenue.

Signage and pavement markings will alert motorists to the presence of bicyclists.

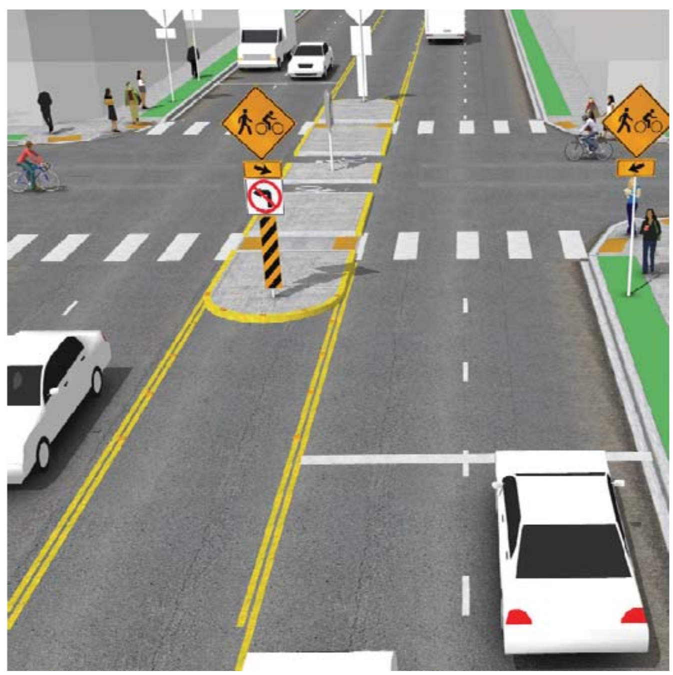
A HAWK across Rosecrans Avenue will help both bicyclists and pedestrians cross the arterial.

Aerial Map and Concept Graphics: Mansel Avenue

Mansel Avenue (Rosecrans Avenue to Manhattan Beach Boulevard)



Example Median Refuge Island (Source: NACTO.org)



Lawndale Project #2: Manhattan Beach Boulevard (Inglewood Avenue to Prairie Avenue)

Project Site

Manhattan Beach Boulevard is an east-west arterial road located in the center of the City of Lawndale. It connects to the City of Redondo Beach to the west and the County of Los Angeles to the east. Manhattan Beach Boulevard provides access to many commercial services and residences, and secondary access to Rogers Anderson Park. There is parallel on-street parking along most of Manhattan Beach Boulevard and a posted speed limit of 40 mph.

Manhattan Beach Boulevard has two travel lanes in each direction with turn pockets and center medians. From Inglewood Avenue to Hawthorne Avenue, the roadway width is approximately 33 to 34 feet on each side of the center median. Between Grivellea Avenue and Hawthorne Boulevard the number of travel lanes increases to three in the eastbound direction. East of Hawthorne Boulevard the number of travel lanes drops to two again. From Hawthorne Boulevard to Prairie Avenue the roadway width is approximately 32 to 33 feet on each side of the center median.

Project Challenges

Manhattan Beach Boulevard has no existing bicycle facilities, thus bicyclists must share the road with high volumes of vehicles traveling at high speeds. A third eastbound travel lane between Grivellea Avenue and Hawthorne Boulevard reduces the space available to provide bicycle facilities.

Proposed Improvements

- Stripe 1 mile of Class II bike lanes
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Remove the third northbound travel lane between Grivellea Avenue and Hawthorne Boulevard to provide adequate space to continue bicycle lanes on this segment

Estimated Cost

$75,000

Photos

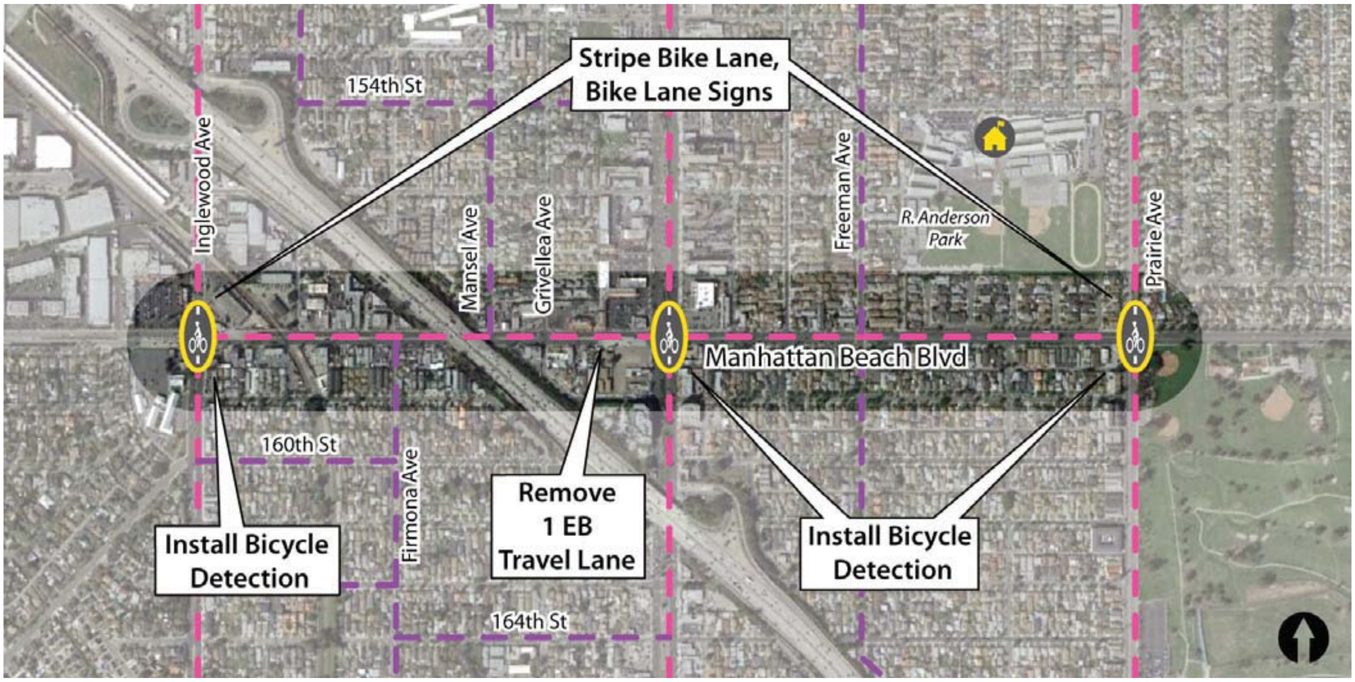
Bicycle Lanes on Manhattan Beach Boulevard will separate bicyclists and motorists to reduce potential conflicts.

Providing bicycle lanes on Manhattan Beach Boulevard will create a more comfortable bicycling environment.

Removing the third eastbound travel lane between Grivellea Avenue and Hawthorne Boulevard will provide adequate space to continue the bike lane through this segment.

Aerial Map and Concept Graphics: Manhattan Beach Boulevard

Manhattan Beach Boulevard (Inglewood Avenue to Prairie Avenue)



Bicycle Loop Detectors

Chapter 7

Manhattan Beach

7 Manhattan Beach

This chapter presents Manhattan Beach's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how Manhattan Beach complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions;
- City-specific goals, policies, and implementation actions;
- Needs analysis;
- Proposed bicycle network;
- Project prioritization; and
- Project costs.

7.1 Bicycle Transportation Account (BTA) Compliance

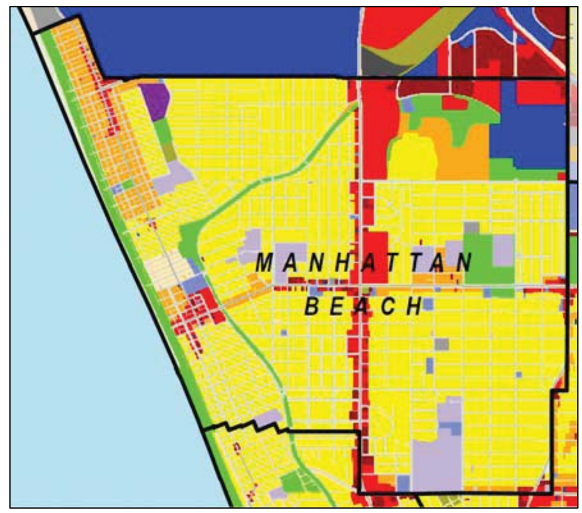
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Manhattan Beach to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

7.2 Existing Conditions

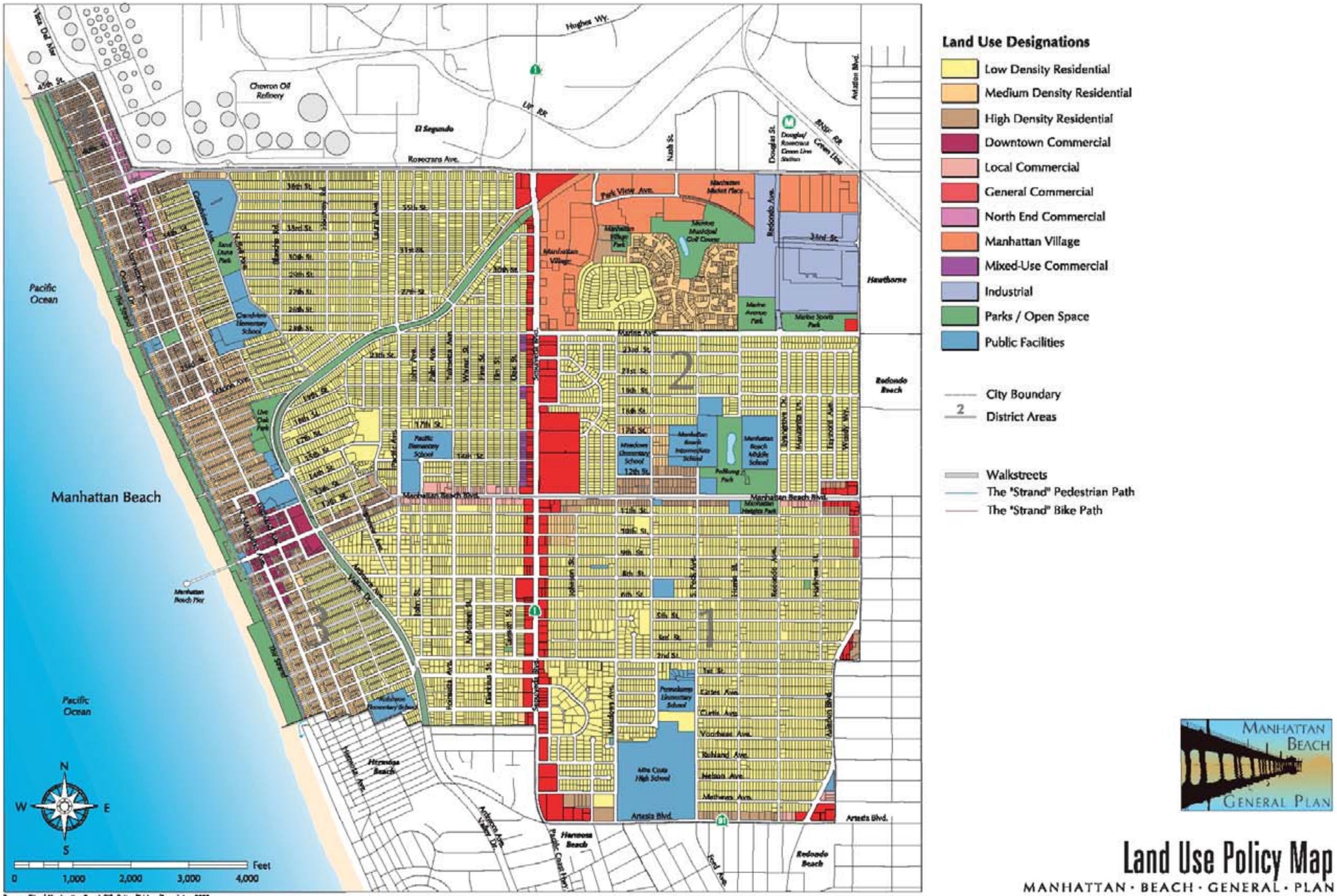
Manhattan Beach is located in the western portion of the South Bay region. It is bordered by the City of El Segundo to the north, the City of Redondo Beach to the east, the City of Hermosa Beach to the south, and the Pacific Ocean to the west. According to the 2000 Census, Manhattan Beach has a population of 34,039. The city was incorporated in 1912.

7.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land uses in Manhattan Beach are shown at right. Almost 70 percent of the land area in Manhattan Beach is devoted to residential uses: approximately 60 percent is single family and about 8 percent is multi-family. Manhattan Beach is also approximately 10 percent open space.



Existing Land Uses in Manhattan Beach
(See Appendix A-3 for larger map)



Source: City of Manhattan Beach GIS; Cotton/Bridges/Associates, 2002

Figure 7-1: City of Manhattan Beach Land Use Policy Map

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Manhattan Beach (2003)

displays the proposed land uses in Manhattan Beach. As compared to the existing uses, the City plans to increase residential densities from single-family to multi-family South of Marine Avenue and west of Valley Drive, as well as south of the pier between Valley Drive and the Strand.

7.2.2 Bicycle Trip Generators

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities.

Appendix A-4 shows population density in Manhattan Beach. The areas with the highest population densities are located along the beach, which is where much of the multi-family housing is located. This has the potential to generate bicycle trips as housing is nearby the downtown and many key community services. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths.

Appendix A-5 displays employment density in Manhattan Beach. Employment is most dense along Sepulveda Boulevard, on the northeast portion of Rosecrans Avenue, and around the intersection of Highland Avenue and Manhattan Beach Boulevard. Both Sepulveda Boulevard and the intersection of Highland Avenue and Manhattan Beach Boulevard primarily support commercial and service land uses. Rosecrans Avenue has commercial and service uses, as well as industrial and general office space. These sites have the potential to generate bicycle activity, as they are located in environments with a variety of land uses where trips between uses can be shorter.

Appendix A-6, Appendix A-6, and **Appendix A-8** display the percent of zero-vehicle households, median annual income, and percent transit commuters by census tract in the City of Manhattan Beach. Manhattan Beach overall has low percentages of transit commuters and high median annual incomes. Most households make above $95,000 per year (in 1999 dollars). Manhattan Beach also has high rates of vehicle ownership. Households without vehicles are concentrated in the southwest and central (Tree

Section) portions of the city. These parts of the city have greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, Manhattan Beach has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Manhattan Beach, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

7.2.3 Relevant Plans and Policies

Table 7-1 outlines information regarding bicycles from the City of Manhattan Beach's Infrastructure Element, Municipal Code, and Suggested Safe Routes to School Maps.

Table 7-1: Manhattan Beach Bicycle-Related Plans and Policies

Document	Description
General Plan Infrastructure Element (2003)	This element contains a map of existing bikeways in the City (**Appendix F-4**), which include the Strand Bikeway and Veterans Parkway, which is a multi-use trail. The element also includes goals and policies relevant to bicycling, which are: • Work with the school district and private schools to improve pedestrian and bicycle safety around schools • Incorporate bikeways and pedestrian ways as part of the City's circulation system • Encourage features that accommodate the use of bicycles in the design of new development • Encourage the development of recreational bicycle routes to link residential, schools, and recreational areas east of Sepulveda Boulevard with the Strand bike path
Municipal Code	The City's Municipal Code prohibits riding bicycles on the sidewalk, except for children under 14 years old in front of schools, stores, or buildings used for business purposes. The Municipal Code provides bicycle requirements based on land use type. Parking must be in the form of a stationary object (either a freestanding bicycle rack or a wall-mounted bracket) to which a user can secure both wheels and the frame of a bicycle with a user-provided six-foot cable and lock. Before installation, the City reviews the design and location of bicycle parking through a Use Permit to ensure design compatibility with the architecture, appropriate materials, safety, and that it does not block pedestrian or vehicle paths-access. The City conducted a comprehensive bikeway study in 2009 to evaluate the needs, wants and opportunities related to bicycles. The study found that most people in the community utilize bikeways for recreation purposes rather than for commuting to and from work. Bicycle parking policies do not reflect that as they focus on providing facilities at commercial rather than recreational sites.

Document	Description
Suggested Routes to School Maps	In August of 2009, the City was awarded Safe Routes to School (SR2S) funding by the State of California. These maps are part of Manhattan Beach's larger SR2S effort. They display suggested routes for walking/biking to Meadows, Grand View, Pennekamp, Pacific, and Robinson Elementary Schools. They also highlight where traffic signals, walkstreets (streets closed to vehicular traffic), crosswalks, and crossing guards are located. Detailed bicycle parking information is presented in **Appendix G**.

7.2.4 Existing Bicycle Network

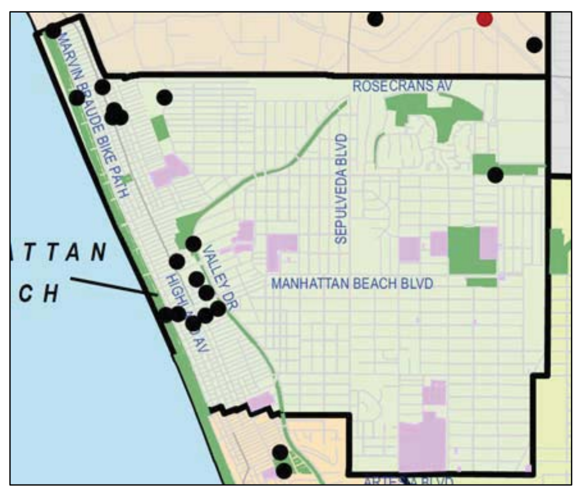
Figure 7-1 shows the existing bicycle facilities in Manhattan Beach. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**. The bicycle network in the City of Manhattan Beach consists of approximately 3 miles of bikeways. This includes a section of the Los Angeles County-maintained Class I bicycle path on the Strand and Class III bicycle routes. **Table 7-2** summarizes the classification and mileage of the existing network.

Table 7-2: Manhattan Beach Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	2.1
Class II (Bike Lanes)	0.0
Class III (Bike Route)	1.1
Total Mileage	**3.2**

7.2.5 Existing End-of-Trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. **Appendix A-9** displays the existing end-of-trip bicycle facilities in the South Bay. The locations of existing bicycle racks in Manhattan Beach are shown at right. These locations include parks, on sidewalks, and at the beach. Bicycle racks in Manhattan Beach include comb racks, wave racks, and several styles of artistic racks. The City does not provide any long-term bicycle parking within its jurisdiction.



Existing End-of-trip Facilities in Manhattan Beach

(See Appendix A-9 for larger map)

- Existing Bike Racks
- Existing Bike Lockers

Figure 7-2: Existing Bicycle Facilities in Manhattan Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

7.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. **Appendix A-10** shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Manhattan Beach. Metro operates bus lines with routes on the City's major arterials, though the western half of Manhattan Beach is underserved. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis.

Metro operates bus lines with routes on the City's major arterials.

LADOT operates the Commuter Express bus service. Line 438 connects the cities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance to Downtown Los Angeles. Most Commuter Express buses are equipped with bicycle racks, which are available on a first-come, first-served basis. **Appendix A-11** shows the Commuter Express Line bus routes.

Beach Cities Transit (BCT) Line 109, operated by the City of Redondo Beach, and Torrance Transit Line 8, operated by the City of Torrance, also serve the City of Manhattan Beach. **Appendix A-13** shows the BCT System Map and **Appendix A-14** shows the Torrance Transit System Map. Buses are equipped with bike racks, which are available on a first-come, first-served basis.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, park and ride lots, and provisions for transporting bicycles on public transit vehicles. Manhattan Beach does not currently provide any intermodal end-of-trip bicycle facilities within its jurisdiction.

7.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. To promote safe bicycling at the Middle School level, the City of Manhattan Beach provides bicycle education to the school, parents, and students through the School Resource Officer (SRO) and Crime Prevention Officer. Once per year, there is a Bicycle Rodeo at Manhattan Beach Middle School and the Police Department provides a presentation and information on bicycle safety, requirements, wearing helmets, and the use of lights and reflectors. Bicycle Rodeos are meant to ensure that children bicycling to school have the appropriate and required equipment, know where to ride, and follow the proper traffic signals, signs and markings. Throughout the school year, the SRO addresses students on campus regarding bicycle safety as needed.

There is not a SRO for the elementary schools in Manhattan Beach, so they utilize saturated enforcement with patrol and traffic officers adjacent to the schools. Officers check to make sure that children have the proper equipment when bicycling to school, and if they don't, they stop children to educate them and issue warnings. If a child receives several warnings, the officer will issue a citation, which requires the parent(s) to go to court.

In the rest of the City, enforcement is performed by patrol and traffic officers. Enforcement is focused in the Downtown and on the Bike Path during the summer months. Officers issue warnings and citations for observed violations. Whenever an officer stops someone, they also educate the person on bicycle safety and the rules of the road regardless of whether a warning or citation is issued.

7.2.8 Past Bicycle-Related Expenditures

Between 2005 and 2011, the City of Manhattan Beach incurred the following bicycle expenditures:

- $2,500 for bicycle racks and bicycle route signs
- $12,000 for labor, installation, core drilling, and concrete for new bicycle racks

7.3 Needs Analysis

The public identified major arterials as streets in need of bicycle facilities.

This section describes the needs of bicyclists in Manhattan Beach. It first summarizes feedback collected from the online survey and public workshops. The section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

7.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Manhattan Beach that the community identified as desirable for bikeways and bicycle support facilities.

The location that the community mentioned the most frequently as in need of bikeways is Valley Drive / Ardmore Avenue. Other locations that the public identified as desirable for bicycle facilities include streets that lead to the beach, such as Marine Avenue, and provide access to schools, including Longfellow Avenue. The community also identified major arterials, such as Artesia Boulevard, Manhattan Beach Boulevard, and Rosecrans Boulevard. Other locations mentioned were residential streets, like Pacific Avenue and Redondo Avenue.

The public identified Polliwog Park as a desirable location for bicycle parking.

The public identified Manhattan Beach Boulevard as desirable for bicycle facilities.

7.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Manhattan Beach by census tract. Manhattan Beach has the highest percentages of bicycle commuters in the central northern portion of the city, which correlates with the percentage of households without vehicles.

In addition to bicycle commuters in Manhattan Beach, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Manhattan Beach's bicycle network in **Section 7.4**.

Table 7-3 presents commute to work data estimates reported by the 2000 US Census for Manhattan Beach. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to these estimates, 0.3 percent of residents in Manhattan Beach commute predominantly by bicycle. Manhattan Beach also has low rates of carpooling and transit riding, which suggests that the city's high average median income and high car ownership rates influence mode split. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in Manhattan Beach for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. The percentage of commuters in Manhattan Beach that commute by transit is much lower than that of those that drive alone. Manhattan Beach also has a low percentage of commuters carpooling and walking.

In addition to bicycle commuters in Manhattan Beach, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Manhattan Beach's bicycle network in **Section 7.4**.

Table 7-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Manhattan Beach
Bicycle	0.38%	0.83%	0.62%	0.32%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	84.47%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	6.89%
Transit	4.73%	5.07%	6.58%	0.38%
Walked	2.93%	2.85%	2.93%	1.26%
Other Means	0.70%	0.79%	0.76%	0.61%
Worked at Home	3.26%	3.83%	3.49%	5.99%

Source: US Census 2000

Table 7-4 presents an estimate of current bicycling within Manhattan Beach using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 7-5** presents the associated air quality benefits from bicycling.

Table 7-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	34,039	2000 US Census, P1
Existing employed population	19,030	2000 US Census, P30
Existing bike-to-work mode share	0.32%	2000 US Census, P30
Existing number of bike-to-work commuters	61	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	6.0%	2000 US Census, P30
Existing number of work-at-home bike commuters	114	Assumes 50% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	0.4%	2000 US Census, P30
Existing transit bicycle commuters	18	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	4,047	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	81	School children population multiplied by school children bike mode share
Existing number of college students in study area	1,713	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995).
Existing college bike commuters	86	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	360	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	719	Total bicycle commuters x 2 (for round trips)

Table 7-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	233	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	60,836	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	1,564	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	408,315	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	5	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	3	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	43	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	1,273	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	1,224	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	5	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	4	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	855	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	11,162	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	332,167	Yearly mileage reduction x 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 7-6 presents projected year 2030 bicycling activity within Manhattan Beach using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. **Table 7-7** presents the associated year 2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 7-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	42,359	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	23,681	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	0.64%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	152	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	7.81%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	185	Assumes 50% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	0.8%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	45	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	3,216	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series*.
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	129	School children population multiplied by school children bicycling mode share
Future number of college students in study area	2,132	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	149	College student population x college student bicycling mode share
Future total number of bike commuters	659	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	1,319	Total bike commuters x 2 (for round trips)

Table 7-7: Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	423	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	110,354	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	2,905	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	758,275	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	9	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	6	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	79	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	2,363	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	2,274	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	9	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	8	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	1,588	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	20,729	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	616,861	Yearly mileage reduction x by 369 grams / mi

Source: Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of 700 to 1,300, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 1,600 pounds of smog forming N0X and roughly 600 thousand pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.

Weekday Bicycle Count Results in Manhattan Beach

(See Appendix A-16 for a larger map and Appendix H for a list of count locations.)

7.3.3 Bicycle Counts

To assess bicycling levels at different sites throughout Manhattan Beach, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

7.3.3.1 Methodology

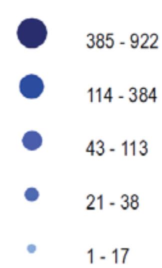
The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Manhattan Beach, volunteers were stationed at six locations on Thursday and seven locations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and

Weekend Bicycle Count Results in Manhattan Beach

(See Appendix A-17 for a larger map and Appendix H for a list of count locations.)



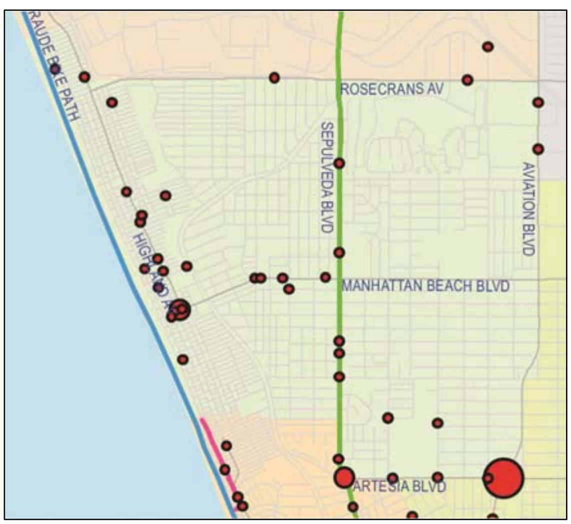
South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.

7.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Manhattan Beach are shown on the previous page. Detailed count data, including a list of count locations, is presented in **Appendix H**. On Thursday, the Manhattan Beach station that experienced the highest volume was Manhattan Beach Boulevard and Manhattan Avenue with 75 bicyclists during the three hour count period. The station with the most bicyclists on Saturday was Manhattan Beach Boulevard and the Strand with 589 bicyclists during the three hour count period.

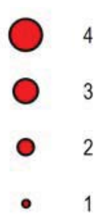
On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, approximately 83 percent of bicyclists were male. About 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.



Bicycle Collisions in Manhattan Beach 2007-2009

(See Appendix A-18 for larger map)



7.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Manhattan Beach. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 7-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Manhattan Beach are shown at right. There were 38 total reported collisions involving bicyclists from 2007-2009 in the City of Manhattan Beach. The intersection of Artesia Boulevard and Aviation Boulevard, which is on the border of the cities of Manhattan Beach and Redondo Beach, had four collisions involving bicyclists in the three year period. Other collisions in Manhattan Beach were concentrated on major boulevards: there were nine crashes on Manhattan Beach Boulevard, eight on Highland Avenue, and eight on Sepulveda Boulevard.

Table 7-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
38	38	36	5	1

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 63 percent of collisions involving bicycles (24 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in Manhattan Beach. The streets with the highest traffic volumes are Sepulveda Boulevard, Aviation Boulevard, Rosecrans Avenue, and Manhattan Beach Boulevard. The only one of these streets with bicycle facilities is Sepulveda Boulevard, which has a Class III bike route. On Sepulveda, bicyclists must still share the traffic lanes with vehicular traffic, creating the potential for conflicts between the two modes. Installing bicycle facilities, especially on major arterials, could reduce the number and severity of collisions involving bicyclists.

7.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Manhattan Beach, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and are shown in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Manhattan Beach, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Manhattan Beach to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

The proposed bicycle network for the City of Manhattan Beach consists of Class I Bike Paths, Multi Use Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets.

7.4.1 Proposed Bikeway Facilities

The proposed bicycle network for the City of Manhattan Beach consists of Class I Bike Paths, Multi Use Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 7-2.** Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 7-9** lists the proposed bicycle paths, **Table 7-10** lists the proposed bicycle lanes, **Table 7-11** lists the proposed bicycle routes, and **Table 7-12** lists the proposed bicycle-friendly streets. The proposed Bicycle network for the South Bay region as a whole is presented in **Appendix A-19**. The proposed bicycle network in Manhattan Beach connects with the recommended networks in El Segundo, Hermosa Beach, and

Redondo Beach. **Figure** 7-2 shows a blue asterisk at the steps between Manhattan Beach and Hermosa Beach, which is outside the jurisdiction of this plan, but is a supported improvement.

Table 7-9: Proposed Class I Bicycle Paths in Manhattan Beach

Street	From	To	Miles
Bell Ave Extension	33rd St	beginning of Bell Ave south of 30th St	0.1
Marine Ave Park	Redondo Ave Extension	Redondo Ave	0.1
Total Bicycle Path Mileage			**0.2**

Table 7-10: Proposed Class II Bicycle Lanes in Manhattan Beach

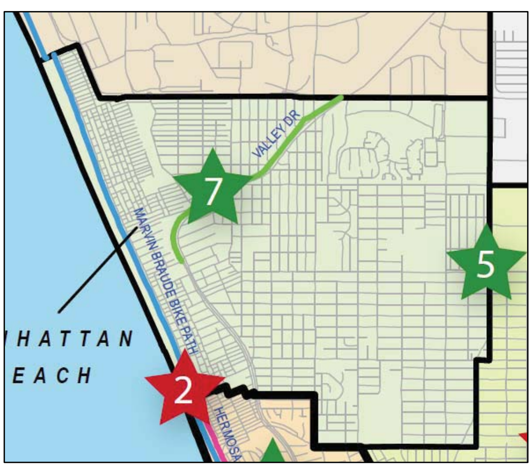
Street	From	To	Miles
Manhattan Beach Blvd	Ardmore Avenue	Aviation Blvd	1.7
Rosecrans Ave	Highland Ave	Aviation Blvd	2.3
Marine Ave	Sepulveda Blvd	Aviation Blvd	1.0
Aviation Blvd	Rosecrans Ave	South City Limits	2.1
Total Bicycle Lane Mileage			**7.0**

Table 7-11: Proposed Class III Bicycle Routes in Manhattan Beach

Street	From	To	Miles
Valley Dr	15th St	South City Limits	0.9
45th St	The Strand	Crest Dr	0.2
15th St	Ocean Dr	Valley Dr	0.2
Highland Av	45th St	33rd St	2.2
Ardmore Ave	Rosecrans Ave	South City Limits	2.1
Redondo Ave - Redondo Ave Extension	Rosecrans Ave	Marine Ave	0.6
Manhattan Ave	15th St	1st St	0.7
Manhattan Beach Blvd	Ocean Dr	Valley Dr	0.2
Rosecrans Ave	The Strand	Highland Ave	0.1
38th Pl	Highland Ave	Crest Dr	0.0
Total Bicycle Route Mileage			**7.1**

Table 7-12: Proposed Bicycle-Friendly Streets in Manhattan Beach

Street	From	To	Miles
Marine Ave	The Strand	Blanch Rd	0.4
Marine Ave	Ardmore Avenue	Sepulveda Blvd	0.4
1st St	Manhattan Avenue	John St	0.4
Bell Ave	Rosecrans Ave	North of 29th St	0.2
Bell Ave - Blanch Rd	North of 29th St	Valley Dr	0.6
Pacific Ave - 5th St	Rosecrans Ave	Ardmore Ave	1.4
Ocean Dr	45th St	1st St	2.1
Oak Ave	Ardmore Ave	Manhattan Beach Blvd	0.8
8th St	Ardmore Ave	Aviation Blvd	1.5
Redondo Ave	Marine Ave	Artesia Blvd	1.5
2nd St	John St	East City Limits	1.3
Meadows Ave - Tennyson St - Prospect Ave	Marine Ave	Artesia Blvd	1.6
11th St	Ardmore Ave	Aviation Blvd	1.6
Peck Ave	Manhattan Beach Blvd	Artesia Blvd	1.0
Voorhees Ave	Peck Ave	Aviation Blvd	0.4
Mathews Ave	Peck Ave	Aviation Way	0.4
Harkness St	Marine Ave	2nd St	1.0
Total Bicycle-Friendly Street Mileage			**16.7**



Opportunities and Constraints in Manhattan Beach

(See Appendix I for larger map)

There are several opportunities and constraints to recommending new bicycle facilities in Manhattan Beach. These are shown at right and are referenced by the numbers in **Appendix I**. **Appendix I** also presents opportunities and constraints in the South Bay region as a whole.

One opportunity includes a proposed Class II on Aviation Boulevard in Redondo Beach and Manhattan Beach. This major thoroughfare provides significant connectivity between residences and major employment centers and thus a bicycle facility on Aviation Boulevard will encourage increased bike commuting to these destinations. See Vitality City's Livability Plan for further detail. Another opportunity is a proposed Class III bikeway on Valley Drive/Ardmore Avenue in Manhattan Beach: While this plan recommends a Class III route, the Vitality City Livability Plan recommends additional options. See the Vitality City Livability Plan for further detail and opportunities.

A constraint is the stairs on the Strand between Hermosa Beach and Manhattan Beach. This constraint is also noted as being outside this plan's jurisdiction because those stairs (along with the

Figure 7-3: Proposed Bicycle Facilities in Manhattan Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

rest of the Strand with the exception of Hermosa Beach) are operated by the State and maintained by the County of Los Angeles. However, this plan urges the cities to remedy the disruption caused by the stairs. This remedy could come in several forms ranging from a bike-friendly ramp that connects the two sections of the Strand to signage that warns cyclists of the disruption and safely guides them to facilities along Hermosa Avenue.

7.4.2 Proposed End-of-Trip Bicycle Facilities

The flat top bicycle rack shown above is an example of a recommended rack type. See Appendix JJ for additional recommended bicycle rack types.

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

The Manhattan Beach Municipal Code currently provides bicycle parking requirements based on percent of vehicle parking at specific land uses, as well as bicycle parking design requirements. The City should consider amending its Municipal Code to include bicycle parking requirements at new and retrofitted multi-family residential, office, and mixed-use developments of all sizes. The Municipal Code should also consider requiring bicycle parking quantities based on square footage of developments or by number of employees/residents to adequately address the bicycle demand at each development.

Manhattan Beach should also consider amending its Municipal Code to include more specific requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should be considered that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles
- Lockable bicycle rooms with permanently anchored racks or
- Lockable, permanently anchored bicycle lockers

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Manhattan Beach's Municipal Code should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

Proposed end-of-trip bicycle facilities in Manhattan Beach are shown in **Figure 7-3.** The City should continue to provide short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs, and ensure that an adequate supply is available. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations
- Downtown Manhattan Beach
- The Beach at the Pacific Ocean

High-activity locations such as transit stations, offices, and major commercial districts could consider providing more secure, long-term bicycle parking options.

High-activity locations such as transit stations, offices, and major commercial districts could consider providing more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities could include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, could be considered at major transit stations and commuter destinations.

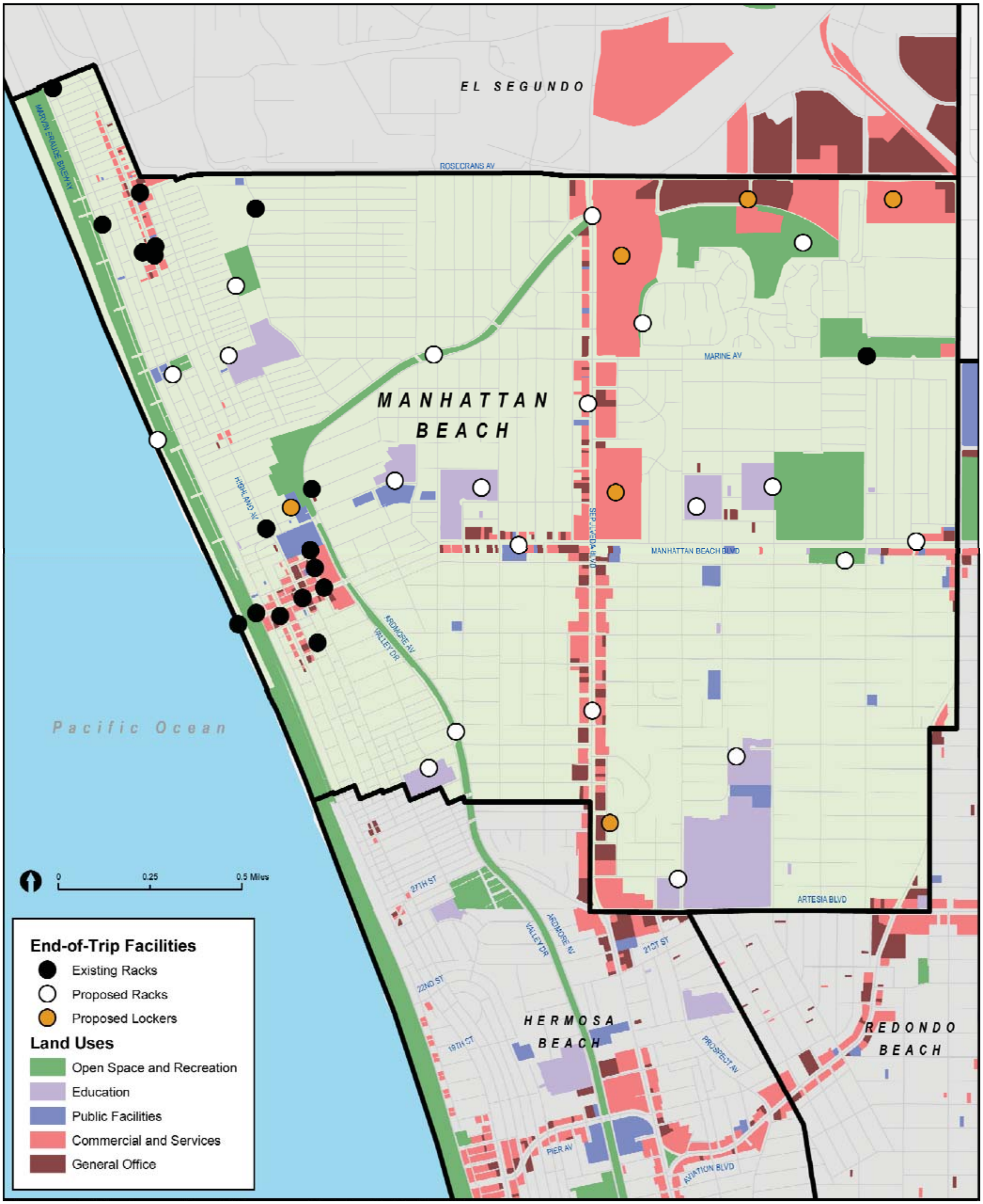


Figure 7-4: Manhattan Beach Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

7.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Manhattan Beach.

7.5.1 Cost Estimates

displays the planning-level capital cost assumptions for each facility type proposed in this plan, and **Table 7-14** displays the cost to implement the proposed network in the City of Manhattan Beach from the cost assumptions.[22] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 7.7**.

Table 7-13: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[23]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

[22] **Table 7-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

[23] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 7-14: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.2	$ 192,000
Bicycle Lane	$40,000	7.0	$ 280,000
Bicycle Route with sharrows	$25,000	7.1	$ 179,000
Bicycle-Friendly Street	$30,000	16.7	$ 502,000
Total		**31.0**	**$ 1,153,000**

7.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Manhattan Beach in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 7.4.1** is grouped into projects based on feasibility of implementation. **Table 7-15** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Manhattan Beach. The projects ranked the highest should be implemented first.

Table 7-15: Manhattan Beach Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR	Valley Dr	15th St	South City Limits	3	6	0	4	0	1	2	1	2	2	**21**
BFS	Marine Ave	The Strand	Blanch Rd	3	6	0	4	0	1	2	0	2	2	**20**
BFS	Marine Ave	Ardmore Avenue	Sepulveda Blvd	3	6	0	4	0	0	2	0	2	2	**19**
BL	Manhattan Beach Blvd	Ardmore Avenue	Aviation Blvd	3	6	0	4	0	2	2	1	0	1	**19**
BL	Rosecrans Ave	Highland Ave	Aviation Blvd	3	6	0	4	0	1	2	1	0	1	**18**
BFS	1st St	Manhattan Avenue	John St	3	6	0	4	0	0	0	1	2	2	**18**
BR	45th St	The Strand	Crest Dr	3	6	0	4	0	0	0	0	2	2	**17**
BR	15th St	Ocean Dr	Valley Dr	3	6	0	4	0	0	0	0	2	2	**17**
BFS	Pacific Ave - 5th St	Rosecrans Ave	Ardmore Ave	0	6	0	4	0	1	1	1	1	2	**16**
BR	Highland Av	45th St	33rd St	0	3	0	2	0	2	2	1	1	2	**13**
BFS	Ocean Dr	45th St	1st St	0	3	0	2	0	1	1	1	1	2	**11**
BFS	Oak Ave	Ardmore Ave	Manhattan Beach Blvd	0	0	0	4	0	0	2	0	2	2	**10**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR	Ardmore Ave	Rosecrans Ave	South City Limits	0	0	0	4	0	0	2	1	1	2	**10**
BR	Manhattan Ave	15th St	1st St	0	3	0	0	0	2	2	1	2	0	**10**
BR	Manhattan Beach Blvd	Ocean Dr	Valley Dr	0	3	0	0	0	2	2	1	2	0	**10**
BFS	8th St	Ardmore Ave	Aviation Blvd	0	0	0	4	0	1	1	0	1	2	**9**
BFS	Ardmore Ave	John St	Redondo Ave	0	0	0	2	2	0	1	1	1	2	**9**
BFS	Meadows Ave - Tennyson St - Prospect Ave	Marine Ave	Artesia Blvd	0	3	0	0	0	1	1	1	1	2	**9**
BFS	Voorhees Ave	Peck Ave	Aviation Blvd	0	3	0	0	0	1	1	0	2	2	**9**
BR	Rosecrans Ave	The Strand	Highland Ave	0	3	0	0	0	2	2	0	2	0	**9**
BFS	2nd St	John St	East City Limits	0	0	0	4	0	1	0	0	1	2	**8**
BR - BP - BR	Redondo Ave	Rosecrans Ave	Marine Ave	0	0	0	4	4	0	0	0	0	0	**8**
BL	Marine Ave	Sepulveda Blvd	Aviation Blvd	3	0	0	0	0	0	2	1	1	1	**8**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BFS	Mathews Ave	Peck Ave	Aviation Way	0	3	0	0	0	0	1	0	2	2	**8**
BFS	Harkness St	Marine Ave	2nd St	0	3	0	0	0	0	1	0	2	2	**8**
BFS	11th St	Ardmore Ave	Aviation Blvd	0	3	0	0	0	1	0	0	1	2	**7**
BFS	Peck Ave	Manhattan Beach Blvd	Artesia Blvd	0	3	0	0	0	1	0	0	1	2	**7**
BR	38th Pl	Highland Ave	Crest Dr	0	3	0	0	0	0	0	1	2	0	**6**
BFS - BP - BFS	Bell Ave - Blanch Rd	Rosecrans Ave	Valley Dr	3	0	0	2	0	0	0	0	0	0	**5**
BL	Aviation Blvd	Rosecrans Ave	South City Limits	0	0	0	0	0	2	2	1	0	0	**5**

*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

7.7 Project Sheets

The City of Manhattan Beach selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Manhattan Beach Project #1: Manhattan Beach Boulevard (Aviation Boulevard to the Strand)

Project Site

Manhattan Beach Boulevard is an east-west corridor located in the center of the City of Manhattan Beach. It connects to Redondo Beach to the east and to the Marvin Braude Bikeway (The Strand) and beach to the west. Manhattan Beach Boulevard provides access to Polliwog Park, Manhattan Heights Park, Manhattan Beach Middle School, Meadows Elementary School, Pacific Elementary School, American Martyrs School, residential/commercial uses, and Downtown Manhattan Beach. There is existing on-street parking along most of the street that is highly utilized in certain segments, including Downtown Manhattan Beach and Polliwog Park.

Between Aviation Boulevard and Sepulveda Boulevard, Manhattan Beach Boulevard two travel lanes in each direction and center medians. The roadway width is approximately 32 feet on each side of the median with on-street parallel parking, with exception to a short segment east of Sepulveda Boulevard where the width drops to 25 feet on the north side of the road and no on-street parking is present. From Sepulveda Boulevard to Dianthus Street, Manhattan Beach Boulevard has two travel lanes in each direction and is approximately 27 feet wide on each side of center medians with parallel on-street parking. From Dianthus Street to Pacific Avenue, Manhattan Beach Boulevard has two travel lanes in each direction and the roadway width is approximately 59 feet with parallel on-street parking. The posted speed limit between Aviation Boulevard and Pacific Avenue is 35 mph. Between Pacific Avenue and Valley Drive/Ardmore Avenue, the street has one westbound travel lane and two eastbound travel lanes. This segment of Manhattan Beach Boulevard is approximately 48 to 50 feet wide with parallel on-street parking. The posted speed limit is 30 mph. West of Valley Drive, the roadway widens to approximately 58 to 60 feet wide, has one travel lane in each direction, left turn pockets, and a mix of angled and parallel on-street parking. The posted speed limit is 25 mph.

Project Challenges

Manhattan Beach Boulevard has no existing bicycle facilities, thus bicyclists must share the road with relatively high volumes of vehicles, especially east of Pacific Avenue. Rolling hills can create potential conflicts between bicyclists and motorists due to the speed differential on inclines. On-street parking along Manhattan Beach Boulevard reduces the available space for bicycle facilities.

Proposed Improvements

- Stripe 1.8 miles of Class II Bike Lanes and signs
- Install 0.3 miles of Class III Bike Route signs
- Add bicycle detection and pavement markings at all signalized intersections
- Remove approximately 69 spaces of on-street parking between Sepulveda Boulevard and Pacific Avenue
- Remove one eastbound travel lane between Pacific Avenue and Ardmore Avenue
- Convert angled parking to head out angled parking west of Valley Drive
- Install intersection crossing treatment at Valley Dr/Ardmore Ave

Estimated Cost

$110,000

Photos

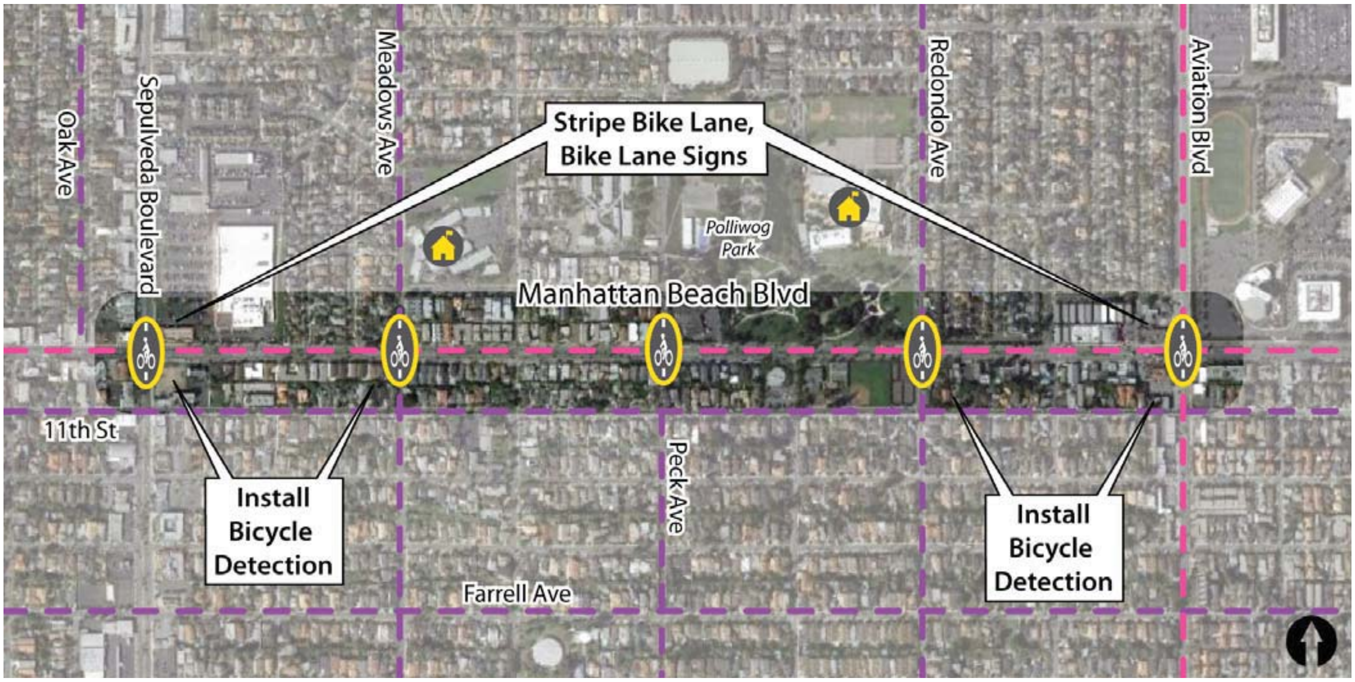
Looking west on Manhattan Beach Boulevard. Bike lanes will provide children riding to school a safer commute.

Removing the additional westbound travel lane west of Pacific Avenue will allow for bicycle lanes without parking removal.

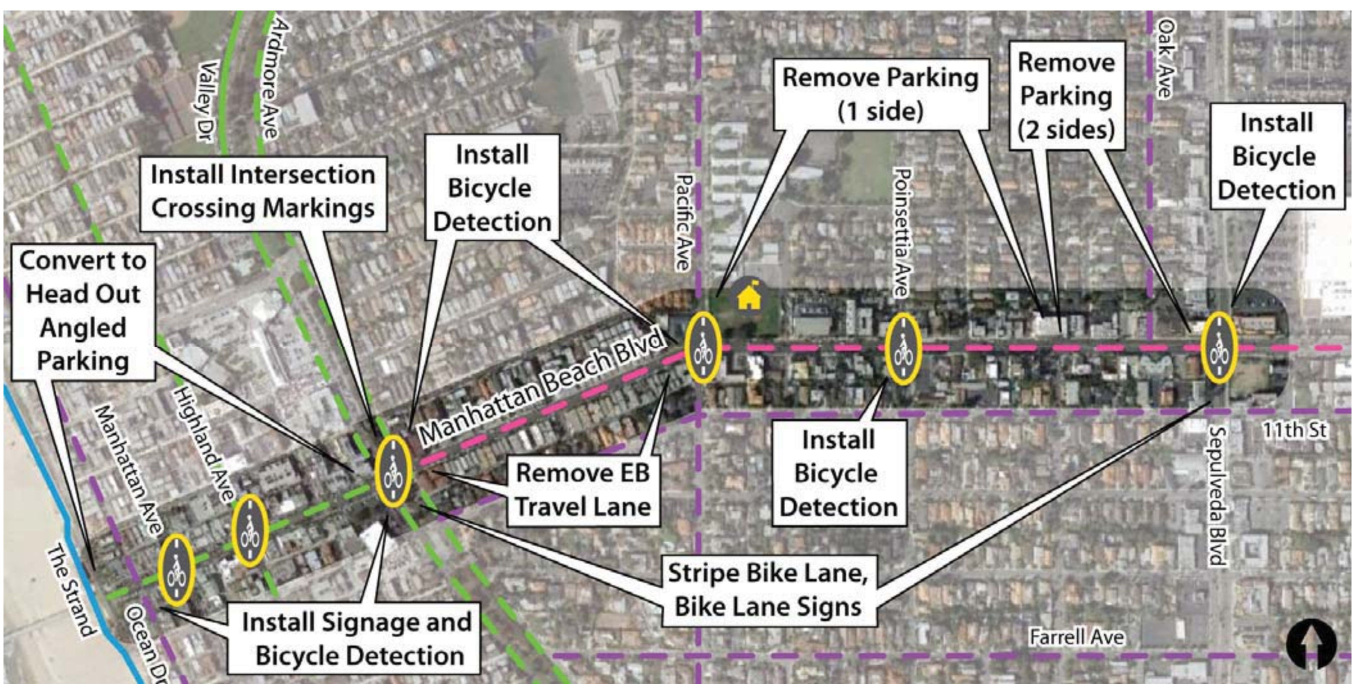
Removing on-street parking spaces to install bicycle lanes will provide a safe and convenient bicycling environment.

Aerial Map and Concept Graphics: Manhattan Beach Boulevard

Manhattan Beach Boulevard (Aviation Boulevard to Sepulveda Boulevard)



Manhattan Beach Boulevard (Sepulveda Boulevard to the Strand)



Aerial Map and Concept Graphics: Manhattan Beach Boulevard

Head Out Angled Parking and Intersection Crossing Markings

Source: NACTO.org

Bicycle Loop Detector

Manhattan Beach Project #2: Redondo Avenue (Artesia Boulevard to Marine Avenue)

Project Site

Redondo Avenue is a north-south residential street located in the eastern portion of the City of Manhattan Beach with rolling hills. Redondo Avenue provides access to Marine Avenue Park, Marine Sports Complex, Manhattan Heights Park, Manhattan Beach Middle School, and Polliwog Park. North of 11th Street there is existing on-street parallel parking along both sides of Redondo Avenue. South of 11th Street there is on-street parallel parking on the northbound side only. Though private property, a connection between Marine Avenue and Rosecrans Avenue could be pursued in the future to provide a continuous route on Redondo Avenue from Redondo Beach to El Segundo (Douglas Street).

Redondo Avenue has one travel lane in each direction and a striped center line. The posted speed limit is 25 mph. There are existing striped crosswalks at signalized intersections and around Manhattan Beach Middle School.

Project Challenges

Redondo Avenue has no existing bicycle facilities, which creates potential conflicts between bicyclists and motorists. Children commuting to school and others accessing the parks by bicycle must share the road with vehicles without any treatments alerting motorists of their presence. Rolling hills create a speed differential between bicyclists and vehicular traffic and can also create conflicts.

Proposed Improvements

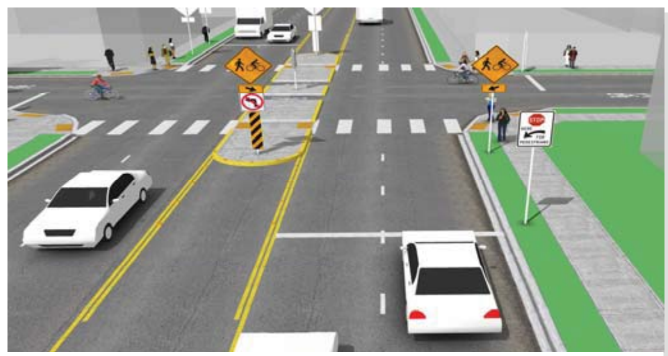
- Install signage and stripe pavement markings, such as sharrows or bike friendly street stencils
- Add bicycle detection and pavement markings at all signalized intersections
- Construct a median refuge island at the intersection of Redondo Avenue and Artesia Boulevard
- Construct bulbouts with high visibility crosswalks
- Install speed feedback signs located on the steep grade between Mathews Avenue and Artesia Boulevard

Estimated Cost

$1,750,000

Photos and Concepts

Looking south on Redondo Avenue. Pavement markings and signage will alert drivers of the presence of bicyclists



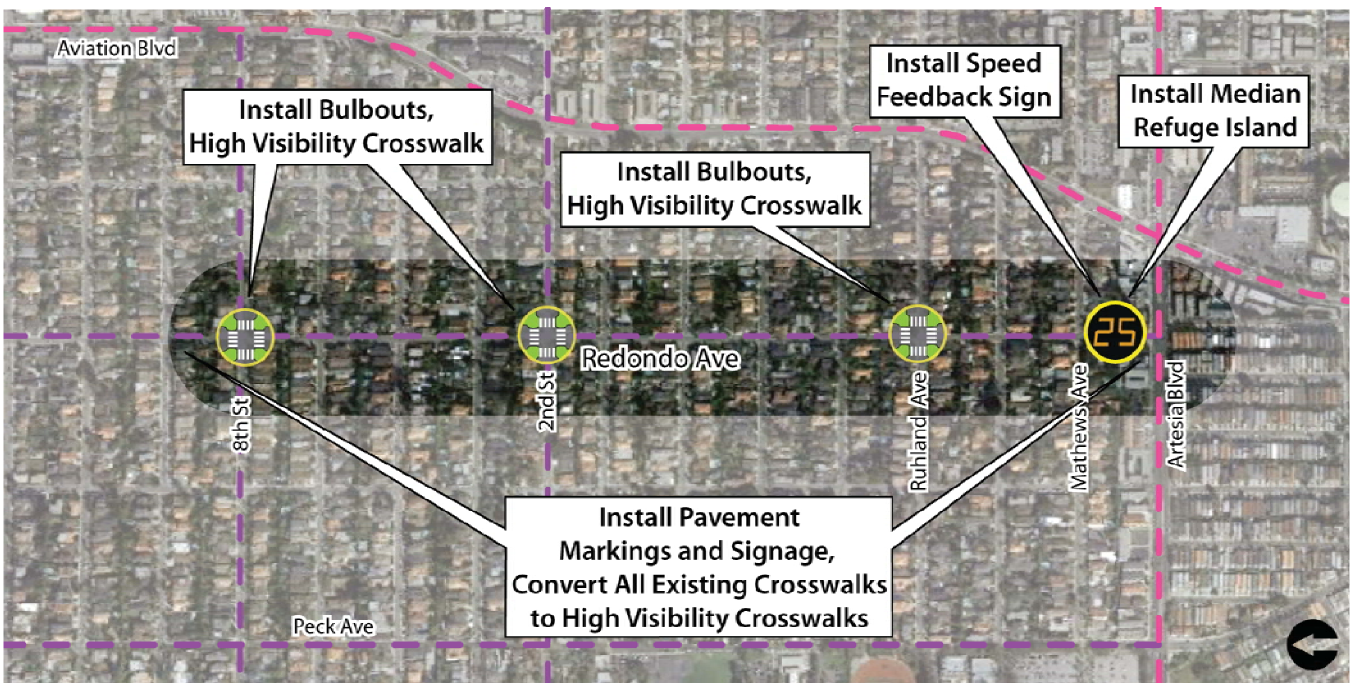
Median refuge islands provide bicyclists a protected space to wait for gaps in traffic. (Source: NACTO.org)

Bicycle detectors at intersections will allow bicycles to trigger the signal when no vehicles are present.

Aerial Map and Concept Graphics: Redondo Avenue

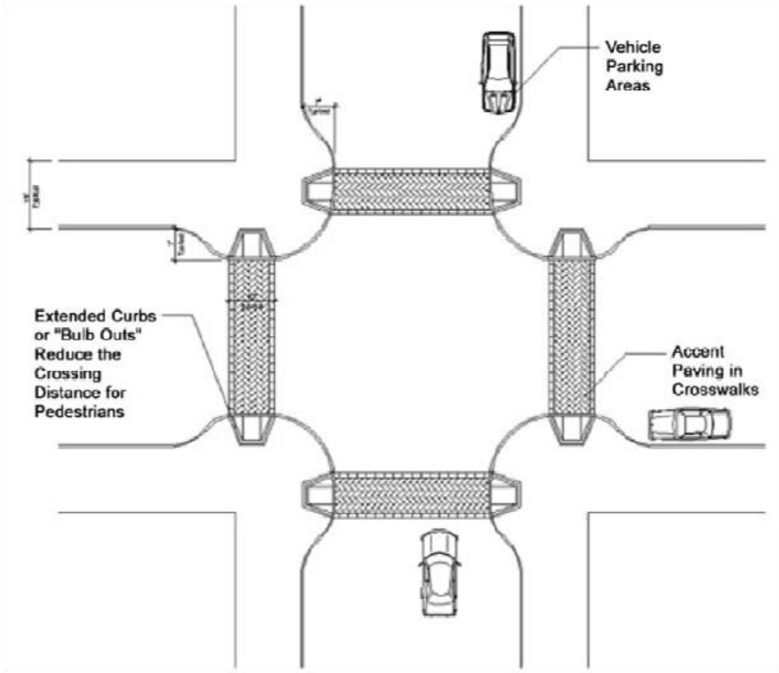
Redondo Avenue (Marine Ave to 8th Street)

8th Street to Artesia Blvd



Aerial Map and Concept Graphics: Redondo Avenue

Bulbouts and High Visibility Crosswalk



Speed Feedback Sign and Median Refuge Island

Chapter 8

Redondo Beach

8 Redondo Beach

This chapter presents Redondo Beach's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how Redondo Beach complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions
- City-specific goals, policies, and implementation actions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

8.1 Bicycle Transportion Account (BTA) Compliance

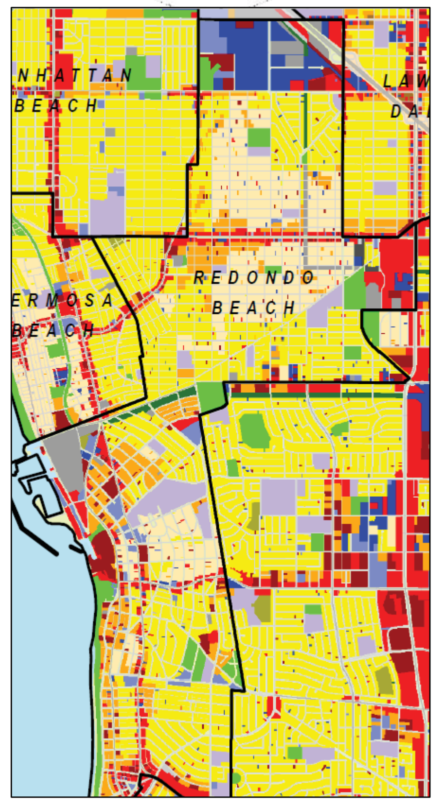
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Redondo Beach to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

8.2 Existing Conditions

Redondo Beach is located in the western portion of the South Bay region. It is bordered by the City of Hawthorne to the north, the City of Manhattan Beach and the City of Hermosa Beach to the west, the City of Lawndale and the City of Torrance to the east, and the City of Torrance again to the south. According to the 2000 Census, Redondo Beach has a population of 63,261. The city was incorporated in 1892.

8.2.1 Land Use

Appendix A-3 displays a map of the existing land uses in the South Bay Region. Land use in Redondo Beach is shown at right. Over 60 percent of the City's land area is devoted to residential uses, though the type of housing is varied. The City consists of 33 percent single



Existing Land Uses in Redondo Beach
(See Appendix A-3 for larger map)

family, approximately 10 percent multi-family, and about 18 percent other residential.

The City of Redondo Beach does not have any proposed changes to its land uses.

8.2.2 Bicycle Trip Generators

High density housing has the potential to generate bicycle activity, as it is generally located in environments with a variety of land uses where trips between uses can be shorter.

Photo Source: Kelly Morphy/WALC Institute for Vitality City

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Appendix A-4 shows population density in Redondo Beach. Many of the areas of highest population density are located along the beach, which is where much of the multi-family housing is located. This has the potential to generate bicycle trips as housing is nearby many key community services. There are also areas of high population density in North Redondo Beach. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths.

Appendix A-5 displays employment density in Redondo Beach. The highest employment densities are in South Redondo Beach near the beach, in North Redondo Beach along Marine Avenue, and in the eastern portion of the City along Hawthorne Boulevard. The high employment density near the beach is from general office land uses. Marine Avenue is concentrated with industrial uses and Hawthorne Boulevard has primarily commercial and service uses. These sites have the potential to generate bicycle activity, as they are located in environments with a variety of land uses where trips between uses can be shorter.

Appendix A-6, Appendix A-7, and **Appendix A-8** display the percent of zero-vehicle households, median annual income, and percent transit commuters by census tract. Redondo Beach has relatively high percentages of households without vehicles. The highest concentrations of these households are along the beach and in North Redondo Beach. Median annual household income is consistently between $55,001 and $75,000 (in 1999 dollars) throughout South Redondo Beach, while North Redondo Beach has pockets where median annual household income is between $75,001 and $95,000. These are in the west on the border of Hermosa Beach and in the north nearer to the border.

The highest percentages of transit commuters are located in South Redondo Beach and the central portion of North Redondo Beach. These parts of the city have greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.

In addition to the reasons discussed above, Redondo Beach has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Redondo Beach, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

8.2.3 Relevant Plans and Policies

Table 8-1 outlines information regarding bicycles from the City of Redondo Beach's Circulation Element, Bicycle Transportation Plan Implementation, and Municipal Code.

Table 8-1: Redondo Beach Bicycle-Related Plans and Policies

Document	Description
General Plan Circulation Element (2009)	The Circulation Element contains the extensive network of existing and proposed bikeways shown in **Appendix F-5 and Appendix F-6** There are four proposed Class I bikeways, two proposed Class II bikeways, and 17 proposed Class III bikeways. These are meant to fill gaps in the system and improve connections. The element mentions a Redondo Beach Sustainability Plan, which has a goal to create bicycle lanes, paths, and storage. Other Circulation Element goals and policies include: • Promote alternative modes for residents and visitors • Provide bicycle parking and support facilities as a TDM strategy • Connect North and South Redondo Beach with bicycle facilities • Focus on bicycle access at transit stations, the waterfront, South Bay Galleria, Artesia Boulevard, Riviera Village, Pacific Coast Highway retail zones, and school zones • Reduce vehicle lanes to 10 feet on residential streets to accommodate bicycle lanes • Bike lanes: minimum five feet; Truck routes/bus routes: minimum 12 feet for vehicle travel lanes; Two-way left-turn lane: minimum 14 feet edge to edge; Combination parking lane/bike lane: minimum 13 feet • Increase the provision of bike lockers, bike racks, and lighting for bike facilities • Ensure that residents will be able to bike to key destinations, such as the beach • Conduct bike ability audits and periodic bicycle counts • Apply for Safe Routes to School grants
Bicycle Transportation Plan (2005)	This project implements Metro's 2006 Bicycle Transportation Strategic Plan Objective I, which is to improve access and mobility by encouraging bicycle accommodation in roadway improvements, and was submitted to Metro's 2009 Call for Projects for funding. It outlines the implementation of bicycle improvements in the City's Circulation Element. The project includes the design and construction of the following elements city-wide: • 2.1 miles of Class II bike lanes • 15.8 miles of Class III bike routes • 105 video-detection cameras • 101 pedestrian-push buttons • 295 bicycle-facility signs • 328 bike-lane symbols or sharrows • The widening of Lilienthal Lane for bicycle improvements • The narrowing of medians on Catalina Ave. from PCH to Beryl St. to provide bike lanes • The installation of a bicycle signal at westbound N. Juanita Avenue to N. Catalina at PCH where the intersection will be reconstructed to provide a bicycle-friendly cut-through at a cul-de-sac
Harbor and Pier Area Guiding Principles (2006)	These principles guide the development and activities in the area surrounding King Harbor and the Pier. Relevant principles include: • Ensure gateways to the Harbor and Pier area are attractive and active • Provide and enhance boating, water, recreation, entertainment, and sports related activity • Require development to be designed to encourage pedestrian activity and accommodate safe bike and pedestrian paths
Municipal Code	Bicycle parking requirements in the Municipal Code vary by the size of the development and type of land use as part of the City's transportation demand and trip reduction measures. Minimum parking requirements are based

Document	Description
	on square footage of the development. Developments of certain sizes are also required to provide information, such as bicycle maps. Detailed bicycle parking information is presented in **Appendix G**. The City prohibits riding bicycles on the sidewalk wherever it is determined by the Council that it creates a hazard to the public. It also prohibits riding bicycles on the Pier, on the west side of Esplanade between Knob Hill Ave and Pearl St., and in areas of high pedestrian traffic.

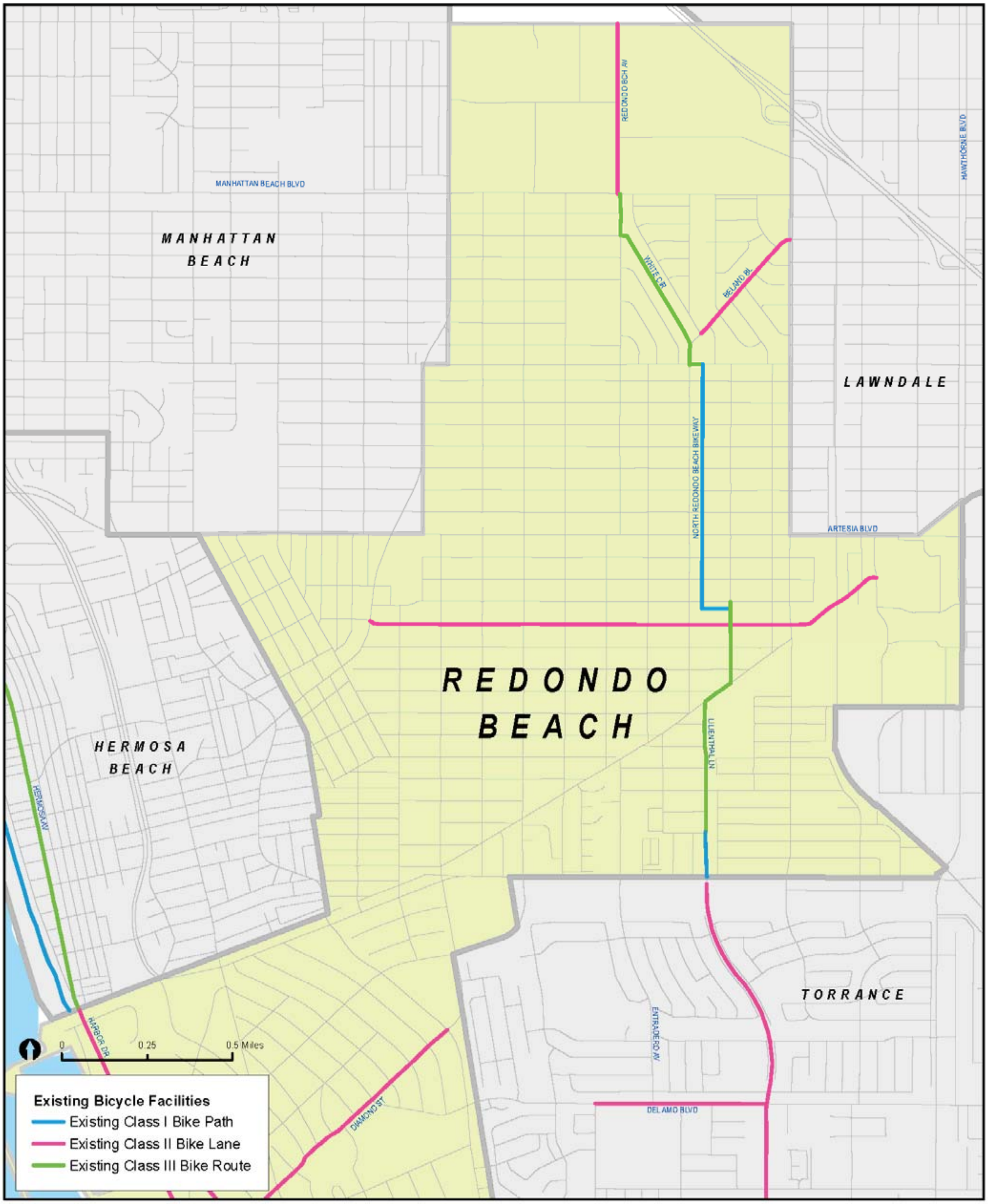


Figure 8-1: Existing Bicycle Facilities in North Redondo Beach

Figure 8-2: Existing Bicycle Facilities in South Redondo Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

8.2.4 Existing Bicycle Network

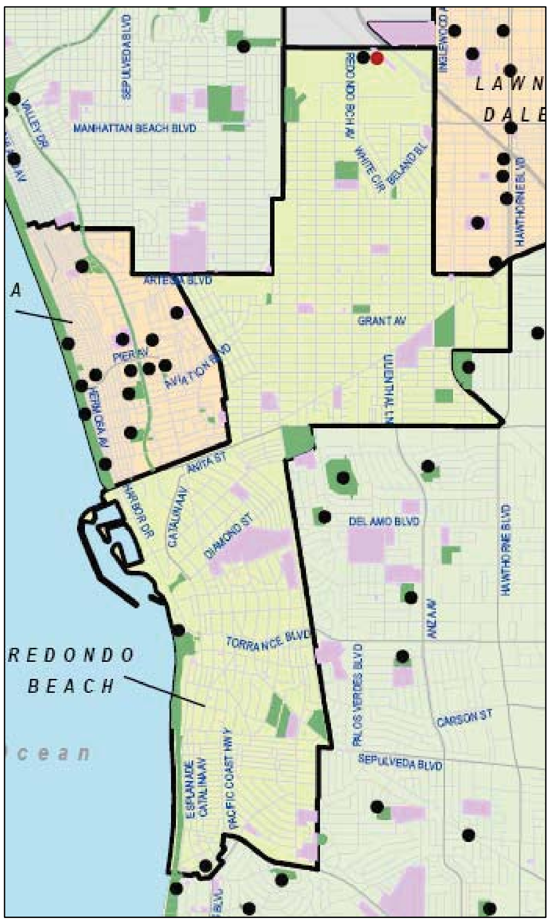
Figure 8-1 and **Figure 8-2** show the existing bicycle facilities in Redondo Beach. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**. Redondo Beach has a 14 mile bicycle network that includes Class I, Class II, and Class III bikeways. Its Class I bike paths are a 0.9 mile segment of the North Redondo Beach Bikeway and the Los Angeles County-maintained Marvin Braude Bikeway. **Table 8-2** summarizes the classification and mileage of the existing network.

Table 8-2: Redondo Beach Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	3.5
Class II (Bike Lanes)	5.9
Class III (Bike Route)	4.7
Total Mileage	**14.1**

8.2.5 Existing End-of-Trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. Existing end-of-trip bicycle facilities in the South Bay are shown in Appendix A-9. Existing bicycle parking in Redondo Beach is shown at left. These locations include the Pier and the Riviera Village. Bicycle parking at transit stations is discussed in Section 8.2.7. Redondo Beach does not currently have any existing publicly-accessible long-term end-of-trip bicycle facilities.



Existing End-of-trip Facilities in Redondo Beach

(See Appendix A-9 for larger map)

Existing Bike Racks
Existing Bike Lockers

8.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. Appendix A-10 shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Redondo Beach. Metro operates bus lines with east-west routes in North Redondo Beach and north-south routes in South Redondo

Beach. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis. Metro also operates the Green Line Light Rail, which has one station in North Redondo Beach on Marine Avenue. Passengers are allowed to bring bicycles on the Metro Rail.

Metro operates the Green Line Light Rail, which has one station in North Redondo Beach on Marine Avenue.

LADOT operates the Commuter Express bus service. Line 438 connects the cities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance to Downtown Los Angeles. Most Commuter Express buses are equipped with bicycle racks, which are available on a first-come, first-served basis. The Commuter Express Line 438 route map is shown in Appendix A-11.

The City of Redondo Beach operates Beach Cities Transit (BCT). It has three lines that connect Redondo Beach to El Segundo, Hermosa Beach, Manhattan Beach, and Torrance. Appendix A-13 shows the BCT System Map. BCT buses are equipped with bike racks, which are available on a first-come, first-served basis.

Torrance Transit Lines 3 and 8, operated by the City of Torrance, also serve the City of Redondo Beach. Appendix A-14 shows the Torrance Transit System Map. Buses are equipped with bike racks, which are available on a first-come, first-served basis.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. The Marine Avenue Metro Green Line station provides both bicycle racks and lockers, which are shown on the previous page and in Appendix A-9. Bicycle locker rentals are $24 for a six month rental plus a $50 refundable security key deposit.

8.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. To promote safe bicycling, Redondo Beach regularly conducts child bicycle helmet safety awareness campaigns as part of the police department's annual work plan by:

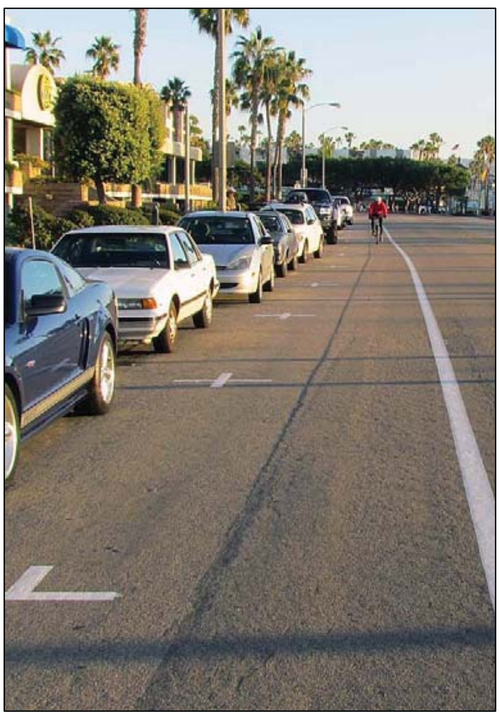
- Conducting media outreach via cable television and the internet
- Working with the school district and crossing guards to distribute helmet safety info to kids
- Partnering with local businesses

- Distributing free coupons to kids who obey the law

Redondo Beach police officers use their discretion to conduct enforcement of bicycle rules. Typically, complaints about bicyclists who violate the law increase during summer months and the City focuses enforcement based upon these complaints. In response, the police department has conducted outreach prior to conducting enforcement operations. The outreach has included the following:

- Placement of message signboards at strategic locations to warn bicyclists of enforcement
- Providing targeted enforcement literature to local bike shops
- Posting information on bicycle blogs to inform bicyclists of pending enforcement details

Redondo Beach also conducted a bicycle rodeo in 2011 to promote safe bicycling to children.



Redondo Beach spent over $1.4 million between 2000 and 2010 to install bicycle facilities and bicycle support facilities.

Photo Source: Dan Burden/WALC Institute for Vitality City

8.2.8 Past Bicycle-Related Expenditures

The City of Redondo Beach has incurred the following bicycle expenditures between 2000 and 2010. The expenditures total to $1,457,365.

- $12,000 for a Class II facility on Catalina Ave (Esplanade to Beryl St) and a Class III facility on Esplanade (Knob Hill Ave to Catalina Ave) in 2008
- $1,422,465 for Class I, II, and III facilities for the North Redondo Beach Bikeway in 2008
- $7,000 for type D loops on Inglewood Ave (Artesia Blvd to Manhattan Beach Blvd) in 2009
- $7,500 for type D loops on Prospect Ave (Palos Verdes Blvd to Pearl St) in 2010
- $3,000 for type D loops as part of a residential rehabilitation project in 2010
- $3,000 for type D loops on Palos Verdes Blvd (Avenue F to East City Limits) in 2010
- $2,400 for bicycle racks at the Pier and Riviera Village between 2008 and 2010

8.3 Needs Analysis

This section describes the needs of bicyclists in Redondo Beach. It first summarizes feedback collected from the online survey and public workshops. The section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

8.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Redondo Beach that the community identified as desirable for bikeways.

The locations that the public identified the most frequently as needed bicycle facilities in Redondo Beach include the following:

- Aviation Boulevard
- Pacific Coast Highway
- King Harbor
- Prospect Avenue
- Torrance Boulevard

The locations that the public identified the most frequently as needed bicycle facilities in Redondo Beach included Prospect Avenue.

8.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Redondo Beach by census tract. The highest percentage of bicycle commuters is located in the southeastern portion of the City on the border with Torrance.

Table 8-3 presents commute to work data estimates reported by the 2000 US Census for Redondo Beach. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to the estimates, 0.8 percent of residents in Redondo Beach commute predominantly by bicycle. This is comparable with the percentage of bicycle commuters in California, and it is higher than Los Angeles County and the United States as a whole. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in Redondo Beach for several reasons. Data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. The percentage of commuters in Redondo Beach that commute by transit is much lower than that of those that drive alone. Redondo Beach also has a low percentage of carpooling and walking.

In addition to bicycle commuters in Redondo Beach, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Redondo Beach's bicycle network in **Section 8.4**.

Table 8-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Redondo Beach
Bicycle	0.38%	0.83%	0.62%	0.81%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	83.35%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	7.43%
Transit	4.73%	5.07%	6.58%	1.47%
Walked	2.93%	2.85%	2.93%	1.41%
Other Means	0.70%	0.79%	0.76%	0.66%
Worked at Home	3.26%	3.83%	3.49%	4.27%

Source: US Census 2000

Table 8-4 presents an estimate of current bicycling within Redondo Beach using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 8-5** presents the associated air quality benefits from bicycling.

Table 8-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	63,261	2000 US Census, P1
Existing employed population	37,661	2000 US Census, P30
Existing bike-to-work mode share	0.8%	2000 US Census, P30
Existing number of bike-to-work commuters	305	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	4.3%	2000 US Census, P30
Existing number of work-at-home bike commuters	161	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	1.5%	2000 US Census, P30
Existing transit bicycle commuters	138	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	5,650	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	113	School children population multiplied by school children bike mode share
Existing number of college students in study area	5,136	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute mode share at the University of California, Los Angeles
Existing college bike commuters	257	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	974	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	1,948	Total bicycle commuters x 2 (for round trips)

Table 8-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	587	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	153,321	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	4,280	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	1,117,149	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	13	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	9	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	117	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	3,482	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	3,350	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	13	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	12	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	2,340	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	30,540	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	908,807	Yearly mileage reduction x 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 8-6 presents projected year 2030 bicycling activity within Redondo Beach using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. **Table 8-7** presents the associated year

2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 8-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	78,724	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	46,866	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	1.6%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	759	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	8.0%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	376	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	2.9%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	344	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	4,490	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series*.
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	180	School children population multiplied by school children bicycling mode share
Future number of college students in study area	6,391	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	447	College student population x college student bicycling mode share
Future total number of bike commuters	2,107	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	4,214	Total bike commuters x 2 (for round trips)

Table 8-7: Projected Year 2030 Bicycling Air Quality Impact

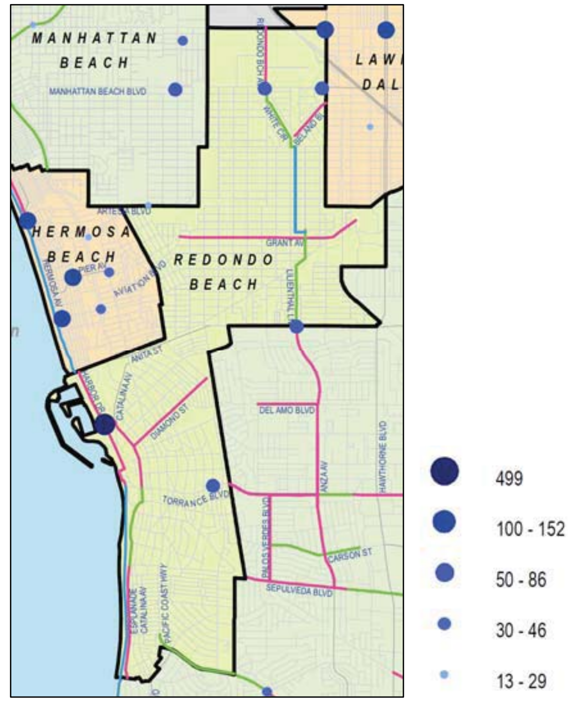
Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	1,251	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	326,430	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	9,339	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	2,437,547	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	28	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	20	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	255	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	7,598	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	7,308	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	28	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	26	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	5,105	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	66,636	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	1,982,959	Yearly mileage reduction x by 369 grams / mi

Source:

Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of about 2,000 to approximately 4,200, resulting in a substantial reduction of both

Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 5,100 pounds of smog forming N0X and roughly 2 million pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.



Weekday Bicycle Count Results in Redondo Beach

(See Appendix A-16 for a larger map and Appendix H for a list of count locations.)

8.3.3 Bicycle Counts

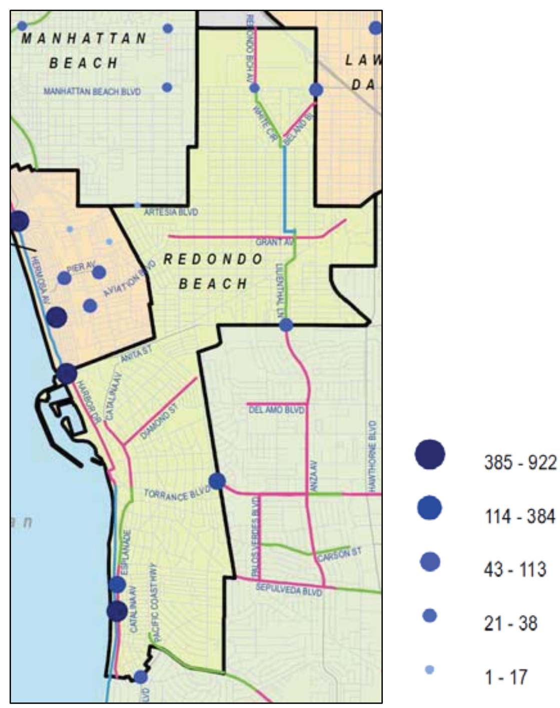
To assess bicycling levels at different sites throughout Redondo Beach, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

8.3.3.1 Methodology

The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

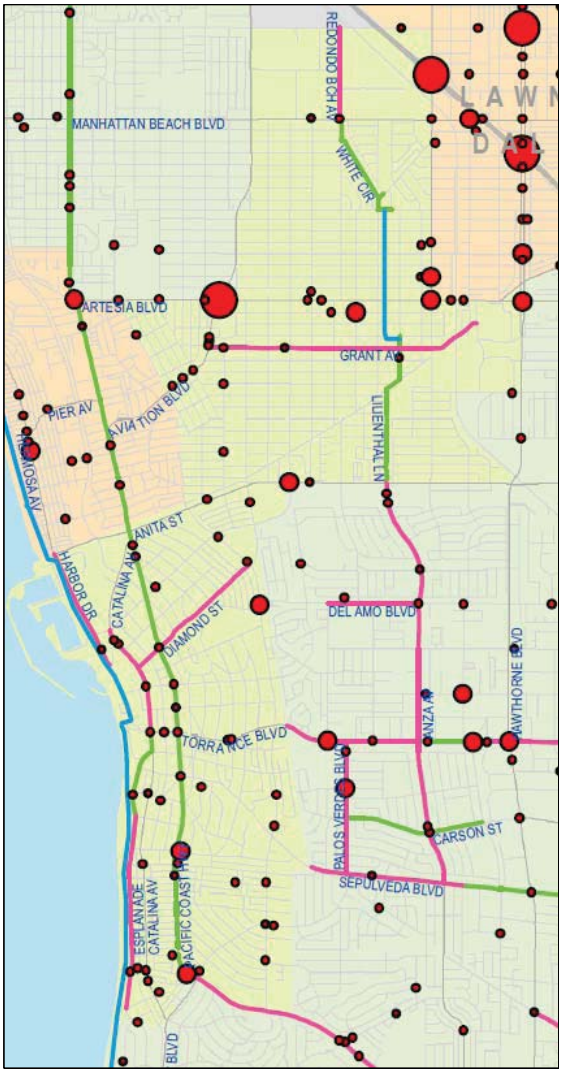
Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Redondo Beach, volunteers were stationed at three stations on Thursday and five stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.



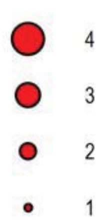
Weekend Bicycle Count Results in Redondo Beach

(See Appendix A-17 for a larger map and Appendix H for a list of count locations.)



Bicycle Collisions in Redondo Beach 2007-2009

(See Appendix A-18 for larger map)



8.3.3.2 Results

The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Redondo Beach are shown at right. Detailed count data, including a list of count locations, is presented in **Appendix H.** On Thursday, the Redondo Beach station that experienced the highest volume was Harbor Drive and Beryl Street with 499 bicyclists during the three hour count period. The other two stations had fewer than 100 bicyclists each. The station with the most bicyclists on Saturday was Herondo Street and the Strand with 732 bicyclists during the three hour count period.

On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, about 83 percent of bicyclists were male. Approximately 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.

8.3.4 Bicycle Collision Analysis

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Redondo Beach. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 8-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Redondo Beach are shown on the preceding page. There were 80 total reported collisions involving bicyclists from 2007-2009 in the City of Redondo Beach. There were four collisions at the intersection of Artesia Boulevard and Aviation Boulevard, on the border of Manhattan Beach and Redondo Beach. There were also 12 collisions on Artesia Boulevard and 14 collisions on Pacific Coast Highway.

Table 8-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
80	84	80	3	0

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 48 percent of collisions involving bicycles (38 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in Redondo Beach. The streets with the highest volumes of vehicles are Aviation Boulevard, Inglewood Avenue, Pacific Coast Highway, Manhattan Beach Boulevard, Artesia Boulevard, and 190th Street. Artesia Boulevard, Aviation Boulevard, and Pacific Coast Highway all had a high number of collisions involving bicycles. Pacific Coast

Highway is the only high volume street with a bicycle facility; it has a Class III bike route. Bicyclists must share lanes with vehicular traffic, creating the potential for conflicts between the two modes. Installing bicycle facilities, especially on major arterials, could reduce the number and severity of collisions involving bicyclists.

8.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Redondo Beach, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and shown in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Redondo Beach, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Redondo Beach to reach their destinations without losing bicycle facilities at city boundaries. Bikeway recommendations are also based on the existing City bicycle plans, public input, topography, traffic volumes, and traffic speeds.

The proposed bikeway network in the City of Redondo Beach consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets.

8.4.1 Proposed Bikeway Facilities

The proposed bikeway network in the City of Redondo Beach consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 8-3** and **Figure 8-4.** The proposed bicycle network in Redondo Beach connects with the recommended networks in Manhattan Beach, Hermosa Beach, Lawndale, and Torrance. **Figure 8-3** shows blue asterisks on the proposed path along the Metro Green Line Extension as it is outside the jurisdiction of this Plan, but is a supported improvement. The proposed bicycle network for the South Bay region as a whole is presented in **Appendix A-19**.

Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 8-9** lists the proposed bicycle paths, **Table 8-10** lists the proposed bicycle lanes, **Table 8-11** lists the proposed bicycle routes, and **Table 8-12** lists the proposed bicycle-friendly streets.

Table 8-9: Proposed Class I Bicycle Paths in Redondo Beach

Street	From	To	Miles
Harbor Dr	Herondo St	Existing Bike Path	0.8
Flagler Ln	Towers St	Diamond St	0.1
Total Bicycle Path Mileage			**0.8**

Table 8-10: Proposed Class II Bicycle Lanes in Redondo Beach

Street	From	To	Miles
Prospect Ave	North City Limits	Pacific Coast Highway	3.0
Knob Hill Ave	Esplanade	Pacific Coast Highway	0.4
Torrance Blvd	West End	East City Limits	0.9
Inglewood Ave	Marine Ave	Ripley Ave	1.8
Artesia Blvd	West City Limits	Hawthorne Blvd	2.3
Catalina Ave	Torrance Blvd	Palos Verdes Blvd	1.6
Juanita Ave - Del Amo Blvd	Diamond St	East City Limits	0.3
Marine Ave	Aviation Blvd	Inglewood Ave	1.0
Ripley Ave	Lilienthal Ln	Inglewood Ave	0.3
Beryl St	Harbor Dr	190th St	1.5
Catalina Ave	Pacific Coast Highway	Beryl St	0.5
Sepulveda Blvd	Prospect Ave	West City Limits	0.3
Avenue I	Esplanade	Catalina Ave	0.1
Manhattan Beach Blvd	Aviation Blvd	Inglewood Ave	1.0
Herondo St	Harbor Dr	Pacific Coast Highway	0.4
Lilienthal Ln	Ripley Ave	Fisk Ln	0.4
Aviation Blvd	Marine Ave	Harper Ave (City Limit)	1.7
190th St	Blossom Ln	East City Limits	1.3
Redondo Beach Blvd	Artesia Blvd	Hawthorne Blvd	0.2
Total Bicycle Lane Mileage			**18.9**

Table 8-11: Proposed Class III Bicycle Routes in Redondo Beach

Street	From	To	Miles
Ripley Ave	Flagler Ln	Lilienthal Ln	0.9
Emerald St	Catalina Ave	Prospect Ave	0.7
Yacht Club Way	West end	Harbor Dr	0.1
Portofina Way	West end	Harbor Dr	0.2
Ford Ave - Herrin St - Ormond Ln	Artesia Blvd	Aviation Blvd	0.5
Sepulveda Blvd	Torrance Blvd	Prospect Ave	0.7
182nd St	Felton Ave	Hawthorne Blvd	0.6

Street	From	To	Miles
Kingsdale Ave	Artesia Blvd	182nd St	0.5
Anita St	Pacific Coast Highway	Blossom Ln	0.9
Francisca Ave	Herondo St	Catalina Ave	0.3
Palos Verdes Blvd	South City Limits	East City Limits	0.9
Knob Hill Ave	Pacific Coast Highway	Camino Real	0.5
Juanita Ave	Pacific Coast Highway	Diamon	0.5
Flagler Ln	Anita St	Beryl St	0.2
Beland Bl - Phelan Ln	Barkley Ln	White Circle	0.1
Total Bicycle Route Mileage			**7.5**

Table 8-12: Proposed Bicycle Friendly Streets in Redondo Beach

Street	From	To	Miles
Flagler Ln - Diamond St	Beryl St	Prospect Ave	0.1
Flagler Ln	Artesia Blvd	Anita St	1.0
Ave C - Juanita Ave - Ave D - Helberta Ave	Esplanade	Prospect Ave	0.9
Warfield Ave	Aviation Blvd	Redondo Beach Ave	0.5
Vanderbilt Ln	Flagler Ln	Inglewood Ave	1.0
Rindge Ln	Warfield Ave	190th St	1.9
Ralston Ln - Firmona Ave	Meyer Ln	190th St	0.9
Mathews Av	Aviation Way	Inglewood Ave	1.1
Voorhees Ave	Aviation Blvd	Inglewood Ave	1.1
Robinson St	Aviation Blvd	Inglewood Ave	1.1
Meyer Ln	Ripley Ave	190th St	0.3
Helberta Ave - El Redondo	Vincent St	Torrance Blvd	0.5
Farrell Ave	Aviation Blvd	Rindge Ln	0.3
Total Bicycle-Friendly Street Mileage			**10.9**

There are several opportunities and constraints to recommending new bicycle facilities in Redondo Beach. These are shown on the following page and are referenced by the numbers in **Appendix I**. **Appendix I** also presents opportunities and constraints in the South Bay region as a whole.

Opportunities include a proposed Class I bikeway on Harbor Drive and a proposed Class II bikeway on Catalina Avenue. See Vitality City's Livability Plan for further detail.

One constraint is "The Wall" on the Strand at the border of Hermosa Beach and Redondo Beach. This wall severs the Marvin Braude Bikeway at the Hermosa Beach-Redondo Beach border. South-bound bicyclists are forced to make a sharp 90-degree turn and are led out to the bike lanes on Harbor Drive. This plan recommends the removal of the wall and that parking lot 13 in Redondo Beach be partially utilized to accommodate a short extension of the Class I facility that will lead to Harbor Drive in a safer and more navigable way.

A second constraint is a proposed Class II bikeway on Artesia Boulevard. Artesia Boulevard between Aviation Boulevard and the city's eastern boundary has undergone an extensive streetscape improvement in recent history. These improvements included an extensively landscaped center median and bulb-outs. As such, this facility is one that can be considered in any future streetscape improvements that might be implemented along Artesia Boulevard in the years to come.

A third constraint is a proposed Class II bikeway along Redondo Beach Boulevard from Hawthorne Boulevard to Artesia Boulevard in Lawndale/Redondo Beach. This segment experiences high vehicular traffic volumes due to the South Bay Galleria, which creates a challenging environment for bicyclists. Upon plan implementation, Lawndale and Redondo Beach should work together to design a facility that provides safety for bicyclists.

Opportunities and Constraints in Redondo Beach

(See Appendix I for larger map)

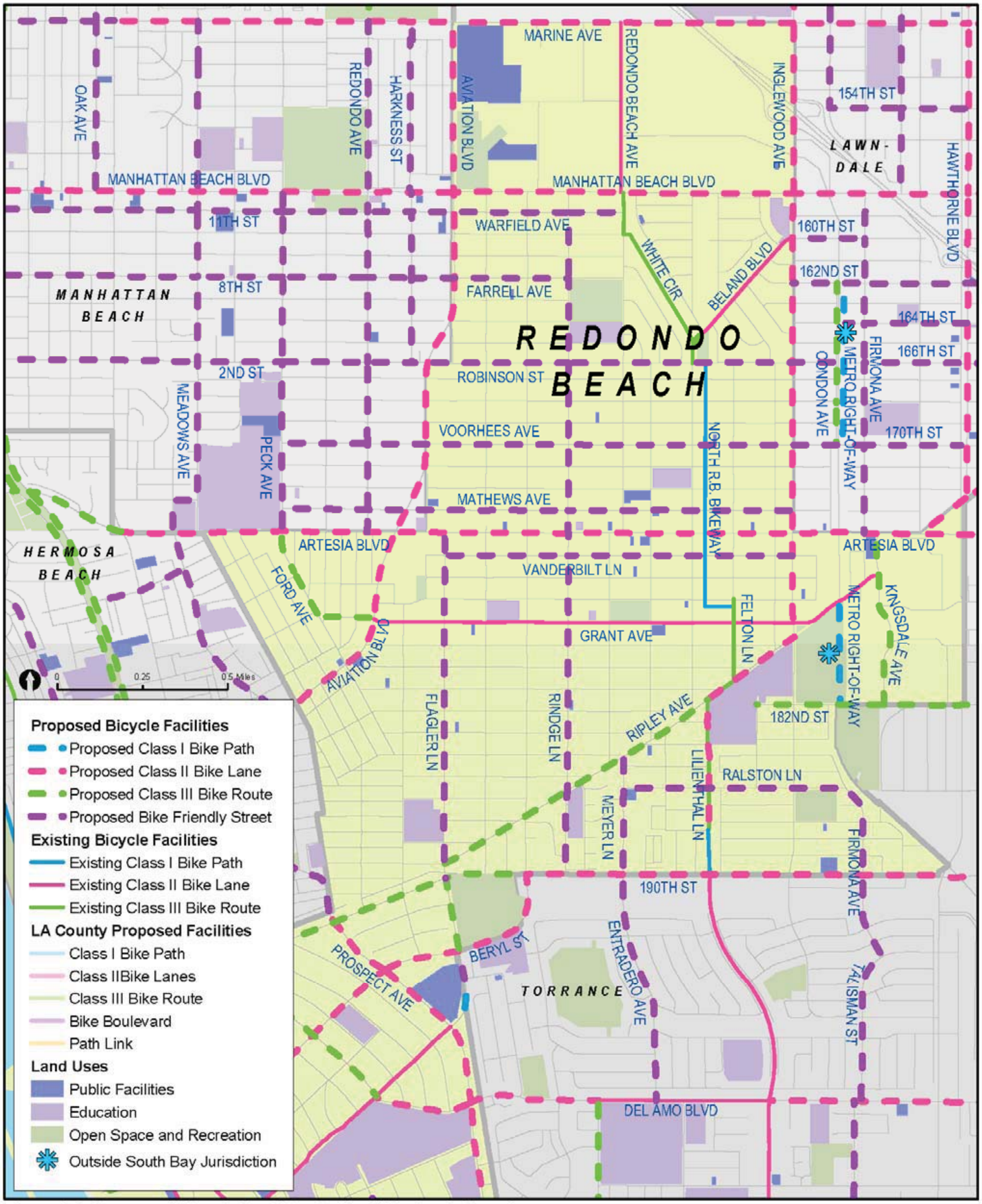


Figure 8-3: Proposed Bicycle Facilities in North Redondo Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

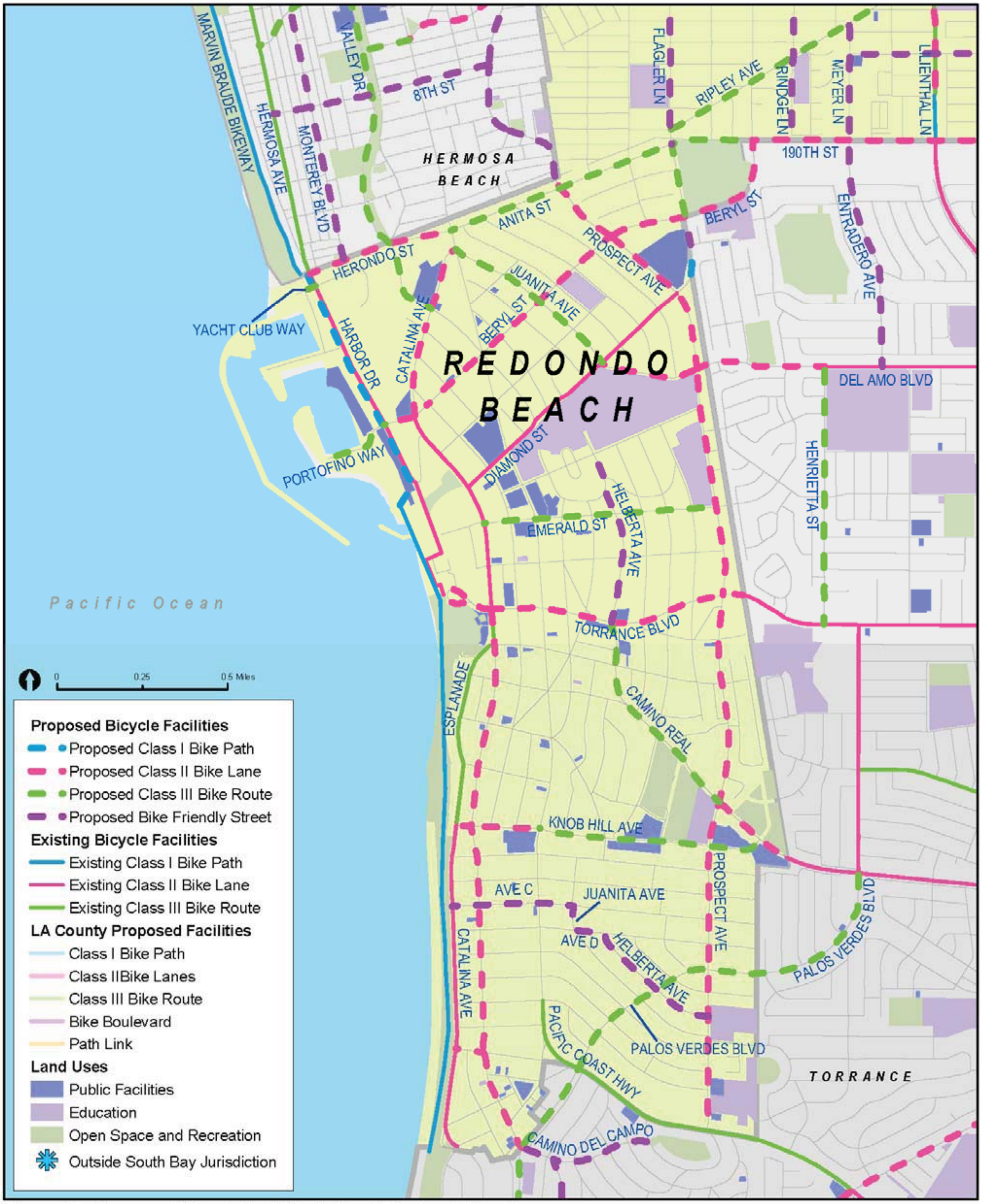


Figure 8-4: Proposed Bicycle Facilities in South Redondo Beach

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

8.4.2 Proposed End-of-Trip Bicycle Facilities

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

Redondo Beach should amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs.

The Redondo Beach Municipal Code currently provides bicycle parking requirements for non-residential developments. The City should amend its Municipal Code to include bicycle parking requirements at new and retrofitted multi-family residential, commercial, office, and mixed-use developments of all sizes. The Municipal Code should also require bicycle parking quantities based on square footage of developments or by number of employees/residents to adequately address the bicycle demand at each development.

Redondo Beach should also amend its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles
- Lockable bicycle rooms with permanently anchored racks or
- Lockable, permanently anchored bicycle lockers

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Redondo Beach's Municipal Code should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

Proposed end-of-trip bicycle facilities in Redondo Beach are shown in **Figure 8-5** and **Figure 8-6.** The City should continue to provide short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs, and ensure that an adequate supply is available. The City should prioritize the installation of bicycle parking throughout the city, with particular attention directed at the following locations:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. Any future transit hubs and intermodal facilities should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

High-activity locations such as transit stations, offices, and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers.

8.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Redondo Beach.

8.5.1 Cost Estimates

Table 8-13 displays the planning-level capital cost assumptions for each facility type proposed in this plan and **Table 8-14** displays the cost to implement the proposed network in the City of Redondo Beach from the cost assumptions.[24] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal.

[24] **Table 8-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

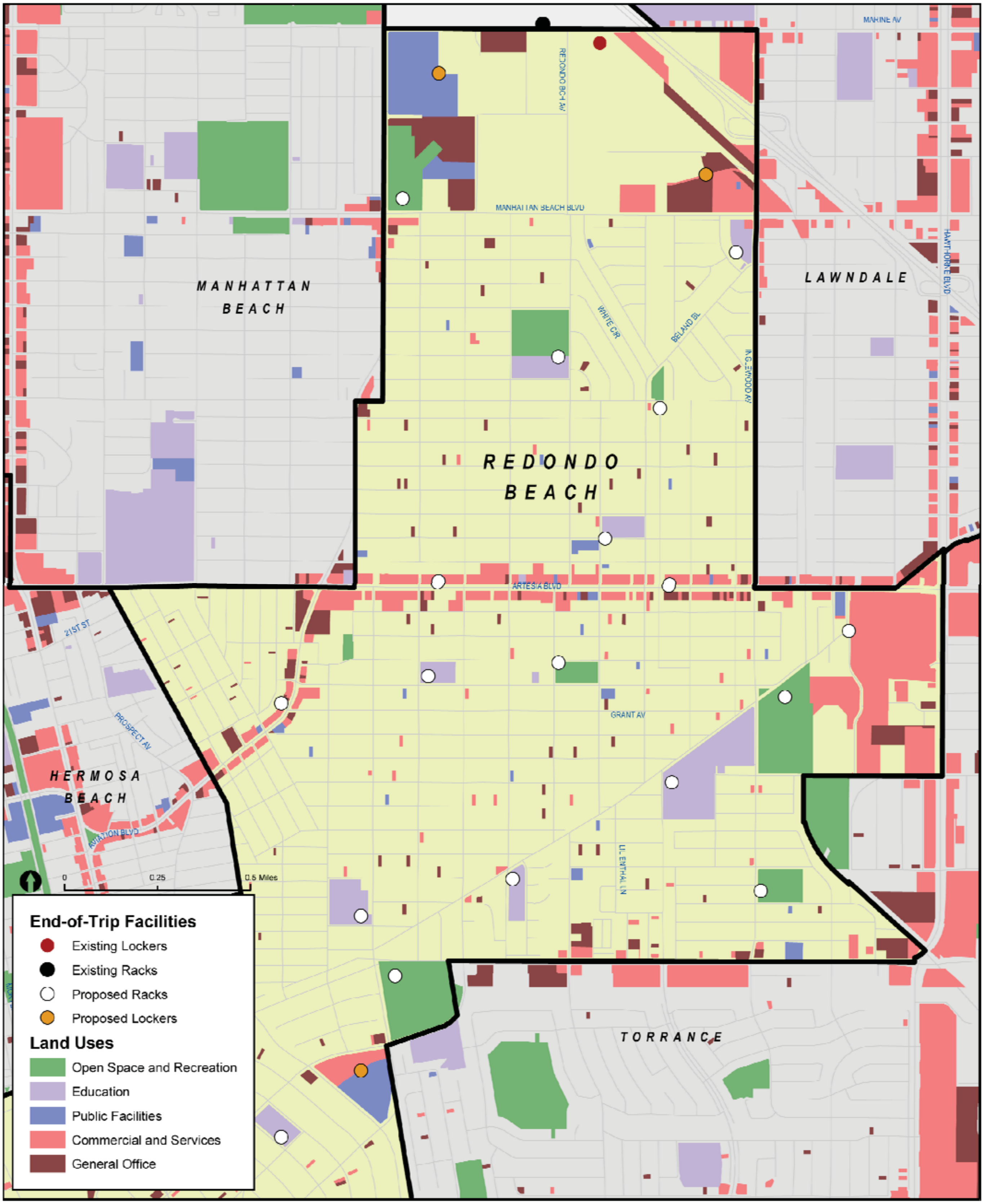


Figure 8-5: North Redondo Beach Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan

El Segundo • Gardena • Hermosa Beach • Lawndale • Manhattan Beach • Redondo Beach • Torrance

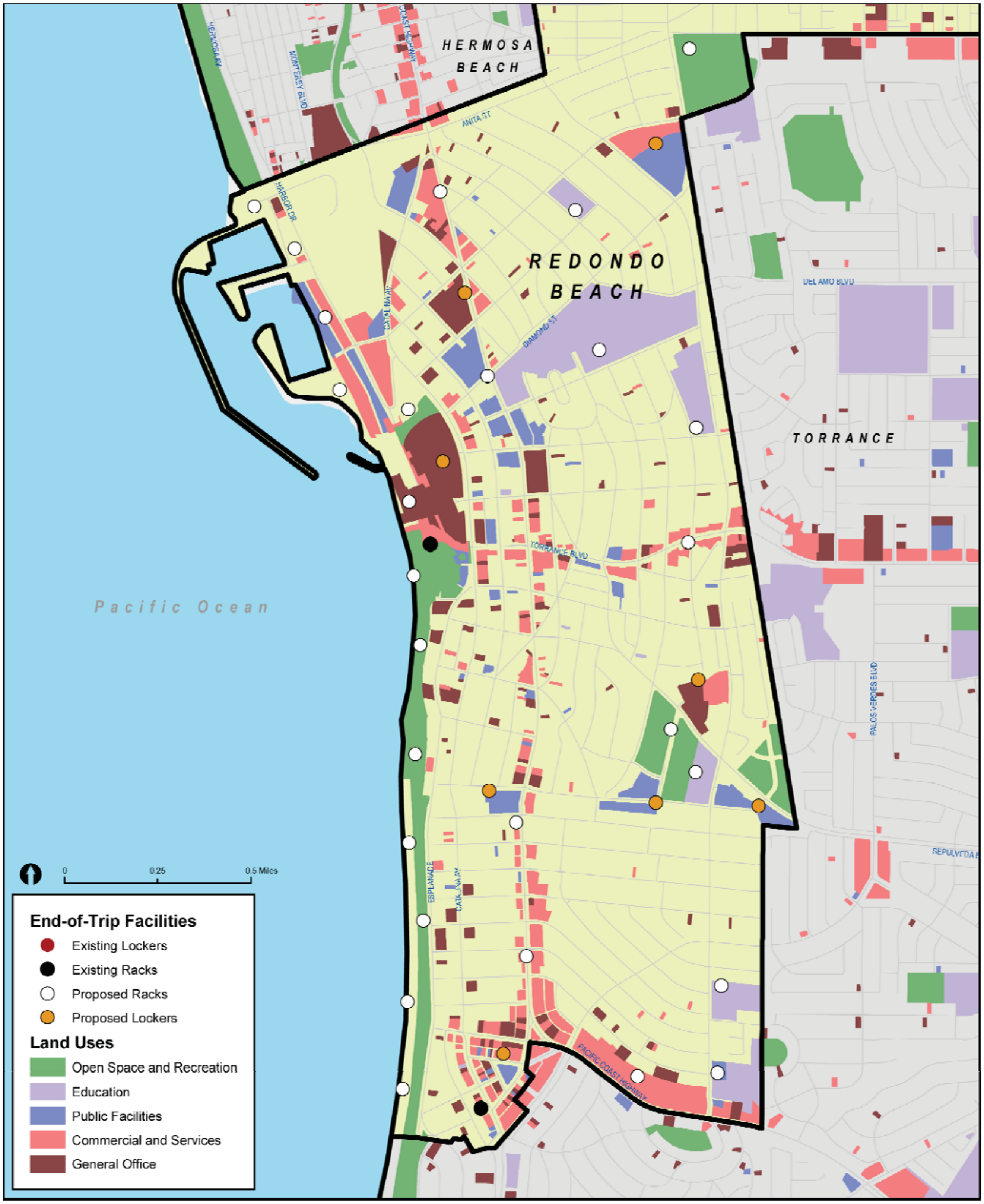


Figure 8-6: South Redondo Beach Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 8.7**.

Table 8-13: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

Table 8-14: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.8	$ 672,000
Bicycle Lane	$40,000	15.9	$ 636,000
Bicycle Route with sharrows	$25,000	10.4	$ 259,000
Bicycle-Friendly Street	$30,000	10.9	$ 328,000
Total		**38.0**	**$ 1,895,000**

8.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Redondo Beach in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 8.4.1** is grouped into projects based on feasibility of implementation. **Table 8-15** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Redondo Beach. The projects ranked the highest should be implemented first.

Table 8-15: Redondo Beach Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BL	Torrance Blvd	West End	East City Limits	6	6	0	4	0	2	2	2	1	2	**25**
BP	Harbor Dr	Herondo St	Existing Bike Path	6	6	0	4	0	1	2	2	0	2	**23**
BL	Inglewood Ave	Marine Ave	Ripley Ave	0	6	0	4	2	2	2	2	0	2	**20**
BL	Artesia Blvd	West City Limits	Hawthorne Blvd	0	6	0	4	4	2	2	1	0	0	**19**
BL	Catalina Ave	Torrance Blvd	Palos Verdes Blvd	3	6	0	2	0	2	2	2	1	1	**19**
BL	Juanita Ave - Del Amo Blvd	Pacific Coast Highway	East City Limits	3	6	0	2	0	1	2	1	2	2	**19**
BR	Ripley Ave	Flagler Ln	Lilienthal Ln	3	6	0	4	0	0	0	1	2	2	**18**
BL - BR	Knob Hill Ave	Esplanade	Camino Real	3	6	0	4	0	2	1	1	1	0	**18**
BL	Marine Ave	Aviation Blvd	Inglewood Ave	0	6	0	0	4	1	2	2	1	2	**18**
BL	Ripley Ave	Lilienthal Ln	Inglewood Ave	3	6	0	4	0	0	0	1	2	2	**18**
BL	Beryl St	Harbor Dr	190th St	3	6	0	4	0	1	1	1	1	1	**18**
BL	Prospect Ave	North City Limits	Pacific Coast Highway	3	6	0	0	0	2	2	1	1	2	**17**
BL	Catalina Ave	Pacific Coast Highway	Beryl St	3	6	0	0	0	0	2	2	2	2	**17**
BL	Sepulveda Blvd	Prospect Ave	West City Limits	3	6	0	2	0	1	2	1	2	0	**17**
BL	Avenue I	Esplanade	Catalina Ave	3	6	0	2	0	1	0	1	2	2	**17**
BL	Lilienthal Ln	Ripley Ave	Fisk Ln	6	6	0	0	0	0	0	1	2	2	**17**
BFS	Warfield Ave	Aviation Blvd	Vail Ave	6	6	0	0	0	0	0	1	2	2	**17**
BR	Beland Bl - Phelan Ln	Barkley Ln	White Cir	6	6	0	0	2	0	0	1	2	0	**17**
BL	Manhattan Beach Blvd	Aviation Blvd	Inglewood Ave	0	6	0	0	2	2	2	1	1	2	**16**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR - BFS - BP - BFS	Flagler Ln - Diamond St	Anita St	Prospect Ave	3	6	0	4	0	2	1	0	0	0	**16**
BR	Emerald St	Catalina Ave	Prospect Ave	3	3	0	0	0	1	0	2	2	2	**13**
BR	182nd St	Felton Ave	Hawthorne Blvd	0	0	0	4	2	1	0	2	2	2	**13**
BR	Juanita Ave	Pacific Coast Highway	Diamond Street	3	6	0	0	0	1	0	1	2	0	**13**
BL	Aviation Blvd	Marine Ave	Harper Ave (City Limit)	0	6	0	0	2	0	2	1	1	1	**13**
BFS	Ave C - Juanita Ave - Ave D - Helberta Ave	Esplanade	Prospect Ave	3	6	0	0	0	0	0	1	1	2	**13**
BFS	Vanderbilt Ln	Flagler Ln	Inglewood Ave	0	6	0	0	0	2	1	1	1	2	**13**
BFS	Rindge Ln	Warfield Ave	190th St	0	6	0	2	0	1	0	1	1	2	**13**
BR	Kingsdale Ave	Artesia Blvd	182nd St	0	0	0	4	4	0	0	0	2	2	**12**
BL	190th St	Blossom Ln	East City Limits	0	6	0	2	0	2	0	1	1	0	**12**
BL	Redondo Beach Blvd	Artesia Blvd	Hawthorne Blvd	0	0	0	4	2	0	2	1	2	1	**12**
BR	Camino Real	Torrance Blvd	Prospect Ave	0	3	0	0	0	1	2	1	2	2	**11**
BFS	Ralston Ln - Firmona Ave	Meyer Ln	190th St	0	6	0	0	0	0	1	1	1	2	**11**
BFS	Mathews Av	Aviation Way	Inglewood Ave	0	6	0	0	0	0	1	1	1	2	**11**
BR	Anita St	Pacific Coast Highway	Blossom Ln	0	3	0	0	0	2	0	1	2	2	**10**
BFS	Voorhees Ave	Aviation Blvd	Inglewood Ave	0	6	0	0	0	0	0	1	1	2	**10**
BFS	Robinson St	Aviation Blvd	Inglewood Ave	0	6	0	0	0	0	0	1	1	2	**10**
BR	Yacht Club	West end	Harbor Dr	0	3	0	0	0	0	0	2	2	2	**9**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
	Way													
BR	Portofino Way	West end	Harbor Dr	0	3	0	0	0	0	0	2	2	2	**9**
BR	Ford Ave - Herrin St - Ormond Ln	Artesia Blvd	Aviation Blvd	0	3	0	0	0	1	0	1	2	2	**9**
BL	Herondo St	Harbor Dr	Pacific Coast Highway	3	0	0	0	0	0	0	2	2	2	**9**
BFS	Meyer Ln	Ripley Ave	190th St	0	3	0	0	0	0	0	1	2	2	**8**
BFS	Helberta Ave - El Redondo	Vincent St	Torrance Blvd	0	3	0	0	0	0	0	1	2	2	**8**
BR	Francisca Ave	Herondo St	Catalina Ave	0	3	0	0	0	0	0	0	2	2	**7**
BR	Palos Verdes Blvd	South City Limits	East City Limits	0	0	0	0	0	2	0	1	2	2	**7**
BFS	Farrell Ave	Aviation Blvd	Rindge Ln	0	0	0	0	0	0	0	1	2	2	**5**

*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

8.7 Project Sheets

The City of Redondo Beach selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Redondo Beach Project #1: Catalina Avenue (Torrance Boulevard to Palos Verdes Boulevard

Project Site

Catalina Avenue is a north-south corridor located in the western portion of the City of Redondo Beach. It connects to existing bike lanes on Catalina Avenue to the north and proposed facilities in the City of Torrance to the south. Catalina Avenue provides access to Veterans Park, a variety of residential and commercial uses, and Downtown Redondo Beach. There is existing on-street parking along most of Catalina Avenue that is highly utilized.

Catalina Avenue has a posted speed limit of 35 mph. From Torrance Boulevard to Avenue I, Catalina Avenue has two travel lanes in each direction and on-street parallel parking. Between Torrance Boulevard and Pearl Street, Catalina Avenue decreases from a roadway width of approximately 86 feet to 60 feet, including a center median, to accommodate turn pockets at Torrance Boulevard. From Pearl Street to Knob Hill Avenue, the roadway width drops to approximately 55 feet. Between Avenue H and Avenue I, the roadway width increases to approximately 78 feet. Catalina Avenue has one travel lane in each direction south of Avenue I and there is a mix of on-street parallel and angled parking. The roadway width is approximately 78 feet.

Project Challenges

This segment of Catalina Avenue has no existing bicycle facilities, thus bicyclists must share the road with vehicular traffic. On-street parking where the roadway narrows reduces the available space for bicycle facilities. Angled parking creates potential conflicts between bicyclists and motorists because it is difficult for drivers to see bicyclists when backing out of parking spaces.

Proposed Improvements

- Stripe 1.6 miles of Class II Bike Lanes and signs
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Conduct a road diet to convert cross-section to one travel lane in each direction and a center turn lane between Torrance Boulevard and Knob Hill Avenue (0.7 miles)
- Convert angled parking to head out angled parking south of Avenue I

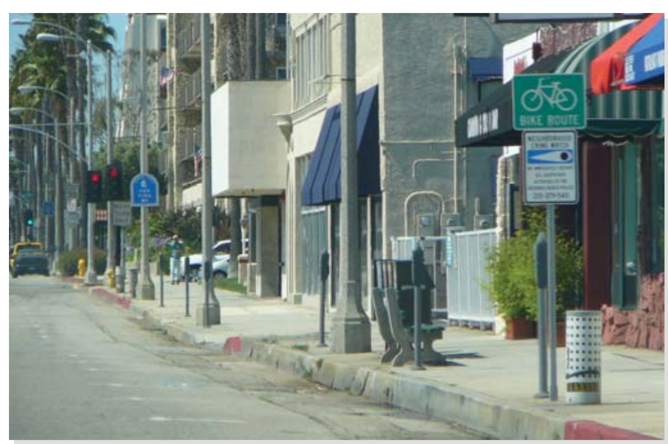
Estimated Cost

$200,000

Photos

Angled parking creates potential conflicts between bicyclists and motorists because it is difficult for drivers to see bicyclists when backing out of parking spaces.

Removing a travel lane north of Knob Hill Avenue will allow for bicycle lanes without removing highly utilized parking.



Proposed bike lanes on Catalina Avenue will connect with existing bike lanes on Catalina Avenue north of Torrance Blvd.

Aerial Map and Concept Graphics: Catalina Avenue

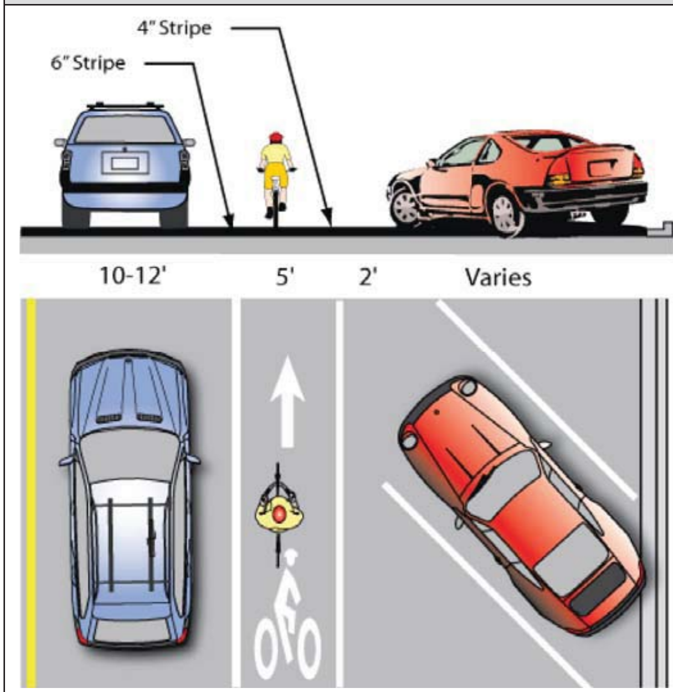
Catalina Avenue (Torrance Boulevard to Avenue B)

Catalina Avenue (Avenue B to Palos Verdes Boulevard)

Aerial Map and Concept Graphics: Catalina Avenue

Road Diet (4 to 3 Lanes)

Head Out Angled Parking



Redondo Beach Project #2: Prospect Avenue (Anita Street to Pacific Coast Highway)

Project Site

Prospect Avenue is a north-south road located in the south-eastern portion of the City of Redondo Beach. It connects to a proposed bike friendly street on Prospect Avenue in Hermosa Beach to the north and to an existing Class III Bike Route in Torrance to the south. Prospect Avenue provides access to Redondo Shores High School, Parras Middle School, and Tulita School. There is existing on-street parking along much of Prospect Avenue on one or both sides of the street that is moderately utilized. The posted speed limit is 35 mph.

Between Anita Street and Torrance Boulevard, Prospect Avenue has two lanes in each direction and a center turn lane. The roadway width ranges from approximately 61 to 65 feet. North of Del Amo Street, there is only on-street parking on the west side of Prospect Avenue. Between Beryl Street and Diamond Street, there is a center median. From Torrance Boulevard to Pacific Coast Highway, there are two travel lanes in each direction, and between Camino Real and Knob Hill Avenue, there is also a center turn lane. From Torrance Boulevard to Palos Verdes Boulevard, the roadway width of Prospect Avenue is approximately 62 to 64 feet. South of Palos Verdes Boulevard to Avenue E, the roadway width drops to approximately 46 feet and has no on-street parking. From Avenue E to Pacific Coast Highway, the roadway widens to approximately 55 feet and has parking on both sides of the street.

Project Challenges

Prospect Avenue has no existing bicycle facilities, which creates potential conflicts between bicyclists and motorists. There are few existing treatments to create a safe bicycling environment for children riding to school. The existing cross-section configuration limits the space available to install bicycle facilities.

Proposed Improvements

- Stripe 3 miles of Class II Bike Lanes and signs
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Conduct a road diet to convert cross-section to one travel lane in each direction and a center turn lane (3 miles)
- Add an additional parking lane where space permits

Estimated Cost

$625,000

Photos

Looking south on Prospect Avenue. Removing a travel lane in each direction will provide adequate space for bike lanes.

Bike lanes on Prospect Avenue will create a safer bicycling environment for children riding to school.

Bicycle loop detectors at signalized intersections will allow bicyclists to trigger the signal when no vehicles are present.

Aerial Map and Concept Graphics: Prospect Avenue

Prospect Avenue (Anita Street to Torrance Boulevard)

Prospect Avenue (Torrance Boulevard to Pacific Coast Highway)

Aerial Map and Concept Graphics: Prospect Avenue

Bike Lane Adjacent to On-street Parking and Buffered Bike Lane

Bicycle Loop Detectors

Chapter 9

Torrance

9 Torrance

This chapter presents Torrance's portion of the South Bay Bicycle Master Plan. It begins with a discussion of how Torrance complies with Bicycle Transportation Account requirements. The chapter is then organized into the following sections:

- Existing conditions
- City-specific goals, policies, and implementation actions
- Needs analysis
- Proposed bicycle network
- Project prioritization
- Project costs

9.1 Bicycle Transportation Account (BTA) Compliance

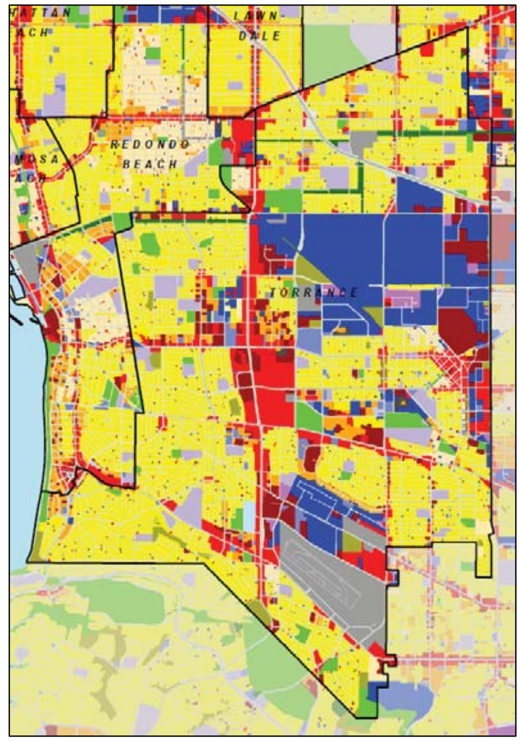
The Bicycle Transportation Account (BTA) is an annual statewide discretionary program that funds bicycle projects through the Caltrans Bicycle Facility Unit. Available as grants to local jurisdictions, the program emphasizes projects that benefit bicycling for commuting purposes. In order for Torrance to qualify for BTA funds, the South Bay Bicycle Master Plan must contain specific elements. **Appendix E** displays the requisite BTA components and their location within this plan in tabular form. The table includes "Approved" and "Notes/Comments" columns for the convenience of the Metro official responsible for reviewing compliance.

9.2 Existing Conditions

Torrance is located in the southern, central portion of the South Bay region. It is bordered to the north by the City of Lawndale, the County of Los Angeles, and the City of Gardena; to the east by the City of Los Angeles; to the south by the Cities of Lomita, Rolling Hills Estates, and Palos Verdes Estates; and to the west by the City of Redondo Beach. According to the 2000 Census, Torrance has a population of 137,933. The City was incorporated in 1921.

9.2.1 Land Use

Appendix A-3 displays a map of the existing land use in the South Bay Region. Land use in Torrance is shown at right. The City is comprised of approximately 45 percent residential land uses, most of which is single family residential. Torrance also consists of



Existing Land Uses in Torrance
(See Appendix A-3 for larger map)

- City Boundary
- Single Family Residential
- Multi-Family Residential
- Other Residential
- General Office
- Commercial and Services
- Public Facilities
- Education
- Military Installations
- Industrial
- Transportation, Communications, and Utilities
- Mixed Commercial and Industrial
- Mixed Urban
- Open Space and Recreation
- Agriculture
- Vacant
- Water
- Under Construction
- Undevelopable
- Unknown

almost 20 percent industrial land, making it a key employment center in the South Bay.

Figure 9-1 displays the proposed land uses for the City of Torrance. There are no significant proposed changes in the City's land uses.

9.2.2 Bicycle Trip Generators

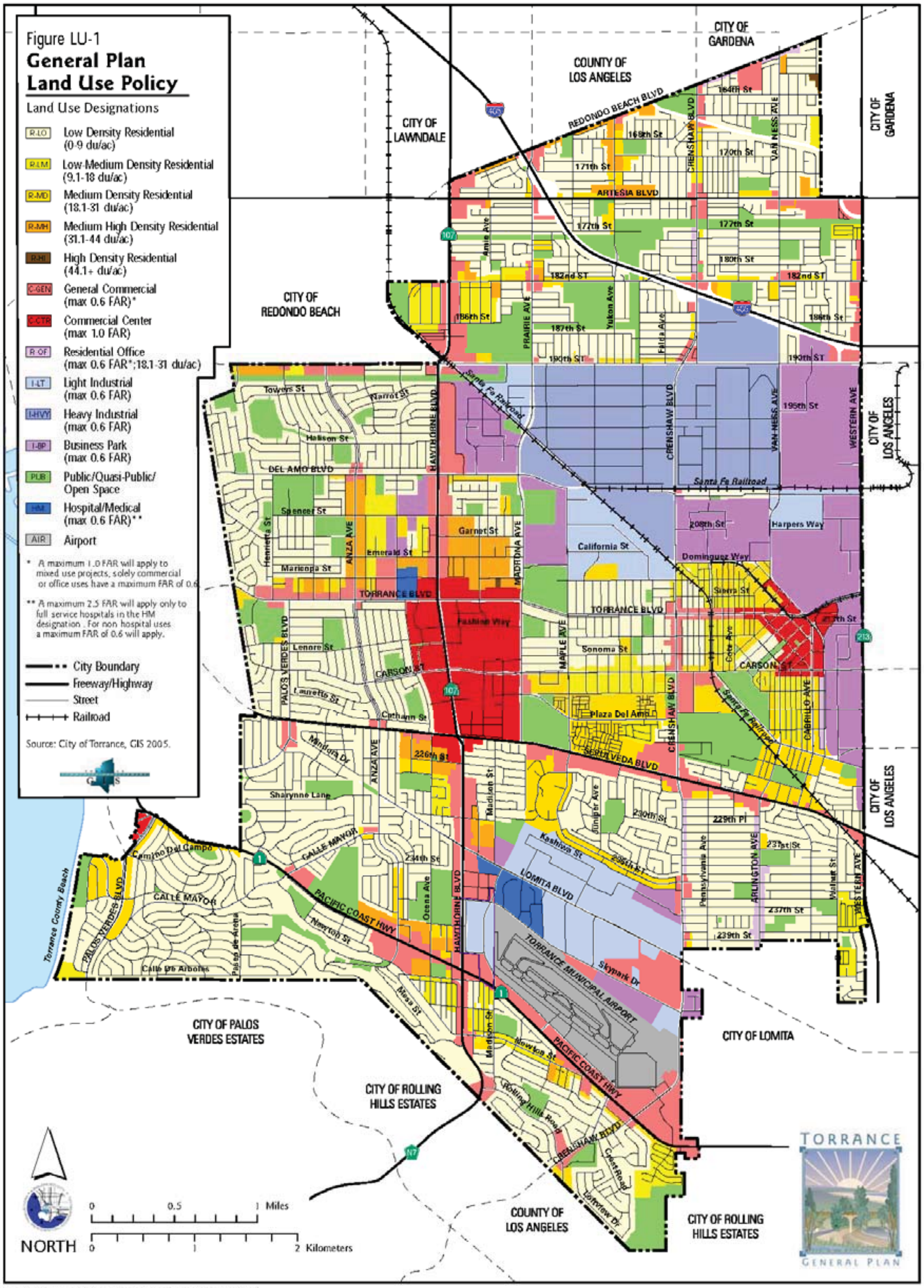
Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities.

Bicycle trip generators refer to population characteristics that are correlated with higher bicycling activity levels, such as high population or employment densities or high concentrations of certain sub-populations, such as transit commuters or zero-vehicle households.

Appendix A-4 shows population density in Torrance. There are areas of high population density along the northern boundary of the city. There is also a pocket of high density in the interior of the city. Population density, measured as the number of persons per acre, is a strong indicator of potential bicycle activity, because more people living in an area implies more trips to and from that area. The high population densities of urbanized environments also tend to support bicycle travel through mixed land uses, interconnected street networks, and shorter trip lengths.

Appendix A-5 displays employment density in Torrance. Employment density in Torrance is highest along Hawthorne Boulevard, Lomita Boulevard, Western Avenue, and Pacific Coast Highway. Hawthorne Boulevard consists primarily of commercial and service, and general office land uses. Between Lomita Boulevard and Pacific Coast Highway there are mostly industrial uses. Western Avenue is concentrated with commercial and service, industrial, and general office uses. These sites have the potential to generate bicycle activity, as they are located in environments with a variety of land uses where trips between uses can be shorter.

Appendix A-6, **Appendix A-7** and **Appendix A-8** display the percent of zero-vehicle households, median annual income, and percent transit commuters by census tract. The highest median annual household incomes are $75,001-$95,000 (in 1999 dollars) and are located in the western portion of Torrance along the border with Redondo Beach. Vehicle ownership is mixed throughout the city, as is percentage of transit commuters. These parts of the city have greater potential for increased bicycling activity because residents who do not have vehicles must use alternative modes and are likely to combine bicycle and transit trips.



CITY OF TORRANCE GENERAL PLAN

Figure 9-1: City of Torrance General Plan Land Use Policy

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Torrance (2009)

In addition to the reasons discussed above, Torrance has the potential for increased bicycle activity from bicyclists passing through on their way to destinations outside of the city. A bicycle network that is connected within Torrance, as well as linked to bicycle facilities in adjacent communities, further generates bicycle traffic as it provides a viable transportation option to driving a motorized vehicle.

9.2.3 Relevant Plans and Policies

Table 9-1 outlines information regarding bicycles from the City of Torrance's Circulation and Infrastructure Element, Bicycle Master Plan, and Municipal Code.

Table 9-1: Torrance Bicycle-Related Plans and Policies

Document	Description
General Plan Circulation and Infrastructure Element (2009)	The following goals and policies related to bicycling are included in the Circulation and Infrastructure Element: • Maintain a comprehensive system of bicycle routes that provide viable options to travel by automobile • Provide and maintain a comprehensive system of bicycle lanes to meet the needs of cyclists traveling to all destinations within the City consistent with the Bicycle Master Plan • Promote the provision of secure bicycle storage and shower and locker facilities at major commercial developments and employment centers • Encourage cyclists to use routes that allow for safe cycling • Promote bicycle safety through educational programs designed for bicyclists and drivers • Seek county, state, federal, and private sector assistance to help finance development of bicycle facilities
Bicycle Master Plan (2009)	This document consists of a map (**Appendix F-7**) that displays existing Class II and Class III bicycle facilities, proposed facilities, and existing bike parking locations. There are proposed facilities at 17 locations.
Municipal Code	Bicycle parking requirements in Torrance's Municipal Code are based on square footage as part of Transportation Demand Management ordinance. Developments of a certain size are required to provide bicycle facility information on a bulletin board or in a display case or kiosk. Detailed bicycle parking information is presented in **Appendix G**. The City of Torrance requires bicyclists to obtain a bicycle license and to place a license plate on the bicycle. The City has a Bicycle Transportation Fund that is used for bicycle routes and other projects to the benefit of the bicyclist. The City also prohibits riding bicycles on sidewalks in business districts and adjacent to public school buildings, churches, recreation centers, and playgrounds.

9.2.4 Existing Bicycle Network

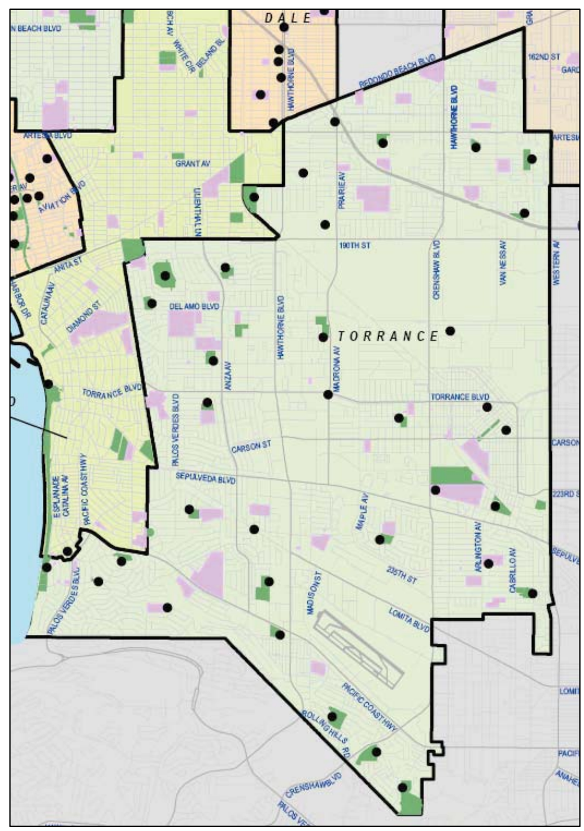
Figure 9-2 shows the existing bicycle facilities in Torrance. **Appendix A-2** displays a map of the existing bicycle facilities in the South Bay Region. Bicycle facility types are discussed in **Section 1.3**. The City of Torrance has a bicycle network of approximately 30 miles of bicycle facilities. Approximately 50 percent of the network consists of Class II bike lanes and the remaining miles are Class III bike paths. **Table 9-2** summarizes the classification and mileage of the existing network.

Table 9-2: Torrance Bicycle Network

Facility Type	Mileage
Class I (Bike Path)	0.0
Class II (Bike Lanes)	14.3
Class III (Bike Route)	15.0
Total Mileage	**29.7**

9.2.5 Existing End-of-trip Parking Facilities

The BTA requires that this plan inventory publicly-accessible short-term and long-term end-of-trip bicycle facilities for the members of the bicycling public to park their bicycles, as well as change and store clothes and equipment. Short-term facilities consist of bicycle racks. Long-term facilities include, but are not limited to, locker, restroom, and shower facilities near bicycle parking facilities. **Appendix A-9** displays existing end-of-trip bicycle facilities in the South Bay. Existing bicycle racks in Torrance are shown at right. These locations include public parks and libraries. Torrance does not currently have any existing long-term end-of-trip bicycle facilities.



Existing End-of-trip Facilities in Torrance

(See Appendix A-9 for larger map)

Existing Bike Racks
Existing Bike Lockers

9.2.6 Multi-Modal Connections

Transit is often best for longer trips, while bicycling is better for shorter trips. Combining transit use and bicycling can offer a high level of mobility that is comparable to travel by automobile. **Appendix A-10** shows the existing Los Angeles Metropolitan Transit Authority (Metro) transit routes that serve the City of Torrance. Metro operates bus lines with routes several east-west routes through the north and south portions of the City and one north-south route through the center. The middle of Torrance is relatively underserved by Metro. Buses are equipped with bicycle racks, which are available on a first-come, first-served basis.

LADOT operates the Commuter Express bus service. Line 438 connects the cities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance to Downtown Los Angeles.

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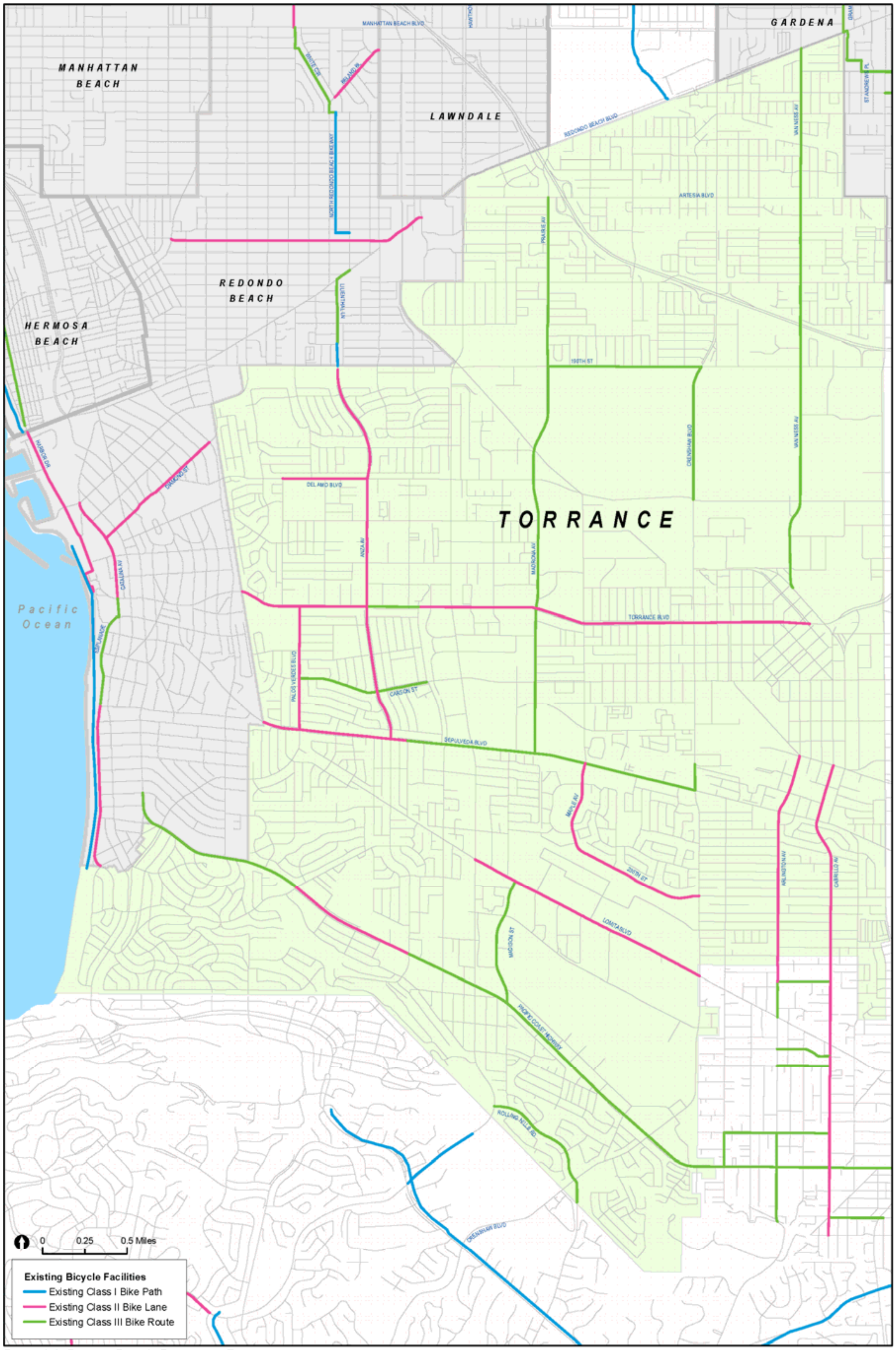

Figure 9-2: Existing Bicycle Facilities in Torrance

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

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Line 448 connects Torrance east to Wilmington and north to Downtown Los Angeles. Most Commuter Express buses are equipped with bicycle racks, which are available on a first-come, first-served basis. The Commuter Express line 438 and 448 bus routes are shown in **Appendix A-11** and **Appendix A-21**.

Beach Cities Transit (BCT) Line 104, operated by the City of Redondo Beach, also serves the City of Torrance. **Appendix A-13** shows the BCT System Map. BCT buses are equipped with bike racks, which are available on a first-come, first-served basis.

The City of Torrance operates Torrance Transit, which consists of eight bus lines that also serve the cities of El Segundo, Gardena, Hermosa Beach, Manhattan Beach, and Redondo Beach. **Appendix A-14** shows the Torrance Transit system map. All Torrance Transit buses are equipped with bike racks, which are available on a first-come, first-served basis.

The BTA requires that this plan inventory existing bicycle transport and parking facilities for connecting to public transit services. These facilities include, but are not limited to, bicycle parking at transit stops, rail and transit terminals, and park and ride lots; and provisions for transporting bicycles on public transit vehicles. Torrance does not currently provide any intermodal facilities within its jurisdiction, however a new transit station is proposed on Crenshaw Blvd at approximately 208th Street. Proposed end-of-trip bicycle facilities at this location are presented in section 9.4.2.

9.2.7 Education and Enforcement Strategies

Bicycle education programs and enforcement of bicycle-related policies help to make riding safer for all bicyclists. To promote safe bicycling, the City of Torrance celebrates national "Bike to Work Day" and "Bike to Work Week" to encourage its employees and residents to ride their bicycles. The Torrance Police Department has conducted bicycle rodeos in the past and offers bicycle patrol for special events. Also, the Torrance Police Department enforces all bicycle-related regulations from the California Vehicle Code and the City's Municipal Code.

Torrance does not currently provide any intermodal facilities within its jurisdiction, however a new transit station is proposed on Crenshaw Blvd at approximately 208th Street (see Appendix A10 for larger map).

9.2.8 Past Bicycle-Related Expenditures

Between 2000 and 2010, the City of Torrance incurred the following bicycle-related expenditures:

- Approximately $50,000 for miscellaneous bicycle-related items

9.3 Needs Analysis

This section describes the needs of bicyclists in Torrance. It first summarizes feedback collected from the online survey and public workshops. The section also provides estimates and forecasts of bicycle commuting to determine the estimated bicycling demand in the city. It finally analyzes bicycle collision data between 2007 and 2009 to identify areas that would benefit from bicycle facility improvements.

9.3.1 Public Outreach

As mentioned in Chapter 1, the public had the opportunity to provide input in the planning process through an online survey and the first round of public workshops. This section summarizes locations in Torrance that the community identified as desirable for bikeways and bicycle parking facilities.

Generally, the public noted that it would like to see bicycle facilities on major arterials, such as Hawthorne Boulevard and Prairie Avenue. The community also said that it would like to connect existing bicycle facilities, such as by closing the gap on Torrance Boulevard and installing bicycle facilities on Van Ness Avenue to connect with Cabrillo Avenue.

The public identified locations that would benefit from additional bicycle parking. These include around El Camino College, on Del Amo Circle near the Fashion Center, and at the Farmer's Market.

The highest percentage of bicycle commuters is located in the southeastern portion of Torrance.

9.3.2 Bicycle Commuter Estimates and Forecasts

United States Census "Commuting to Work" data provides an indication of current bicycle system usage. **Appendix A-15** shows the percent bicycle commuters in Torrance by census tract. The highest percentage of bicycle commuters is located in the southeastern portion of the city.

Table 9-3 presents commute to work data estimates reported by the 2000 US Census for Torrance. For comparative purposes, the table includes commute to work data for the United States, California, and County of Los Angeles. According to the estimates, 0.44 percent of residents in Torrance commute predominantly by bicycle. This is lower than the percentage of bicycle commuters in California and in Los Angeles County, and it is higher than the U.S. as a whole. It is important to note that this figure likely underestimates the true amount of bicycling that occurs in Torrance for several reasons. First, data reflects respondents' dominant commute mode and therefore does not capture trips to school, for errands, or other bike trips that would supplant vehicular trips. Also, US Census data collection methods only enable a respondent to select one mode of travel, thus excluding bicycle trips if they constitute part of a longer multimodal trip. The percentage of commuters in Torrance that commute by transit is much lower than that of those that drive alone. Torrance also has a low percentage of carpooling and walking.

In addition to bicycle commuters in Torrance, bicyclists from neighboring communities use the city's bicycle network to reach their destinations and are not reflected in this data. This Plan addresses the need for regional connectivity to accommodate bicyclists passing through Torrance's bicycle network in **Section 9.4**.

Table 9-3: Means of Transportation to Work

Mode	United States	California	Los Angeles County	Torrance
Bicycle	0.38%	0.83%	0.62%	0.44%
Drove Alone – car, truck, or van	75.70%	71.82%	70.36%	82.92%
Carpool – car, truck, or van	12.19%	14.55%	15.08%	9.80%
Transit	4.73%	5.07%	6.58%	1.25%
Walked	2.93%	2.85%	2.93%	1.33%
Other Means	0.70%	0.79%	0.76%	0.44%
Worked at Home	3.26%	3.83%	3.49%	3.48%

Source: US Census 2000

Table 9-4 presents an estimate of current bicycling within Torrance using US Census data along with several adjustments for likely bicycle commuter underestimations, as discussed above. **Table 9-5** presents the associated air quality benefits from bicycling.

Table 9-4: Existing Bicycling Demand

Variable	Figure	Source
Existing study area population	137,933	2000 US Census, P1
Existing employed population	66,569	2000 US Census, P30
Existing bike-to-work mode share	0.4%	2000 US Census, P30
Existing number of bike-to-work commuters	293	Employed persons multiplied by bike-to-work mode share
Existing work-at-home mode share	3.5%	2000 US Census, P30
Existing number of work-at-home bike commuters	232	Assumes 10% of population working at home makes at least one daily bicycle trip
Existing transit-to-work mode share	1.3%	2000 US Census, P30
Existing transit bicycle commuters	208	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Existing school children, ages 6-14 (grades K-8)	12,480	2000 US Census, P8
Existing school children bicycling mode share	2.0%	National Safe Routes to School surveys, 2003.
Existing school children bike commuters	250	School children population multiplied by school children bike mode share
Existing number of college students in study area	11,314	2000 US Census, PCT24
Existing estimated college bicycling mode share	5.0%	Review of bicycle commute share in seven university communities (source: National Bicycling & Walking Study, FHWA, Case Study No. 1, 1995), review of bicycle commute mode share at the University of California, Los Angeles
Existing college bike commuters	566	College student population multiplied by college student bicycling mode share
Existing total number of bike commuters	1,548	Total bike-to-work, school, college and utilitarian bike trips. Does not include recreation.
Total daily bicycling trips	3,096	Total bicycle commuters x 2 (for round trips)

Table 9-5: Existing Bicycling Air Quality Impact

Variable	Figure	Source
Current Estimated VMT Reductions		
Reduced Vehicle Trips per Weekday	928	Assumes 73% of bicycle trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	242,255	Reduced weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	6,499	Assumes average round trip travel length of 5 miles for adults/college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	1,696,351	Reduced weekday vehicle miles x 261 (weekdays / year)
Current Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	19	Daily mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/wkday)	14	Daily mileage reduction x 0.95 grams / mi
Reduced CO (lbs/wkday)	178	Daily mileage reduction x 12.4 grams / mi
Reduced C02 (lbs/wkday)	5,287	Daily mileage reduction x 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	5,086	Yearly mileage reduction x 1.36 grams / mi
Reduced PM10 (lbs/yr)	19	Yearly mileage reduction x 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	18	Yearly mileage reduction x 0.0049 grams / mi
Reduced NOX (lbs/yr)	3,553	Yearly mileage reduction x 0.95 grams / mi
Reduced CO (lbs/yr)	46,374	Yearly mileage reduction x 12.4 grams / mi
Reduced $C0_2$ (lbs/yr)	1,379,991	Yearly mileage reduction x 369 grams / mi

Source:
Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks.* 2005.

Table 9-6 presents projected year 2030 bicycling activity within Torrance using California Department of Finance population and school enrollment projections. The projection contains the assumption that bicycle mode share will double by 2030, due in part to bicycle network implementation. Actual bicycle mode share in 2030 will depend on many factors, including the extent of network implementation. **Table 9-7** presents the associated year

2030 air quality benefit forecasts. The calculations follow in a straightforward manner from the Projected Year 2030 Bicycling Demand.

Table 9-6: Projected Year 2030 Bicycling Demand

Variable	Figure	Source
Future study area population	171,647	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050.*
Future employed population	82,840	Calculated based on CA Dept. of Finance, *Population Projections for California and Its Counties 2000-2050*,
Future bike-to-work mode share	0.9%	Double the rate from 2000 US Census, P30
Future number of bike-to-work commuters	729	Employed persons multiplied by bike-to-work mode share
Future work-at-home mode share	5.41%	Calculated based on change in mode share from 1990 US Census, P49, to 2000 US Census, P30
Future number of work-at-home bike commuters	448	Assumes 10% of population working at home makes at least one daily bicycle trip
Future transit-to-work mode share	2.5%	Double the rate from 2000 US Census, P30
Future transit bicycle commuters	518	Employed persons multiplied by transit mode share. Assumes 25% of transit riders access transit by bicycle
Future school children, ages 6-14 (grades K-8)	9,917	Calculated from CA Dept. of Finance, *California Public K–12 Graded Enrollment and High School Graduate Projections by County, 2010 Series.*
Future school children bicycling mode share	4.0%	Double the rate of national school commute trends. National Safe Routes to School surveys, 2003.
Future school children bike commuters	397	School children population multiplied by school children bicycling mode share
Future number of college students in study area	14,079	Calculated based on CA Dept. of Finance, Population Projections for California and Its Counties 2000-2050, Sacramento, California, July 2007.
Future estimated college bicycling mode share	7.0%	A slight increase over the existing college bicycle mode share assumption, commensurate with projected increases in bicycling for other populations
Future college bike commuters	986	College student population x college student bicycling mode share
Future total number of bike commuters	3,077	Total bike-to-work, school, college and utilitarian biking trips. Does not include recreation.
Total daily bicycling trips	6,154	Total bike commuters x 2 (for round trips)

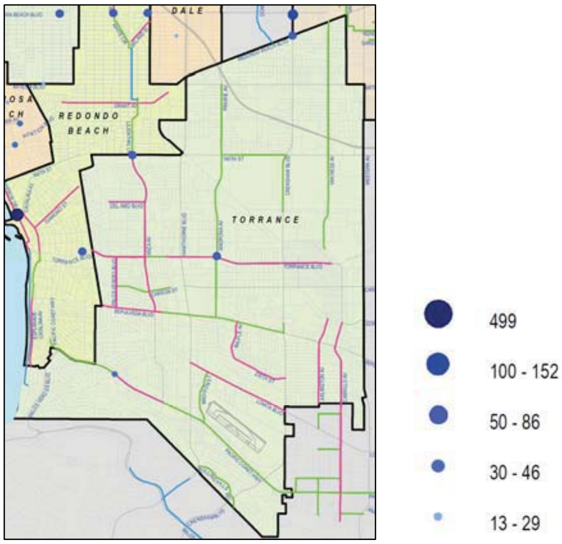
Table 9-7: Projected Year 2030 Bicycling Air Quality Impact

Variable	Figure	Source
Forecasted VMT Reductions		
Reduced Vehicle Trips per Weekday	1,789	Assumes 73% of biking trips replace vehicle trips for adults/college students and 53% for school children
Reduced Vehicle Trips per Year	466,911	Reduced number of weekday vehicle trips x 261 (weekdays / year)
Reduced Vehicle Miles per Weekday	12,840	Assumes average round trip travel length of 8 miles for adults / college students and 1 mile for schoolchildren
Reduced Vehicle Miles per Year	3,351,184	Reduced number of weekday vehicle miles x 261 (weekdays / year)
Forecasted Air Quality Benefits		
Reduced Hydrocarbons (lbs/wkday)	38	Daily mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/wkday)	0	Daily mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/wkday)	0	Daily mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/wkday)	27	Daily mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/wkday)	351	Daily mileage reduction x by 12.4 grams / mi
Reduced $C0_2$ (lbs/wkday)	10,445	Daily mileage reduction x by 369 grams / mi
Reduced Hydrocarbons (lbs/yr)	10,048	Yearly mileage reduction x by 1.36 grams / mi
Reduced PM10 (lbs/yr)	38	Yearly mileage reduction x by 0.0052 grams / mi
Reduced PM2.5 (lbs/yr)	36	Yearly mileage reduction x by 0.0049 grams / mi
Reduced NOX (lbs/yr)	7,019	Yearly mileage reduction x by 0.95 grams / mi
Reduced CO (lbs/yr)	91,612	Yearly mileage reduction x by 12.4 grams / mi
Reduced CO_2 (lbs/yr)	2,726,208	Yearly mileage reduction x by 369 grams / mi

Source:

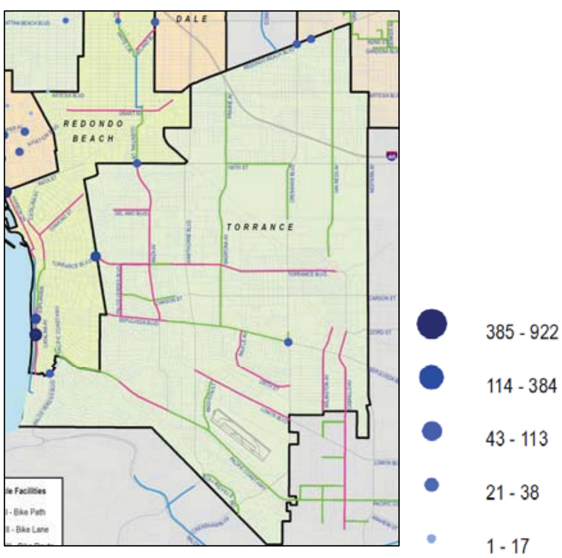
Emissions rates from **EPA report 420-F-05-022** *Emission Facts: Average Annual Emissions and Fuel Consumption for Gasoline-Fueled Passenger Cars and Light Trucks. 2005.*

This model uses the latest state projections for population growth and reasonable assumptions about future bicycle ridership. The benefits model predicts that the total number of bicycle commute trips could increase from the current daily estimate of about 3,000 to over 6,000, resulting in a substantial reduction of both Vehicle Miles Traveled (VMT) and associated emissions. This includes a yearly emissions reduction by 2030 of approximately 7,000 pounds



Weekday Bicycle Count Results in Torrance

(See Appendix A-16 for a larger map and Appendix H for a list of count locations.)



Weekend Bicycle Count Results in Torrance

(See Appendix A-17 for a larger map and Appendix H for a list of count locations.)

of smog forming N0X and roughly 2.7 million pounds of $C0_2$, the principal gas associated with global climate change. Providing bicycle facilities will encourage new bicyclists to begin to ride, thus positively impacting air quality by reducing harmful pollutants from driving motorized vehicles. Because this plan recommends local connections throughout and regional links between the participating cities, it has the potential to have even greater air quality benefits. Bicyclists may not need to rely as heavily on vehicles for transportation because bicycling will be a viable transportation alternative upon implementation of this Plan.

9.3.3 Bicycle Counts

To assess bicycling levels at different sites throughout Torrance, volunteers conducted bicycle counts, in which they manually recorded the number of bicyclists that rode by.

9.3.3.1 Methodology

The methodology for the bicycle counts derives from the National Bicycle and Pedestrian Documentation Project (NBPD), a collaborative effort of Alta Planning + Design and the Institute of Transportation Engineers. The NBPD methodology aims to capture both utilitarian bicycling and recreational bicycling. The NBPD also provides guidance on how to select count locations.

Volunteers conducted bicycle counts in each of the seven participating cities in the South Bay on Thursday, November 4, 2010 from 3:00 p.m. to 6:00 p.m. and Saturday, November 6, 2010 from 10:30 a.m. to 1:30 p.m. These dates are meant to capture volumes of bicyclists on a typical weekday and weekend day. Fall is an appropriate time to conduct bicycle counts in California because school is back in session and vacations are typically over. In Torrance, volunteers were stationed at three stations on Thursday and three stations on Saturday. There were 36 total locations in the South Bay region on each day.

The count locations were selected in partnership by city staff, Alta Planning + Design, Los Angeles County Bicycle Coalition staff, and South Bay Bicycle Coalition board members. This snapshot of locations is meant to capture a diverse bicycling population using the roads and streets that span the spectrum of bike-friendliness.

9.3.3.2 Results

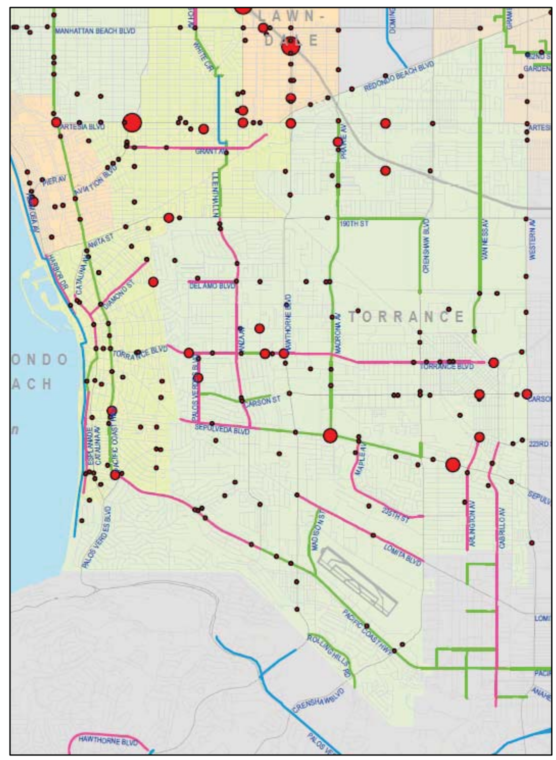
The count results for the South Bay are displayed in **Appendix A-16** and **Appendix A-17**. Count results for Torrance are shown at left. Detailed count data, including a list of count locations, is presented in **Appendix H**. On Thursday, the Torrance station that experienced the highest volume was 190th Street and Anza Avenue with 60 bicyclists during the three hour count period. The station with the most bicyclists on Saturday was Palos Verdes Boulevard and Catalina Avenue with 82 bicyclists during the three hour count period.

On both days, the locations with the highest numbers of bicyclists in the South Bay region as a whole were those along the Strand on the County-maintained Marvin Braude Bikeway. Apart from the Strand stations, the inland count locations in Lawndale and Gardena experienced the most riders during the week. On the weekend, there were overall fewer riders in the inland count stations and more riders along the coast. This suggests that more bicyclists ride a bicycle for commuting during the week and for recreation on the weekend.

In the region as a whole, about 83 percent of bicyclists were male. Approximately 70 percent of those observed did not wear helmets and 41 percent rode on the sidewalks. On Thursday, there were 18 locations at which over half of the observed bicyclists rode on the sidewalk and on Saturday there were nine. Riding on the sidewalk can be an indicator of a lack of bicycle facilities, as bicyclists that are uncomfortable riding with traffic may choose to ride on the sidewalk instead.

9.3.4 Bicycle Collision Data

Safety is a major concern for both existing and potential bicyclists. Concern about safety is the most common reason given for not riding a bicycle (or riding more often), according to national surveys. Identifying bicycle collision sites can draw attention to areas that warrant improvement, particularly if multiple collisions occur at the same location. This analysis employs the most reliable data source available, the California Highway Patrol's Statewide Integrated Traffic Records System. The data set only includes reported collisions, and so represents a subset of all the bicycle collisions in Torrance. This data does not include any assessment of conditions present at the time of the collision. There are numerous factors that may contribute to a given incident including but not limited to time of day, visibility, distractions, obstacles or traffic law obedience. This data simply reflects reported incidents, resulting injuries and the party at fault. This data does not infer faulty infrastructure, but rather provides a baseline of collisions



Bicycle Collisions in Torrance 2007-2009

(See Appendix A-18 for larger map)

that often decreases in correlation with bike plan implementation and the improvements to facilities and road user behavior and awareness that accompanies it. Fault as determined by law enforcement is discussed below.

Table 9-8 presents the number of reported collisions involving bicyclists, number of bicyclists involved, and severity of the bicycle collisions for three consecutive years: 2007, 2008, and 2009. **Appendix A-18** shows locations of bicycle collisions in the South Bay region in the same time period. Bicycle collisions in Torrance are shown on the preceding page. There were 131 total reported collisions involving bicyclists from 2007-2009 in the City of Torrance. Collisions in Torrance occurred throughout the city, many of which were concentrated on major arterials: 16 collisions occurred on Torrance Boulevard, 11 occurred on Sepulveda Boulevard, eight occurred on Pacific Coast Highway, and 11 occurred on Hawthorne Boulevard.

Table 9-8: Bicycle Collision Data 2007-2009

Total Crashes Involving Bicyclists	Number of Bicyclists Involved	Persons Injured	Persons Severely Injured	Persons Killed
131	133	132	4	1

Source: California Highway Patrol, Statewide Integrated Traffic Records System (SWITRS)

As reported by police officers in traffic reports, bicyclists were at fault in 66 percent of collisions involving bicycles (64 crashes) in this time period.

Providing bicycle facilities encourages more people to ride. When motorists begin to look for and expect to see bicyclists, collisions between vehicles and bicyclists are reduced. The City of New York, for example, reported that as ridership increased between 1998 and 2008, the number of annual casualties from bicycle collisions decreased (see **Appendix B**).

Appendix A-1 displays estimated weekday traffic volumes in Torrance. There are major arterials that carry high volumes of automobiles throughout the entire city. Torrance Boulevard, Sepulveda Boulevard, and Pacific Coast Highway, the locations with the highest numbers of collisions, all have heavy vehicular traffic, which can create potential conflicts between bicycles and vehicles. Pacific Coast Highway has high employment densities, and Hawthorne Boulevard has both high employment and population densities, both of which generate high numbers of trips.

This contributes to the vehicle-bicycle conflicts, as well. Installing bicycle facilities, especially on major arterials, could reduce the number and severity of collisions involving bicyclists.

9.4 Proposed Bicycle Network

This section presents the proposed bicycle network for the City of Torrance, which includes bicycle parking facilities. Upon implementation of the proposed network, the City should coordinate and collaborate with adjacent participating South Bay cities to emphasize a regional bicycle network. Bicycle facilities discussed in this Plan are described in **Section 1.3** and are shown in **Figure 1-3** and **Figure 1-4**. **Appendix C** outlines the recommended standards for each facility classification as compared to minimum standards. In addition to creating a comprehensive network of bikeways in Torrance, the recommended system ties into the proposed bicycle facilities for the other South Bay participating cities to create a connected regional network. This will give bicyclists from adjacent communities the opportunity to pass through Torrance to reach their destinations without losing bicycle facilities at city boundaries.

9.4.1 Proposed Bikeway Facilities

The proposed bicycle network in the City of Torrance consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets, and is shown in **Figure 9-3.** The proposed bicycle network in Torrance connects with the recommended networks in Redondo Beach, Lawndale, and Gardena. **Figure 9-3** shows a blue asterisk on the proposed bicycle path along the Metro Green Line extension as it is outside the jurisdiction of the Plan, but is a supported improvement. The proposed South Bay bicycle network as a whole is presented in **Appendix A-19**.

Four tables identify the streets on which facilities are proposed, the extents of each proposed facility, and the length in miles of each proposed facility. **Table 9-9** lists the proposed bicycle paths, **Table 9-10** lists the proposed bicycle lanes, **Table 9-11** lists the proposed bicycle routes, and **Table 9-12** lists the proposed bicycle-friendly streets.

The proposed bicycle network in the City of Torrance consists of Class I Bike Paths, Class II Bike Lanes, Class III Bike Routes, and Bike Friendly Streets.

Table 9-9: Proposed Class I Bicycle Paths in Torrance

Street	From	To	Miles
Madrona Ave Extension	Sepulveda Blvd	229th Pl	0.5
Total Bicycle Path Mileage			**0.5**

Table 9-10: Proposed Class II Bicycle Lanes in Torrance

Street	From	To	Miles
220th St	Cabrillo Ave	Western Ave	0.2
Prairie Ave - Madrona Ave	Redondo Beach Blvd	Sepulveda Blvd	3.6
Torrance Blvd	Anza Ave	Earl St	0.3
Sepulveda Blvd	Existing Bike Lanes (east of Anza Ave)	Western Ave	3.0
Lomita Blvd	Anza Ave	Hawthorne Blvd	0.6
Van Ness Ave - Cabrillo Ave	190th St	Ferrocarril Ave	2.5
Ferrocarril Ave	Arlington Ave	Western Ave	0.5
190th St	Blossom Ln	Western Ave	3.8
Del Amo Blvd	West City Limits	Henrietta St	0.2
Del Amo Blvd	Anza Ave	Maple Ave	1.3
Skypark Dr	Madison St	Crenshaw Blvd	1.3
Western Ave	Artesia Blvd	South City Limits	4.4
Redondo Beach Blvd	Hawthorne Blvd	East City Limits	2.4
Artesia Blvd	Hawthorne Blvd	Western Ave	2.5
Calle Mayor	Riviera Way	Anza Ave	1.0
Beryl St	Flagler Ln	190th St	0.4
Total Bicycle Lane Mileage			**28.0**

Table 9-11: Proposed Class III Bicycle Routes in Torrance

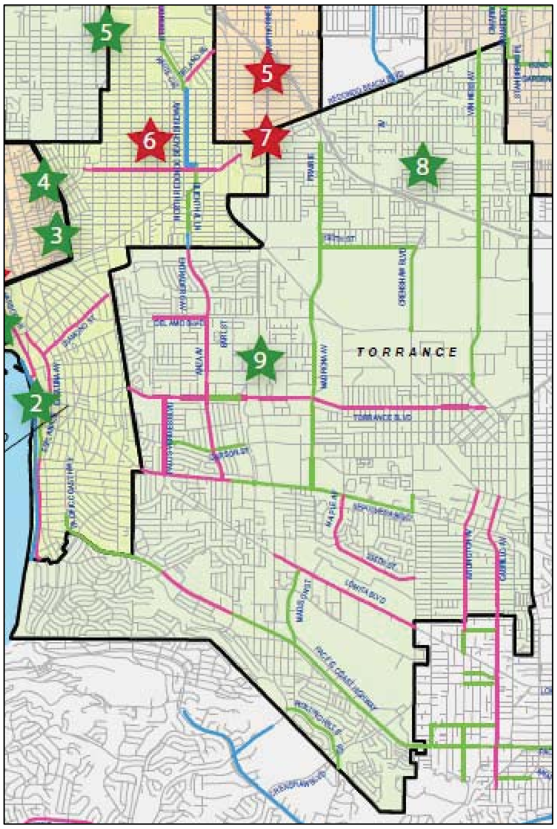
Street	From	To	Miles
Columbia St - Alaska Ave - Maricopa St	Maple Ave	Elm Ave	0.7
Sartori Ave	Torrance Blvd	Cabrillo Ave	0.2
Henrietta St	Del Amo Blvd	Torrance Blvd	0.8
Maple Ave	Del Amo Blvd	Sepulveda Blvd	1.6
Plaza del Amo (west)	Madrona Ave	Crenshaw Blvd	1.0
Del Amo Blvd	Crenshaw Blvd	Western Ave	1.1
Plaza del Amo (east)	Madrid Ave	Arlington Ave	0.6
Anza Ave	Sepulveda Blvd	Newton St	1.5
Cravens Ave	Arlington Ave	Cabrillo Ave	0.5

Street	From	To	Miles
Palos Verdes Blvd	Sepulveda Blvd	West City Limits	0.5
235th St	Crenshaw Blvd	Western Ave	1.1
238th St	Arlington Ave	East City Limits	0.7
Palos Verdes Blvd	South City Limits	Pacific Coast Highway	1.1
W 164th St	Redondo Beach Blvd	East City Limits	1.0
182nd St	West City Limits	Western Ave	2.9
Calle Mayor	Palos Verdes Blvd	Riviera Way	0.9
Torrance Blvd	Sartori Ave	Van Ness Ave	0.1
Total Bicycle Route Mileage			**16.2**

Table 9-12: Proposed Bicycle-Friendly Streets in Torrance

Street	From	To	Miles
Elm Ave	Maricopa St	Torrance Blvd	0.2
Dominguez St	Madrid Ave	Torrance Blvd	0.8
Falda Ave - 182nd Pl	182nd St	190th St	0.6
220th St	Martina Ave	Cabrillo Ave	0.3
Earl St - Torrance Blvd	Del Amo Blvd	Ocean Ave	0.8
239th St	Crenshaw Blvd	Arlington Ave	0.5
Ocean Ave	Torrance Blvd	Newton St	2.5
Arlington Ave	Dominguez St	Plaza Del Amo East	1.0
Newton St	Calle Mayor	Pacific Coast Highway	2.3
162nd St	Van Ness Ave	East City Limits	0.3
Entradero Ave	190th St	Del Amo Blvd	0.7
Madrid Ave	Dominguez St	Plaza Del Amo East	0.7
Yukon Ave	Redondo Beach Blvd	190th St	1.5
Firmona Ave - Tallisman	190th St	Del Amo Blvd	0.7
Camino del Campo	Palos Verdes Blvd	Vista del Parque	0.4
Pennsylvania Ave	Sepulveda Blvd	South City Limits	0.9
Via Pasqual - Cll de Arboles - Pso de las Tortugas - Vista Montana	Via Monte D Oro	Newton St	1.6
Via Monte D Oro	Camino del Campo	South City Limits	0.9
171st St	Prairie Ave	Gramercy Pl	1.8
Total Bicycle-Friendly Streets			**18.3**

There are opportunities and constraints to recommending new bicycle facilities in Torrance. These are shown on the following page and are referenced by the numbers in **Appendix I**. **Appendix I**



Opportunities and Constraints in Torrance

(See Appendix I for larger map)

also presents opportunities and constraints in the South Bay region as a whole. While it is not feasible to propose bicycle lanes on Crenshaw Boulevard and Hawthorne Boulevard at the time of this Plan, there may be opportunity in the future if the streets undergo reconstruction or other changes that would provide adequate space. There may also be opportunity to propose parallel facilities as Crenshaw Boulevard and Hawthorne Boulevard are important regional connections.

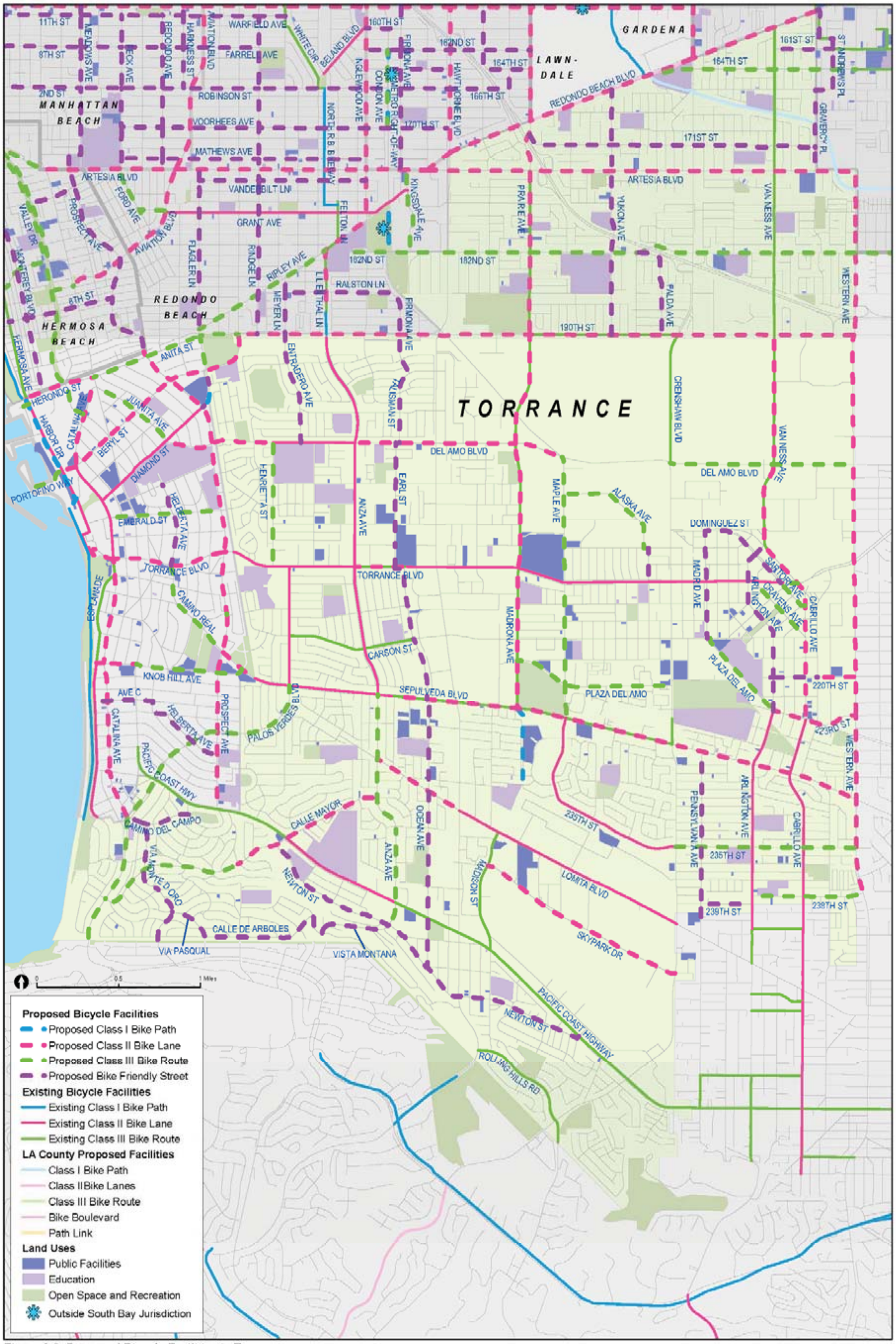


Figure 9-3: Proposed Bicycle Facilities in Torrance

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

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9.4.2 Proposed End-of-Trip Bicycle Facilities

Support facilities and connections to other modes of transportation are essential components of a bicycle system because they enhance safety and convenience for bicyclists at the end of every trip. With nearly all utilitarian and many recreational bike trips, bicyclists need secure and well-located bicycle parking. A comprehensive bicycle parking strategy is one of the most important things that a jurisdiction can apply to immediately enhance the bicycling environment. Moreover, a bicycle parking strategy with connections to public transit will further the geographical range of residents traveling without using an automobile.

The Torrance Municipal Code currently provides bicycle parking requirements for non-residential developments. The City should consider amending its Municipal Code to include bicycle parking requirements at new and retrofitted multi-family residential, commercial, office, and mixed-use developments of all sizes. The Municipal Code should also require bicycle parking quantities based on square footage of developments or by number of employees/residents to adequately address the bicycle demand at each development.

Though the City complies with its existing Transportation Demand Management ordinance, Torrance may consider amending its Municipal Code to include requirements on types of both short- and long-term bicycle parking facility designs, which are shown in **Appendix J**. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles
- Lockable bicycle rooms with permanently anchored racks or
- Lockable, permanently anchored bicycle lockers

Bicycle rack designs should include racks that provide two two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel.

When people commute by bicycle they often sweat or become dirty from weather or road conditions. Providing changing and storing facilities encourages commuters to travel by bicycle because they have a place to clean up before work or school. Torrance should require all new mid-to-large employers, offices, and businesses to supply changing and storing facilities, such as by providing showers and clothes lockers within the buildings or arranging agreements with nearby recreation centers to allow commuters to use their facilities.

Proposed end-of-trip bicycle facilities in Torrance are shown in **Figure 9-4**. The City should continue to provide short-term bicycle parking in the form of bicycle racks at all major trip attractors, including commercial and civic activity centers and transit hubs, and ensure that an adequate supply is available. The following locations are examples of sites at which the City could install additional bicycle parking as appropriate:

- Parks
- Schools
- Commercial/office areas
- Civic/government buildings
- Public transit stations

The proposed transit station on Crenshaw Blvd at approximately 208th Street, as well as any future transit hubs and intermodal facilities, should include secure bicycle parking areas as part of their design, like a BikeStation.

High-activity locations such as transit stations and major commercial districts should provide more secure, long-term bicycle parking options, such as bicycle lockers. The proposed transit station on Crenshaw Blvd at approximately 208th Street, as well as any future transit hubs and intermodal facilities, should include secure bicycle parking areas as part of their design. Secure bicycle parking areas that provide services, such as bicycle rentals and repair, should be considered at major transit stations and commuter destinations.

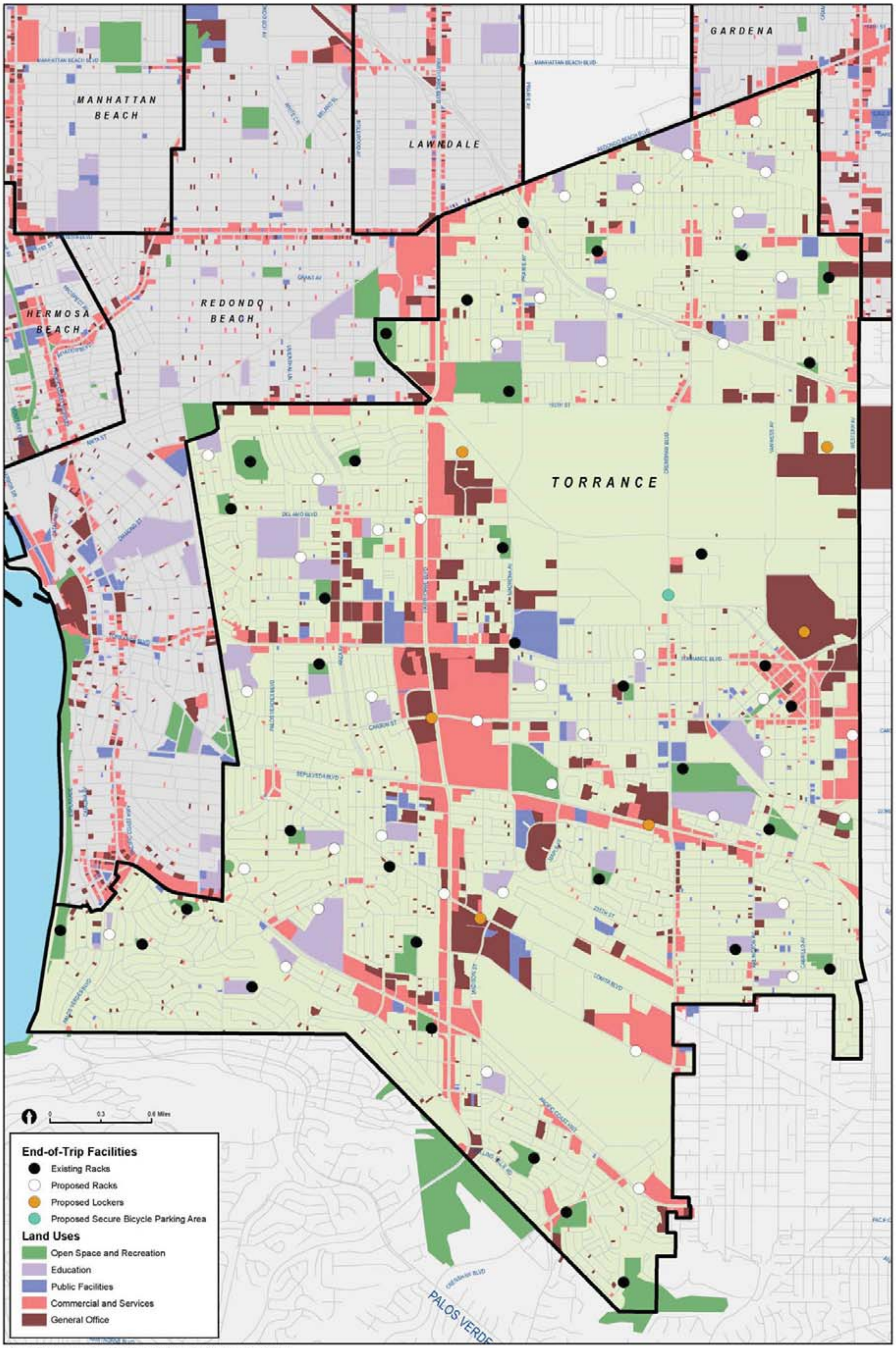

Figure 9-4: Torrance Proposed End-of-Trip Facilities

South Bay Bicycle Master Plan

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9.5 Project Costs

This section presents the cost to implement the proposed bicycle network in Torrance.

9.5.1 Cost Estimates

Table 9-13 displays the planning-level capital cost assumptions for each facility type proposed in this plan, and **Table 9-14** displays the cost to implement the proposed network in the City of Torrance from the cost assumptions.[25] Cost assumptions are based on LA County averages and may vary depending on environmental conditions of a given facility, unforeseen construction cost variations, and similar considerations. Cost assumptions exclude specific treatments that may vary by location and must be determined by field review, such as traffic calming measures, restriping of existing travel lanes, and sign removal. Cost assumptions do not include traffic signal improvements, such as changes to phasing, recalibration of loop detectors, or installation of push buttons. For detailed cost estimations, refer to the project sheets presented in **Section 9.7**.

Table 9-13: Unit Cost Estimates for Proposed Bicycle Facility Types

Facility Type	Description	Estimated Cost[26]
Class I Bicycle Path	Paving, striping and signage	$800,000 / mile
Class II Bicycle Lanes (two sides)	Striping, signage, and travel lane restriping	$40,000 / mile
Class III Bicycle Routes (two sides)	Signage	$15,000 / mile
Class III Bicycle Routes (two sides) with sharrows	Pavement markings and signage	$25,000 / mile
Bicycle Friendly Street	Pavement markings, signage, and limited traffic calming	$30,000 / mile

[25] **Table 9-14** assumes the cost of implementing Class III Bicycle Routes with Sharrows based on the policies presented in **Chapter 2**

[26] Cost estimates include physical removals and installations (e.g. of signs and striping), contract contingency costs, preliminary engineering, and construction engineering. The source for the unit costs is the LA County Bicycle Master Plan, which are based upon a peer review of Southern California bikeway construction unit costs.

Table 9-14: Estimated Cost of Proposed Bicycle Network

Facility Type	Unit Cost per mile	Length of Proposed Network (miles)	Cost
Bicycle Path	$800,000	0.5	$ 376,000
Bicycle Lane	$40,000	28.0	$ 1,118,000
Bicycle Route with sharrows	$25,000	16.2	$ 406,000
Bicycle-Friendly Street	$30,000	18.3	$ 549,000
Total		**63.0**	**$ 2,449,000**

9.6 Project Prioritization

A prioritized list of bicycle projects will help guide the City of Torrance in implementing the proposed bicycle facilities presented in this Plan. Each proposed facility discussed in **Section 9.4.1** is grouped into projects based on feasibility of implementation. **Table 9-15** presents the prioritized projects based on the prioritization methodology displayed in **Appendix K**. Each criterion contains information about a facility and its ability to address an existing or future need in Torrance. The projects ranked the highest should be implemented first.

Table 9-15: Torrance Prioritized Bicycle Projects

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Proposed Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BL	Prairie Ave - Madrona Ave	Redondo Beach Blvd	Sepulveda Blvd	3	6	1	4	0	2	2	2	0	2	**22**
BL	Van Ness Ave - Cabrillo Ave	190th St	Ferrocarril Ave	3	6	2	4	0	2	2	2	0	1	**22**
BR	Torrance Blvd	Sartori Ave	Van Ness Ave	3	6		4	0	2	2	2	2	0	**21**
BL	Torrance Blvd	Anza Ave	Earl St	6	6	0	0	0	2	2	1	2	0	**19**
BL	Sepulveda Blvd	Existing Bike Lanes (east of Anza Ave)	Western Ave	3	6	0	2	0	2	2	2	0	2	**19**
BL	Lomita Blvd	Anza Ave	Hawthorne Blvd	3	6	0	4	0	1	0	2	2	1	**19**
BR	Henrietta St	Del Amo Blvd	Torrance Blvd	6	6	0	0	0	1	0	1	2	2	**18**
BR	Maple Ave	Del Amo Blvd	Sepulveda Blvd	3	6	0	2	0	2	1	1	1	2	**18**
BR	Plaza del Amo (west)	Madrona Ave	Crenshaw Blvd	3	6	0	2	0	0	1	2	2	2	**18**
BL	190th St	Blossom Ln	Western Ave	3	6	0	4	0	2	1	2	0	0	**18**
BR	Del Amo Blvd	Crenshaw Blvd	Western Ave	3	6	0	0	0	1	2	2	1	2	**17**
BR	Plaza del Amo (east)	Madrid Ave	Arlington Ave	3	6	0	0	0	2	1	1	2	2	**17**
BR	Anza Ave	Sepulveda Blvd	Newton St	3	6	0	0	0	1	2	2	1	2	**17**
BL	Ferrocarril Ave	Arlington Ave	Western Ave	3	6	0	0	0	2	0	2	2	2	**17**
BL	Beryl St	Flagler Ln	190th St	3	6	0	0	0	1	1	1	2	2	**16**
BFS	Earl St - Torrance Blvd	Del Amo Blvd	Ocean Ave	3	6	0	0	0	2	0	1	2	2	**16**
BFS	Arlington Ave	Dominguez St	Plaza Del Amo East	3	6	1	0	0	1	0	2	1	2	**16**
BL	Del Amo Blvd	West City Limits	Henrietta St	3	6	0	0	0	0	2	1	2	1	**15**
BL	Del Amo Blvd	Anza Ave	Maple Ave	3	6	0	0	0	2	2	1	0	1	**15**
BL	Artesia Blvd	Hawthorne Blvd	Western Ave	0	3	0	4	0	2	2	2	0	2	**15**
BR	Palos Verdes Blvd	Sepulveda Blvd	West City Limits	3	6	0	0	0	0	1	0	2	2	**14**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Proposed Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BR	235th St	Crenshaw Blvd	Western Ave	3	6	0	0	0	0	1	1	1	2	**14**
BR	238th St	Arlington Ave	East City Limits	3	6	0	0	0	0	0	1	2	2	**14**
BL	Skypark Dr	Madison St	Crenshaw Blvd	0	6	0	4	0	0	0	1	1	2	**14**
BFS	239th St	Crenshaw Blvd	Arlington Ave	3	6	0	0	0	0	0	1	2	2	**14**
BFS	162nd St	Van Ness Ave	East City Limits	3	6	0	0	0	0	0	1	2	2	**14**
BFS	Entradero Ave	190th St	Del Amo Blvd	3	6	0	0	0	0	0	1	2	2	**14**
BL	Western Ave	Artesia Blvd	South City Limits	0	3	2	0	0	2	2	2	0	2	**13**
BR - BFS	Columbia St - Alaska Ave - Maricopa St - Elm Ave	Maple Ave	Torrance Blvd	3	6	0	0	0	1	0	0	2	0	**12**
BR	Palos Verdes Blvd	South City Limits	Pacific Coast Highway	0	6	0	0	0	1	1	1	1	2	**12**
BL	Redondo Beach Blvd	Hawthorne Blvd	East City Limits	0	3	0	2	0	2	2	2	0	1	**12**
BL	Calle Mayor	Riviera Way	Anza Ave	0	6	0	0	0	2	0	1	1	2	**12**
BFS	Ocean Ave	Torrance Blvd	Newton St	3	3	0	0	0	2	0	2	0	2	**12**
BFS	Yukon Ave	Redondo Beach Blvd	190th St	0	3	2	0	0	2	0	1	1	2	**11**
BR	Cravens Ave	Arlington Ave	Cabrillo Ave	0	3	0	0	0	0	0	2	2	2	**9**
BR	Plaza del Amo (east)	West City Limits	Western Ave	0	3	1	0	0	0	0	1	2	2	**9**
BFS	Firmona Ave - Tallisman	190th St	Del Amo Blvd	0	3	0	0	0	0	1	1	2	2	**9**
BFS - BR	Dominguez St - Sartori Ave	Madrid Ave	Cabrillo Ave	0	3	0	2	0	1	0	1	1	0	**8**
BFS	Falda Ave - 182nd Pl	182nd St	190th St	0	3	0	0	0	0	0	1	2	2	**8**
BR	182nd St	West City Limits	Western Ave	0	0	0	2	0	1	0	2	1	2	**8**
BR	Calle Mayor	Palos Verdes Blvd	Riviera Way	0	3	0	0	0	0	0	1	2	2	**8**
BFS	Camino del Campo	Palos Verdes Blvd	Vista del Parque	0	3	0	0	0	0	0	1	2	2	**8**

Facility Type*	Facility Name	From	To	Gap Closure	Connectivity: Existing	Connectivity: Proposed Regional	Connectivity: Activity Centers	Connectivity: Multi-Modal	Safety	Public Input	Underserved Communities	Project Cost	Parking Displacement	Total
BP	Madrona Ave Extension	Sepulveda Blvd	229th Pl	0	3		4	0	0	0	1	0	0	**8**
BFS	Newton St	Calle Mayor	Pacific Coast Highway	0	3	0	0	0	0	0	1	1	2	**7**
BFS	Madrid Ave	Dominguez St	Plaza Del Amo East	0	0	0	0	0	1	0	2	2	2	**7**
BFS	Pennsylvania Ave	Sepulveda Blvd	South City Limits	0	3	0	0	0	0	0	1	1	2	**7**
BFS	Via Pasqual - Cll de Arboles - Pso de las Tortugas - Vista Montana	Via Monte D Oro	Newton St	0	3	0	0	0	0	0	0	1	2	**6**
BFS - BL	220th St	Martina Ave	Western Ave	0	0	0	2	0	0	0	1	2	0	**5**
BFS	Via Monte D Oro	Camino del Campo	South City Limits	0	0	0	0	0	0	0	1	1	2	**4**
BFS	171st St	Prairie Ave	Gramercy Pl	0	0		0	0	0	0	2	1	0	**3**

*BP=Bike Path, BL=Bike Lane, BR=Bike Route, BFS=Bike Friendly Street

9.7 Project Sheets

The City of Torrance selected two of its top priority projects from the previous table for more detailed concept designs. Project sheets are shown on the following pages and include:

- A review of the existing site conditions
- Site challenges
- Recommended improvements
- Estimated cost
- Photos
- Aerial images
- Concept graphics

Torrance Project #1: Van Ness Avenue – Cabrillo Avenue (Redondo Beach Boulevard to Plaza del Amo)

Project Site

Van Ness Avenue – Cabrillo Avenue is a north-south corridor located in the eastern portion of the City of Torrance. It connects to Gardena to the north and to existing bike lanes on Cabrillo Avenue to the south. Van Ness Avenue – Cabrillo Avenue provides access to Lincoln Elementary School, the YMCA, Downtown Torrance, and major employers, including ProLogis and Toyota. There is existing on-street parking along the northern and southern segments of Van Ness Avenue – Cabrillo Avenue that is highly utilized in certain segments, including Downtown Torrance.

From Redondo Beach Boulevard to 186th Street, Van Ness Avenue – Cabrillo Avenue has four travel lanes, on-street parallel parking on both sides of the street, and a posted speed limit of 35 mph. The roadway width from Redondo Beach Boulevard to 190th Street is approximately 55 to 57 feet. Between 190th Street and Torrance Boulevard, Van Ness Avenue has four travel lanes and a center turn lane, and the posted speed limit increases to 45 mph. The roadway width is approximately 61 to 63 feet, except for a half-mile stretch between Toyota Way and Del Amo Boulevard where the width drops to approximately 55 feet. There is only on-street parking between Arlington Avenue and Torrance Boulevard on the west side of the street. South of Torrance Boulevard, the posted speed limit drops to 30 mph. Between Torrance Boulevard and 213th Street, the roadway width ranges from 67 feet to 82 feet. From 213th Street to Plaza Del Amo, there are center medians with parallel parking, as well as curbside parallel parking. The roadway width is approximately 36 to 37 feet on each side of the median.

Project Challenges

Van Ness Avenue is an existing Class III Bike Route, but is a challenging bicycling environment due to high vehicle speeds. There are few treatments making a safe bicycling environment for children riding to school and the YMCA. Existing on-street parking reduces the space available for bicycle facilities.

Proposed Improvements

- Stripe 2.5 miles of Class II Bike Lanes and install signs
- Install 1.9 miles of Class III Bike Route signs and stripe sharrows
- Add bicycle loop detectors and pavement markings at all signalized intersections
- Conduct a road diet to convert cross-section to one travel lane in each direction from Torrance Boulevard to Plaza Del Amo (0.9 miles)
- Construct bulbouts with high visibility crosswalks

Estimated Cost

$2,000,000

Photos

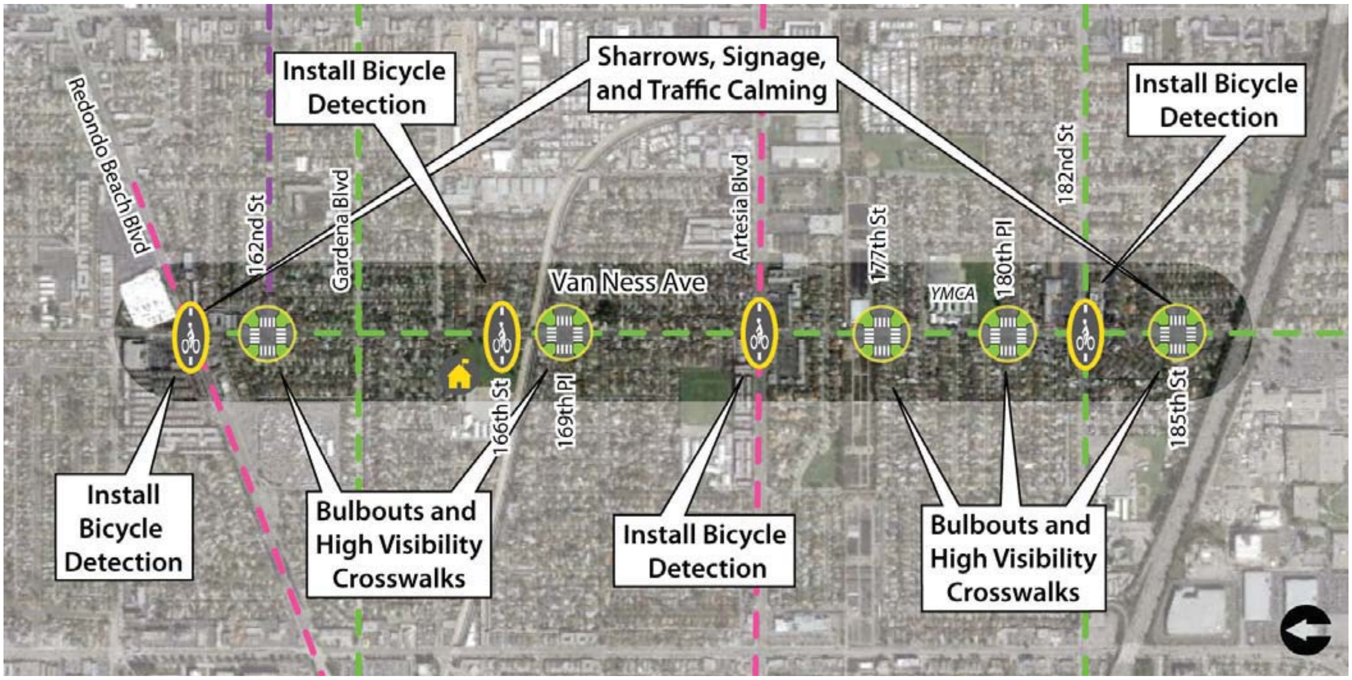
Sharrows and traffic calming north of 190th Street will create a safer bicycling environment on Van Ness Avenue.

Bike lanes on Van Ness, which has a posted speed limit of 45 mph, will provide a designated space for bicyclists to ride.

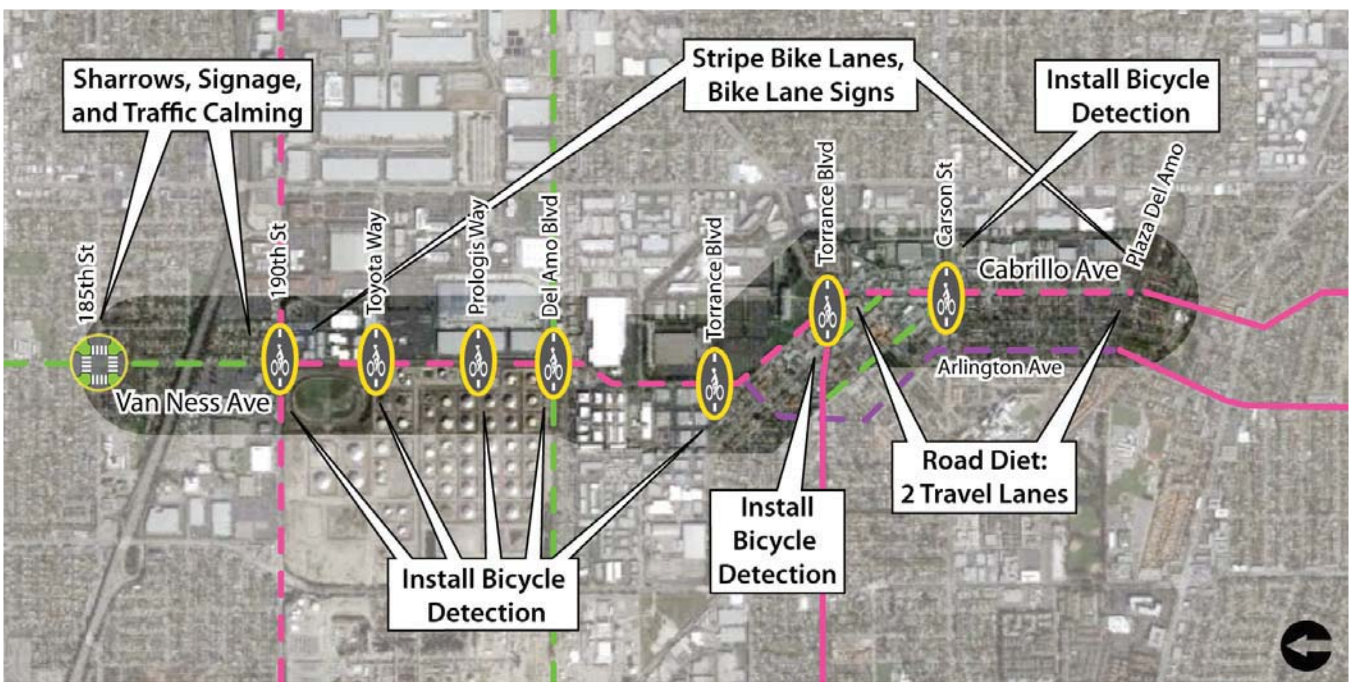
Removing a travel lane will calm traffic and retain on-street parking in Downtown Torrance.

Aerial Map and Concept Graphics: Van Ness Avenue – Cabrillo Avenue

Van Ness Avenue – Cabrillo Avenue (Redondo Beach Boulevard to 185th Street)

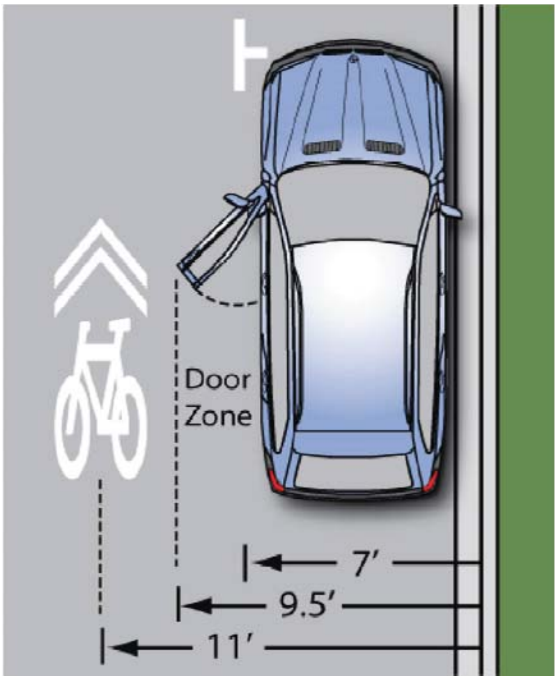


Van Ness Avenue – Cabrillo Avenue (185th Street to Plaza Del Amo)



Aerial Map and Concept Graphics: Van Ness Avenue – Cabrillo Avenue

Sharrows



Bulbouts and High Visibility Crosswalks

Torrance Project #2: 190^{th} Street (Blossom Lane to Prairie Avenue)

Project Site

190^{th} Street is an east-west corridor located in the northern portion of the City of Torrance. The eastern segment of 190^{th} Street shares a border with Redondo Beach. 190^{th} Street continues west into Redondo Beach and east into the City of Los Angeles. It provides access to Dominguez Park, Columbia Park, and residential and commercial uses. There is existing on-street parking along much of 190^{th} Street west of Prairie that is moderately utilized. East of Crenshaw there is only on-street parking in front of residences. From Blossom Lane to Inglewood Avenue the posted speed limit is 35 mph. East of Inglewood Avenue the speed limit increases to 40 mph until Prairie Avenue where it again increases to 45 mph.

Between Blossom Lane and Rindge Lane, 190^{th} Street has a roadway width of approximately 77 to 78 feet. There are four travel lanes, a center turn lane, occasional additional turn pockets at intersections, and on-street parallel parking. The roadway width drops to approximately 73 to 74 feet between Rindge Lane and Inglewood Avenue and there is scattered on-street parallel parking. From Inglewood Avenue to 191^{st} Street, the roadway width of 190^{th} Street increases to approximately 75 to 77 feet. The width increases to between 83 and 100 feet from 191^{st} Street to Hawthorne Boulevard to accommodate turn lanes at the intersection. From Hawthorne Boulevard to Prairie Avenue, the roadway width drops back to approximately 77 to 83 feet and there is no existing on-street parking on either side of the street.

Project Challenges

There are no existing bicycle facilities on this segment of 190^{th} Street. Bicyclists must share the road with high volumes of vehicles traveling at high speeds, creating a challenging bicycling environment.

Proposed Improvements

- Stripe 1.8 miles of Class II Bike Lanes and signs
- Add bicycle loop detectors and pavement markings at all signalized intersections

Estimated Cost

$150,000

Photos

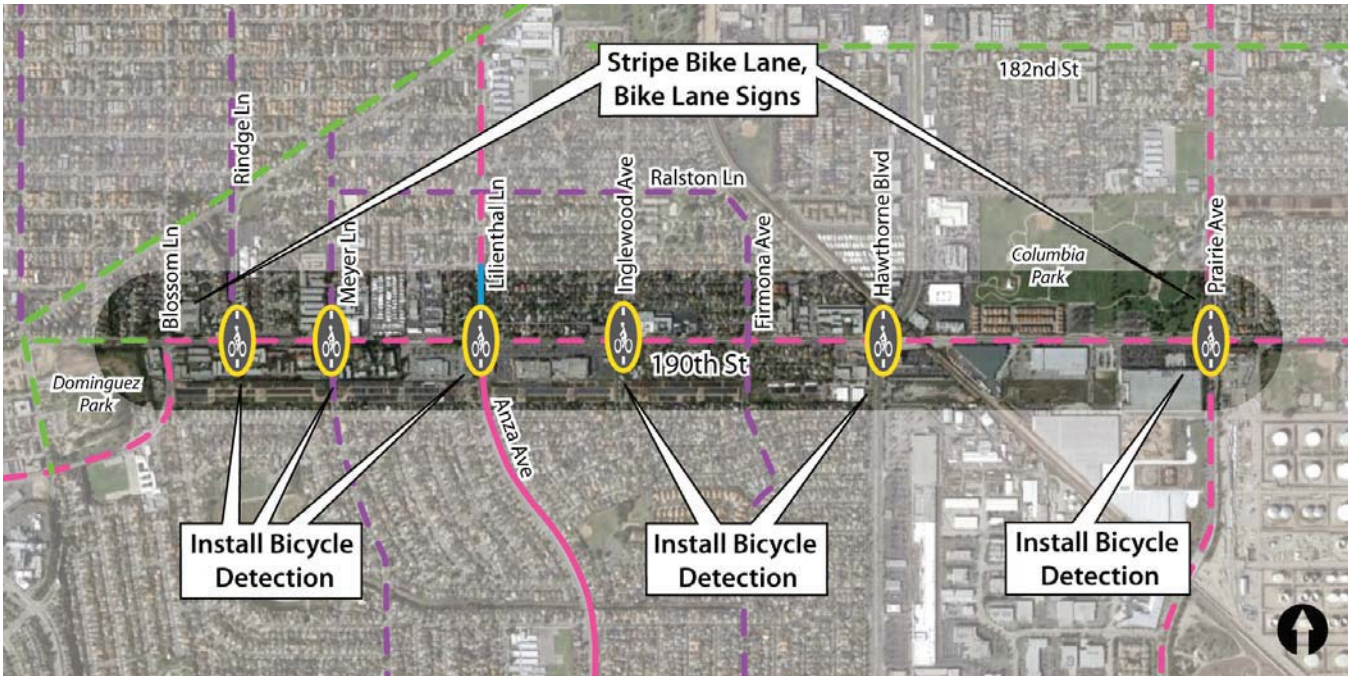
Wide parking lanes provide adequate space for bicycle lanes on some segments of 190^{th} Street.

Bicycle detectors at intersections will allow bicyclists to trigger the signal when no vehicles are present.

Striping bicycle lanes will provide separation between bicyclists and motorists.

Aerial Map and Concept Graphics: 190th Street

190th Street (Blossom Lane to Prairie Avenue)



Bike Lane and Bicycle Loop Detector

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Chapter 10

Recommended Programs

10 Recommended Programs

Creating a region that supports and encourages its residents to bicycle involves more than just infrastructure improvements. Each of the seven participating cities in the South Bay should consider more than bicycle facility improvements and develop or participate in programs that educate bicyclists and motorists, raise awareness about opportunities to bike, and enforce the laws that keep bicyclists safe. The participating cities can encourage increased bike ridership by supporting programs that incentivize bicyclists through encouragement and improved convenience, safety, and education

This chapter recommends programs for the seven South Bay participating cities that will educate people about bicyclists' rights and responsibilities, and safe bicycle operation, as well as encourage residents to bicycle more frequently. This chapter should be used as a toolbox: each city should draw upon its unique resources to choose the programs that best suit it. For example, partnership with active community groups can make group bike rides successful, while strong relationships with local businesses enable bike-friendly business programs to work. The cities could also work together to make regional efforts at promoting bicycling in the South Bay, such as through combined efforts in managing bicycle awareness campaigns.

Bicycle skills courses can improve cyclist confidence and safety by teaching effective bicycling techniques.

Photo Source: Dan Burden/WALC Institute for Vitality City

10.1 Education Programs

Education programs enable bicyclists, pedestrians, and motorists to understand how to travel safely in the roadway environment according to the law. Education programs are available in an array of mediums, from long-term courses with detailed instruction to single sessions focusing on a specific topic. Curriculums should be appropriate to the target audience and to the format of instruction.

10.1.1 Bicycle Skills Courses

Target Audience: General public

Most bicyclists do not receive comprehensive instruction on safe and effective bicycling techniques, laws, or bicycle maintenance. Bike skills training courses are an excellent way to improve both bicyclist confidence and safety. The League of American Bicyclists (LAB) developed a comprehensive bicycle skills curriculum which is considered the national standard for adults seeking to improve their on-bike skills. The classes available include bicycle safety checks and basic maintenance, basic and advanced on-road skills, commuting, and driver education.[27]

LACBC currently offers adult LAB courses taught by League Certified Instructors. The South Bay participating cities could partner with the LACBC or other non-profit organizations to expand course offerings to target all ages, and incorporate them into recreation center programs or other city programs. Bicycle skills courses that target children should to the extent feasible be fully integrated into school curriculum through PE classes, general assembly, and other means of instruction. The cities could also look for other possible groups to partner with for educational purposes.

10.1.2 Drivers Education Training

Target Audience: General public

Interacting with bicyclists on the road is often not included in training for new drivers. Teaching motorists how to share the road from the start can help reduce potential conflicts between drivers and bicyclists. The League of American Bicyclists (LAB) offers a three-hour motorist education classroom session that teaches participants topics including roadway positioning of bicyclists, traffic and hand signals, principles of right-of-way, and left and right turn problems.[28] The South Bay participating cities could encourage instructors of driver education courses to add this class to their curriculum. The cities could also work with the Department of Motor Vehicles and Superior Court to explore opportunities to offer this class as a diversion course for motorists who receive citations for reckless driving or as a training session for local professional drivers.

Bicycle Rodeos set up stop signs, traffic cones, and other props to simulate the roadway environment and teach students basic bicycling techniques.

10.1.3 Bicycle Rodeos

Target Audience: Children

Bicycle Rodeos are individual events that help students develop basic bicycling techniques and safety skills through the use of a bicycle safety course. Rodeos use playgrounds or parking lots set-up with stop signs, traffic cones, and other props to simulate the roadway environment. Students receive instruction on how to

[27] Additional program information is available online at www.bikeleague.org/programs/education/courses.php.

[28] http://www.bikeleague.org/programs/education/courses.php#motorist

maneuver, observe stop signs, and look for on-coming traffic before proceeding through intersections. Bicycle Rodeos also provide an opportunity for instructors to ensure children's helmets and bicycles are appropriately sized. Events can include free or low-cost helmet distribution and bike safety checks.

Trained adult volunteers, local police, and the fire department can administer Rodeos. Bicycle Rodeos can be stand-alone events or can be incorporated into health fairs, back-to-school events, and Walk and Bike to School days.

The Cities of El Segundo, Manhattan Beach, and Redondo Beach currently conduct Bicycle Rodeos, though these could be expanded to occur at all elementary and middle schools at least twice per year. Bicycle Rodeos also occurred in the City of Torrance in 2011. Each City could begin organizing Bicycle Rodeos biannually at all elementary and middle schools. Bicycle Rodeos should also be held at community events, such as Earth Day celebrations.

10.1.4 Share the Path Campaign

Target Audience: Bike path users

"Share the Path" campaigns promote safe and courteous behavior among all users.

Conflicts between path users can occur on popular, well-used path systems. "Share the Path" campaigns promote safe and courteous behavior among all users. These campaigns typically involve distribution of bicycle bells and other bicycle paraphernalia, and brochures with safety tips, and maps at bicycle rides and other public events.

Effective "Share the Path" campaigns generally involve the following:

- Developing a simple, clear **Share the Path brochure** for distribution through local bike shops and wherever bike maps are distributed.
- Hosting a **bicycle bell giveaway** event on a popular shared-use path. Volunteers and agency staff can distribute bells to bicyclists and "Share the Path" brochures to other path users, and answer users' questions. Other volunteers may walk along the path and thank bicyclists who use their bells when passing.
- Conducting media outreach before a bell giveaways event. The event organizers should publicize positive stories about bicycling and use the event as an opportunity for marketing the path system. Media outreach can include

public service announcements promoting courtesy and respect among all path users, and encouraging users to share the path safely.

Though not all seven of the participating cities currently have a bicycle path within their jurisdictions, hosting a "Share the Path" campaign can educate residents to ride safely so that they will be prepared when a path is constructed in the future.

10.1.5 Bicycles on Transit Campaign

Target Audience: Commuters

South Bay participating cities that operate transit services could begin a campaign so that bicyclists will feel comfortable combining their trips with transit.

A common statement from bicyclists is that they do not know how to combine their bicycle trips with transit, whether it is because they are not familiar with how to use bicycle racks on buses or they do not know which transit vehicles accommodate bicycles. The Los Angeles County Metropolitan Transportation Authority (LA Metro) posts information on its website that includes how to load and unload bicycles onto buses, when bicycles are allowed on trains, and which stations have bicycle parking.[29] South Bay participating cities that operate transit services could begin similar educational campaigns so that bicyclists will feel comfortable combining their trips with transit.

As part of the campaign, cities could distribute informational pamphlets, such as bicycle rack instructions and transit maps, at community events. They could also have sample bike racks and bicycles that members of the community can practice with.

10.2 Public Awareness Campaigns and Marketing

Campaigns that make the public aware of bicycling and market it as a viable form of transportation help to increase the numbers of riders. In turn, bicycling becomes a safer form of transportation because people expect to see bicyclists on the road.

10.2.1 Bikeway Maps

One of the most effective ways of making people aware of bicycling as a transportation alternative is to distribute maps and guides to show that bicycle infrastructure exists. A map can also demonstrate the ease in accessing different parts of the community by bike, and highlight unique areas, shopping districts, or recreational areas. The

[29] http://www.metro.net/around/bikes/bikes-metro/

South Bay participating cities could partner to develop a region-wide map to show connectivity between the South Bay cities, which could be available on paper and/or online.

Schools may create specialized biking and walking maps to direct students to walk and bicycle along the safest routes to school, such as those used in Manhattan Beach. These specialized maps may include arrows to indicate the routes and show stop signs, signals, crosswalks, sidewalks, trails, overcrossings, and crossing guard locations surrounding the school. The maps could focus on the attendance boundary of a particular school. Routes should take advantage of low volume residential streets and off-street facilities such as bike paths, sidewalks, and pedestrian bridges.

10.2.2 Community Bikeway Adoption

Community Bikeway Adoption programs resemble the widely instituted Adopt-a-Highway programs throughout the country. These programs identify local individuals, organizations, or businesses interested in “adopting” a bikeway, walkway, or shared-use path. “Adopting” a facility means that a person or group is responsible for the facility’s maintenance, either through direct action or funding the City’s maintenance of that facility. For example, members of a local recreation group may volunteer every other weekend to sweep a bikeway and identify larger maintenance needs. Alternatively, a local bike shop may adopt a bikeway by providing funding for the maintenance costs. Some adopted bikeways post sponsors’ names on bikeway signs to display their commitment to bicycling.

10.2.3 Share the Road Education Campaign

A Share the Road campaign educates motorists, bicyclists and pedestrians about their legal rights and responsibilities on the road, and the need for increased courtesy and cooperation among all users. Share the Road campaigns often hold periodic traffic checkpoints along roadways with concentrated bicycle and pedestrian activity. Motorists, bicyclists and pedestrians stop at these checkpoints to receive a Share the Road flyer from police officers and can give feedback to officers regarding the campaign. Checkpoints can also occur along local bikeways and paths. Public service announcements on radio and television can help promote

Share the Road campaigns educate motorists, bicyclists and pedestrians about their legal rights and responsibilities on the road.

the Share the Road campaign. The Marin County Bicycle Coalition offers an example of a successful Share the Road campaign.[30]

10.3 Enforcement Programs

Motorists, pedestrians and bicyclists alike are sometimes unaware of each other's rights as they travel city streets. Enforcement programs target unsafe bicyclist and motorist behaviors and enforce laws that reduce bicycle/motor vehicle collisions and conflicts. Enforcement fosters mutual respect between roadway users and improves safety. These programs generally require coordination between law enforcement, transportation agencies, and bicycling organizations. Educating the public through enforcement policies will supplement the physical improvements made in the South Bay region.

10.3.1 Directed Enforcement

Target Audience: Bicyclists and motorists

Traffic enforcement agencies enforce laws pertaining to bicycles as part of the responsible normal operations. Directed enforcement is one way to publicize bicycle laws in a highly visible and public manner. Examples of directed enforcement actions include: intersection patrols, handing out informational sheets to motorists, bicyclists and pedestrians; and enforcing speed limits and right-of-way. This can help with issues prevalent in the South Bay, such as motorists parking in the bicycle lanes, and bicyclists running red lights and stop signs.

10.3.2 Speed Radar Trailer/Speed Feedback Signs

Target Audience: Motorists

Speed radar trailers can help reduce traffic speeds and enforce speed limits in areas with speeding problems. Police set up an unmanned trailer that displays the speed of approaching motorists along with a speed limit sign. Speed trailers may be effective on busier arterial roads without bikeway facilities or near schools with reported speeding. The speed trailer's roadway placement should not obstruct bicycle traffic.

Speed trailers work as both an educational and enforcement tool. By itself, the unmanned trailer educates motorists about their current speed in relation to the speed limit.

Speed radar trailers can help reduce speeds.

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[30] www.marinbike.org/Campaigns/ShareTheRoad/Index.shtml.

Speed trailers can transport easily to streets where local residents complain about speeding problems. The cities' police departments could station officers near the trailer to issue speeding citations when speeding continues to occur.

City staff could provide the management role for this program, working with the public to determine which locations are in most need. This program can be administered randomly, cyclically, or as demand necessitates because of the speed trailers' portability.

10.3.3 Bicycle Patrol Units

Target Audience: Bicyclists and motorists

On-bike officers are an excellent tool for community and neighborhood policing because they are more accessible to the public and able to mobilize in areas where patrol cars cannot (e.g., overcrossings and paths). Bike officers undergo special training in bicycle safety and bicycle-related traffic laws and are therefore especially equipped to enforce laws pertaining to bicycling. Bicycle officers help educate bicyclists and motorists through enforcement and also serve as excellent outreach personnel to the public at parades, street fairs, and other gatherings.

On-bike officers can offer increased enforcement of laws pertaining to bicycling.

10.4 Encouragement Programs

Encouragement programs focus on encouraging people to bicycle more frequently by providing incentives, recognition, or services that make bicycling a more convenient and viable transportation mode.

10.4.1 Bike to Work Day/Week

Bike to Work Day/Week is celebrated nationwide as part of "Bike Month" every May. Jurisdictions throughout the United States hold events to encourage new people to ride bicycles and existing riders to continue to commute by bicycle. Throughout the day or week, agencies hold events to encourage people to participate in the program, such as free breakfast to bicyclists at several stations throughout their jurisdictions. Some of the South Bay cities participate in Bike to Work Day/Week, though all of the cities could join their efforts and support a region-wide program with stations throughout the cities. Torrance, for example, hosts a Bike to Work Day pit-stop in front of City Hall that is open to the public. The Los Angeles County Bicycle Coalition and the South Bay Bicycle Coalition could also partner with the cities to enhance these events.

10.4.2 Bicycle Commuter Campaigns

A Bicycle Commuter Campaign encourages people to commute by bicycle and to make the general public aware that bicycling is a practical mode of transportation. San Luis Obispo (SLO) Regional Rideshare, for example, organizes the "Commute for Cash Challenge" every October as part of "Rideshare Month" in which commuters log the miles that they commute using alternative transportation for a chance to win prizes.[31] The City of Torrance currently has an organized employee rideshare program, that provides incentives to employees who use vanpools, carpools, transit, walk, and ride a bicycle as their transportation to work. This program could serve as a starting point for the other participating cities. The South Bay participating cities could also implement a campaign to highlight bicycling as a commute mode and encourage new riders to try it.

10.4.3 Organized Bike Rides

Organized group bicycle rides can encourage new riders to try riding a bicycle as they are designed to make all participants feel safe and confident. Formalized rides are led by an experienced rider who ensures that participants follow all bicycle regulations and safety measures, and usually one of the ride organizers will remain in the back of the group to guarantee that no riders are left behind. The participating cities could work with local bicycle advocacy groups to organize regional group rides so that residents can feel more comfortable riding in the South Bay. These rides could be promoted by way of an online events calendar or other means. Local cycling and advocacy groups, such as the South Bay Bicycle Coalition, Los Angeles County Bicycle Coalition and Beach Cities Cycling Club organize several group bicycle rides on a regular basis. The "Sunday Funday" ride, for example, is a monthly group ride for LACBC members of all ages and abilities. Each month LACBC leads bicyclists on an exploration of a different portion of the County. A similar ride would be an opportunity for the South Bay to highlight its new bikeways once constructed. Cities are encouraged to work with local groups to promote and connect the community to cycling activities.

The participating cities should work with the Los Angeles County and South Bay Bicycle Coalitions to provide secure bicycle parking at regularly occurring events.

[31] http://www.rideshare.org/CommuteforCashChallenge2010.aspx

10.4.4 Event Bicycle Parking

Providing safe and secure bicycle parking helps encourage individuals to bicycle. San Francisco passed a city ordinance that requires all major city events to provide bike parking and pioneered an innovative tool for stacking hundreds of bicycles without racks.[32] The South Bay participating cities may consider temporary bicycle parking for events with expected large attendance and at regularly occurring events like a farmers market. LACBC, SBBC, and the Beach Cities Cycling Club all offer secure, professional, and attended bike valet services. The participating cities could work with these groups to provide this service at their events.

10.4.5 Bicycle Maintenance Stations

An effective way to encourage riding is by providing free maintenance stations at popular destinations. The City of Cambridge, for example, has free bicycle maintenance stations in several trip-generating locations. These stations include items such as tire gauges, pumps, and tools for small bicycle repairs. Bicycle maintenance stations are an inexpensive alternative to providing stand-alone bicycle repair shops. The South Bay participating cities could install them at activity centers, including schools and the Strand.

10.4.6 Bicycle Friendly Business Program

Local businesses have the potential to encourage bicycling by providing their patrons that commute by bicycle with discounts and other amenities. The participating South Bay cities may consider starting a regional "Bicycle Friendly Business" program that honors South Bay businesses that support bicycling. The program could assign a gold, silver, or bronze designation to businesses that apply for the program based on the level of benefits they provide bicyclists. The League of American Bicyclists has a Bicycle Friendly Business program as part of its Bicycle Friendly Communities designation, which would act as a good model for the South Bay participating cities to follow.[33]

Ciclovias can highlight the South Bay's new bikeways once constructed.

10.4.7 Ciclovias/ "Sunday Streets"

First implemented in Bogota, Colombia, the Ciclovia is a community event based around a street closure. Ciclovias provide

[32] www.sfbike.org/?valet

[33] http://www.bikeleague.org/programs/bicyclefriendlyamerica/bicyclefriendlybusiness/about.php

local recreational and business opportunities for the community and are increasingly popular citywide events. Ciclovias can combine with other popular community events to promote walking and bicycling as a form of viable transportation. Ideally, Ciclovias should provide access to civic, cultural, or commercial destinations.

The City of Los Angeles has hosted two ciclovias, called "CicLAvia," since October 2010. At both CicLAvia events, routes went through downtown Los Angeles. The participating cities could work with the event organizers to create a route through the South Bay. This would be an opportunity to highlight some of the South Bay's new bikeways once constructed.[34]

10.4.8 Bike Wrangler

The bike wrangler partners with bicycle shops or bicycle repair cooperatives to store and repair the bicycles.

A bike wrangler program gathers used and abandoned bicycles and distributes them to people who cannot afford bicycles. The bike wrangler can collect from many sources of used bicycles, including local police department auctions, universities, and individuals. The bike wrangler partners with bicycle shops or bicycle repair cooperatives to store and repair the bicycles.

The Los Angeles County Department of Public Health recently funded a Bike Wrangler program. The Los Angeles County Cycling Collaborative (CCC), which is a partnership of the Los Angeles County Bicycle Coalition and the County's five bicycle repair cooperatives, will be administering the program from a space near downtown Los Angeles. The participating cities could work with this existing program by connecting their local institutions to the CCC Bike Wrangler. They can work with the Bike Wrangler to bring bicycle workshops and refurbished bicycles to the South Bay.

10.5 Monitoring and Evaluation

In order to track the progress of the South Bay Bicycle Master Plan, it is critical that the participating cities monitor and evaluate changes in bicycling.

10.5.1 Annual Bicycle Counts and Surveys

As a mechanism for tracking bicycling trends over time and for evaluating the impact of bicycle projects, policies, and programs from the South Bay Bicycle Master Plan, the participating cities

[34] More information is available at www.healthystreets.org/pages/sunday_parkways.htm and http://www.ciclavia.org

may consider partnering with local advocacy groups and volunteers to conduct annual bicycle counts. Count locations should at minimum include the locations that were part of the 2010 count effort. Ongoing count data will enable the cities to analyze changes in bicycling levels and to track the impact of new bicycle infrastructure. As a means of engaging the South Bay community in bicycle counts, the cities of El Segundo, Manhattan Beach, Hermosa Beach, and Redondo Beach could partner to install an automated bicycle counter on the Strand that publicly displays the cumulative number of bicyclists counted.

The participating cities should conduct annual bicycle counts and surveys to track bicycling trends over time.

Annual surveys should also be conducted to measure "attitudes" about bicycling. These surveys could be either online surveys or intercept surveys. Surveys should determine if bicyclists are reacting positively or negatively to bicycle facilities and programs implemented. Results of the counts and surveys can inform future bicycling planning efforts and be presented to the Bicycle Advisory Committee at regular meetings.

10.5.2 Mobility Coordinator Position

A number of cities around the country staff a part- or full-time Mobility Coordinator position. Cities with such a position usually experience relative success in bike plan implementation. To take full advantage of current bicycle planning and safety efforts and to assist with implementation of bicycling programs, the South Bay Cities Council of Governments (SBCCOG) should consider creating and staffing an ongoing mobility coordinator position to assist the participating cities in multi-jurisdictional implementation and grant funding efforts. This position would be contingent on available funding. Should SBCCOG not obtain funding, each city should arrange for existing or new staff to dedicate time towards implementation of the bike plan and applying for relevant grants funds.

In addition to supporting existing programs, such as bicycling parking provision and educational activities, potential job duties for this staff position are listed below. See policy section 3.2 in **Chapter 2** for details on tasks of the Mobility Coordinator.

- Monitoring facility planning, design, and construction that may impact bicycling
- Staffing bicycle advisory committee meetings
- Coordinating the implementation of the recommended projects and programs listed in this Plan

- Identifying new projects and programs that would improve the city's bicycling environment and improve safety for bicyclists, pedestrians, and motorists
- Coordinating evaluation of projects and programs, such as bicycle counts
- Pursuing funding sources for project and program implementation

Chapter 11

Wayfinding and Signage Plan

11 Wayfinding and Signage Plan

This chapter presents a regional bicycle wayfinding and signage plan for the South Bay participating cities that will support the proposed bikeway network, while simultaneously creating an identity for the South Bay participating cities' bikeways. Such prominent and unique identification will be important to wayfinding for bicyclists using the first multi-jurisdictional inter-connected bikeway system. The signage plan presented here is meant to assure bicyclists that they are using a network that is continuous and easily navigated. The regional bicycle wayfinding system will direct bicyclists to major destinations in the South Bay, such as downtown areas, commercial centers, and transit hubs. Recommended signage presented in this plan should be placed on all existing and proposed routes. This chapter is organized by proposed signage design, signage location, kiosks, and collaborative efforts.

11.1 Signage Design

Bicycle wayfinding signage provides destination, direction, and distance information to bicyclists navigating through the South Bay bicycle network. The proposed design guidelines use standard signs from the federal Manual on Uniform Traffic Control Devices (MUTCD), as well as the California MUTCD. MUTCD signs used in this signage plan include:

- D11-1: Bicycle Route Guide Sign
- D1-1b: Destination Supplemental Sign
- M7-1 through M7-7: Directional Arrow Supplemental Sign

D11-1: Bicycle Route Guide Sign

Using signage standards outlined in the MUTCD allows for signage that is consistent throughout jurisdictions. However, the proposed signs include revised modifications to brand the South Bay bicycle network, as well as bicycle facilities in each participating city. **Table 11-2** further explains these modifications.

11.1.1 Design Guidelines

The South Bay bicycle wayfinding signage system recommends the following three sign types:

- **Standard signs:** Confirm a bicyclist is riding on a designated bikeway
- **Turn signs:** Specify where a bikeway turns to prepare bicyclists in advance

Example Hybrid Confirmation and Decision Sign.

- **Hybrid Confirmation and Decision signs:** Confirm a bicyclist is riding on a designated bikeway; include mileage to key destinations that can be accessed by the bikeways; and provide directional arrows to key destinations. In some instances, they also identify the junction of two or more bikeways

Table 11-1 displays design and placement standards for the three recommended sign types presented in this chapter. **Figures 11-1, 11-2, 11-3, 11-4 and 11-5** illustrate the signage design guidelines.

Table 11-1: Design Standards for Recommended Sign Types

Type	Sign Type	Design Standards	Placement
Standard Signs	• Bicycle Route Guide Sign D11-1 size: 24" wide x18" tall	N/A	• One sign per ¼ directional mile (mid-block) and at the far side of key intersections

Turn Signs	• Bicycle Route Guide Sign D11-1 size: 24" wide x 18" tall
	• Directional Arrow Supplemental Signs M7-1 through M7-7 size: 12" wide x 9" tall
		N/A	• Signs should be placed the at the following distances before an intersection depending on the number of lanes a bicyclist must travel across in order to initiate a legal left turn:
			  • 25 feet before a zero lane merge
			  • 100 feet before a one lane merge
			  • 200 feet before a two lane merge

Hybrid Confirmation and Decision Signs	• Bicycle Route Guide Sign D11-1 size: 24" wide x18" tall
	• Destination Supplemental Signs D1-1b size: 24" wide
		• Maximum of one destination per plaque
		• A maximum of three destinations shall be listed
		• Destinations shall use upper case and lower case letters
		• For destination names that do not fit on one line abbreviations or two-line entry may be used
		• Destinations shall be listed by closest proximity to the sign placement
		• Signs shall include the bikeway's endpoint along the length of the route
		• Where a bikeway ends at a location with no obvious destination, use the closest major destination on an intersecting bikeway or the intersecting street if there is no obvious destination
		• Common symbols are to be used to convey destination information in a space-efficient manner (see **Figure 11-5 and Figure 11- 6**)
		• Directional arrows shall be placed to the left of a destination
		• Straight arrows shall be centered over the left and right arrow
			• Two signs per directional mile
			• Signs should be placed at the following distances before an intersection depending on the number of lanes a bicyclist must travel across in order to initiate a legal left turn:
			  • 25 feet before a zero lane merge
			  • 100 feet before a one lane merge
			  • 200 feet before a two lane merge

Figure 11-1: Sign Types

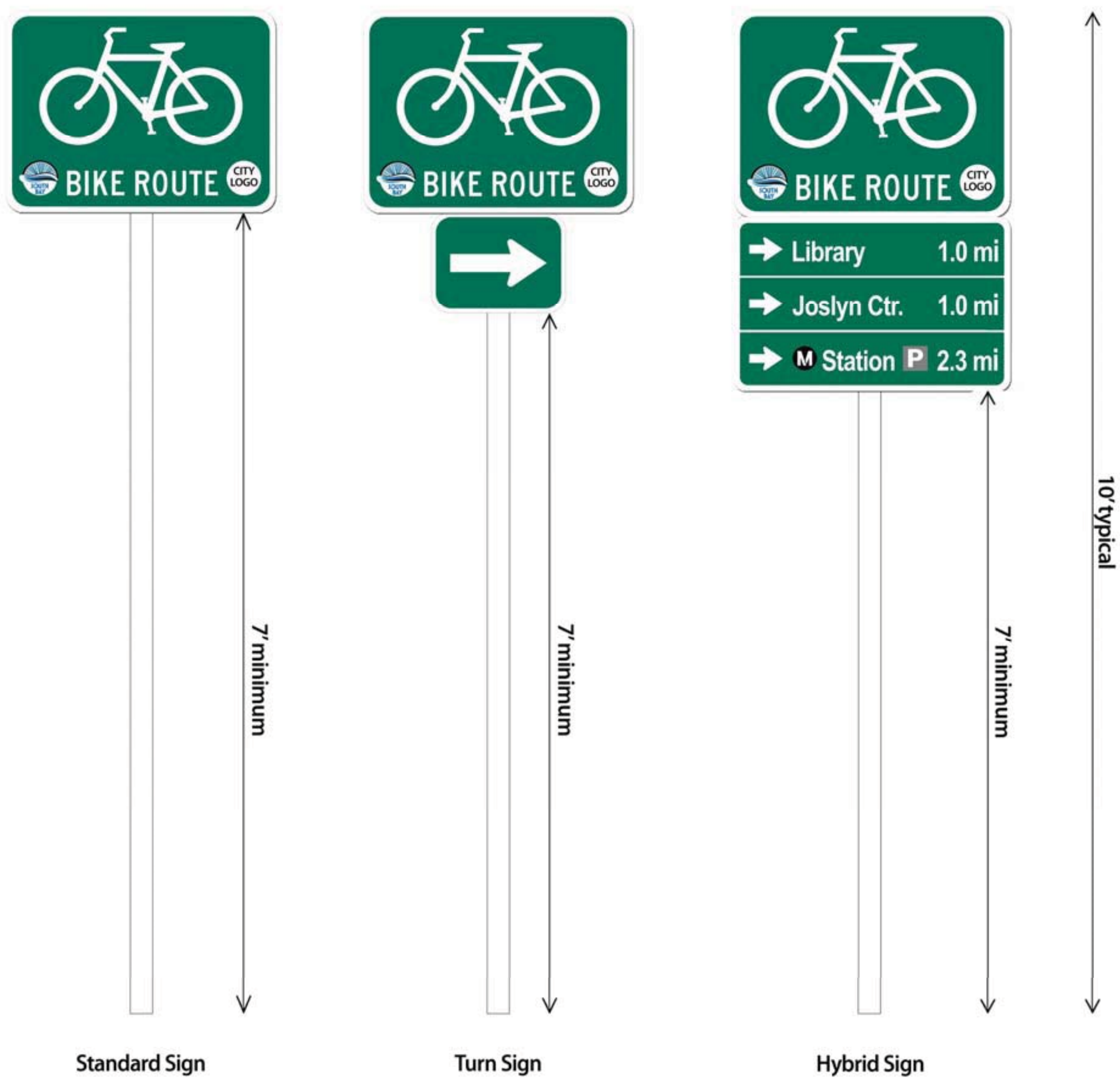

Figure 11-2: South Bay D11-1 Layout Details

NOTES
- All units in inches
- FHWA C Series Font, capital letters height 2.125", all CAPS
- City Logo Dimensions 2" x 2"
- South Bay Logo 2.25" x 2"
- Bike Logo 18.42" x 10.5" (per MUTCD for 24" D11-1 sign)

Figure 11-3: D1-1b Layout Details

NOTES

- All units in inches
- FHWA C Series Font, capital letter height 2", capitalize only first letter of each word
- MUTCD Standard Arrow (3" x 2.1")
- Forward and left destinations aligned left with arrow; right destinations aligned with right with arrow
- Head and left arrows centered
- Mileage font to follow destination name and may not exceed set margins
- Primary logo precedes destination name and may not exceed set margins
- Secondary logo follows destination name and may not exceed set margins
- Logo dimensions vary (see Figure 11-4)

Figure 11-4: South Bay and Participating City Logos used on signs

NOTES

-Used with modified MUTCD D11

- South Bay Logo dimensions (2.25" x 2")

- City logo dimensions (2" x 2")

Figure 11-5: Los Angeles Metro and Bicycle Parking symbols used on signs

NOTES

-Dimensions vary but must not exceed the provided margins

As noted earlier in this chapter, recommended signs deviate slightly from MUTCD standard signs. **Table 11-2** presents differences between the MUTCD and South Bay recommended sign standards.

Table 11-2: Modifications to MUTCD Design Sign Layout Specifications

Modification	Explanation
Developing a Hybrid sign from the standard MUTCD confirmation and decision sign (D1-1b) , which incorporates direction, destination name and distance	Provides bicyclists with maximum wayfinding information for improved usage and support of the overall network
Reduces horizontal perimeter from 1.5" to 0.75"	Increases ability to accommodate lengthy destination names
Incorporating symbols with destination names	Increases ability to accommodate lengthy destination names in addition to improving communication for users
Maintains 24" wide supplemental sign (D1-1b)	Consistency across the network increases user familiarly as well as allows for the addition of destinations as the bikeway network is implemented
Uses FHWA 2000 (Highway Gothic) C series *condensed* font series (rather than D series)	Increases ability to accommodate lengthy destination names; maintains 2" cap height; consistent with the cities of Chicago and Seattle
Inclusion of South Bay and City Logos on D11-1 sign, by reducing cap height of "BIKE ROUTE" to 2" (from 3")	Providing the Logos allows for improved identification and branding of the South Bay bicycle network, as well as the participating cities

11.1.2 Sample Signage

Figure 11-6 through **Figure 11-12** present sample signage for each of the participating South Bay cities. Signs will include the logo of the city it is located in, as well as the South Bay bikeway logo. Since color signs may result in high costs, the logos could also be printed in black and white.

Figure 11-6: Sample Wayfinding sign for El Segundo

Figure 11-7: Sample Wayfinding sign for Gardena

Figure 11-8: Sample Wayfinding sign for Hermosa Beach

Figure 11-9: Sample Wayfinding sign for Lawndale

Figure 11-10: Sample Wayfinding sign for Manhattan Beach

Figure 11-11: Sample Wayfinding sign for Redondo Beach

Figure 11-12: Sample Wayfinding sign for Torrance

11.1.3 Specifications

In order to have consistency in the wayfinding system, it is important to follow a set of specifications for sign placement and installation. **Table 11-3** displays specifications for the recommended South Bay wayfinding signage. Some cities may already have sign placement and installation standards, in which case they could choose to continue using those for guidance.

Table 11-3: Specifications for Implementation of signage

Specifications
• The standard pole for bikeway guide signs is a 2" square perforated unistrut pole • The pole should be placed 18" to 24" in the ground, depending upon the overall weight of the signs and the soil/pavement conditions. • Heavy sign installations may require poles up to 36" into the ground. • Poles of 12' in length are generally adequate to accommodate a D11-1 with a supplementary D1-1b sign. Longer poles are needed if additional signs will share the same pole. • The D11-1 should be installed at 10' in height as measured from the top edge of the sign. This height will allow for the installation of supplementary signs while maintaining a minimum 7' clearance to the bottom edge of the bottom sign. • When a D11-1 is mounted on a pole with an existing parking restriction sign, the D11-1 and any supplementary sign should be located above the parking restriction sign. • Signs shall not be mounted to utility poles or traffic signal mast arms • Existing poles should be used wherever practical.

11.2 Signage Locations

Table 11-4 presents a list of suggested key destinations for each participating South Bay city. The cities may modify this list in the future as needed. **Appendix L** provides maps illustrating the approximate location of key destinations in each city, as well as proposed signage routes based upon estimated frequency of use and proximity to areas of interest.

Table 11-4: Key Destinations by Participating City

Destination
El Segundo
Beach (end of Grand Ave)
Chevron refinery
El Segundo City Hall/Downtown
Josyln Community Center
El Segundo Public Library
The Urho Saari Swim Stadium
Imperial and Main Street
El Segundo and Nash Greenline Metro Station
Mattel Corporation
Mariposa and Nash Greenline Metro Station
Campus El Segundo Athletic Fields
Boeing Corporation
Los Angeles Air Force Base
Aviation/LAX Greenline Metro Station
Plaza El Segundo
Gardena
Crenshaw Greenline Metro Station
Dominguez Channel Bikeway at El Segundo Blvd and Crenshaw Blvd
Dominguez Channel Bikeway at Rosecrans Ave and Crenshaw Blvd
El Camino College
Gardena Civic Center/Nakaoka Community Center
Gardena Mayme Dear Library
Hermosa Beach
Hermosa Beach Pier Plaza
Hermosa Beach City Hall/Upper Pier
Hermosa Beach Library/Upper Pier
Valley Park
Lawndale
Lawndale Civic Center/Library
Jane Adams Park
Rogers-Anderson Park
Proposed Lawndale Metro Station at Rosecrans Ave and Manhattan Beach Blvd
Manhattan Beach
Manhattan Beach Pier/Roundhouse Marine Studies Lab and Aquarium
Live Oak Park and Josyln Community Center
Manhattan Beach City Hall and Library

Manhattan Beach Library
North Manhattan Beach/El Porto
Manhattan Village Mall
Polliwog Park and the Creative Arts Center
AdventurePlex (Marine Ave Park and Marine Ave Sports Complex)
Downtown Manhattan Beach
Metlox
Redondo Beach
Redondo Beach
Riviera Village
Esplanade
Dominguez Park / Dog Park
North Redondo Beach Bikeway at Marine Ave and Redondo Beach Ave
North Redondo Beach Bikeway at Artesia Blvd and Inglewood Ave
North Redondo Beach Bikeway at Lilienthal Ln and 190th street (Lilienthal Park)
Torrance
Torrance Beach
Torrance Airport / Zamperini Field
Madrona Marsh Nature Center
Wilson Park
Downtown Torrance
El Prado Park and Torrance History Museum
Torrance City Hall and Library

11.3 Kiosks

In addition to an effective signage system, the South Bay Signage plan also proposes the installation of informational kiosks to support the proposed bikeway network and signage. Proposed kiosk locations should be located at key destinations and include bicycle facility information for the participating cities and the South Bay region as a whole.

11.3.1 Design Guidelines

Potential locations for kiosks include key destinations in each City are provided in **Appendix L**. **Figure 11-13** and **Figure 11-14** present sample kiosk prototypes as potential designs for the cities' use. These are simply conceptual in design and can be modified to conform with each cities' existing signage plans. **Figure 11-15** displays a potential placement of the sample kiosk.

The design guidelines for kiosks will vary per each city's design preferences and existing standards. However, it is recommended that the participating cities use similar guidelines to create consistency across jurisdictions and brand the South Bay bicycle network. Kiosks should provide the following information:

- A map of key destinations in each city
- A map of the bicycle network in the city
- A map of the entire South Bay Bicycle Network
- The South Bay Bicycle Network Logo

Recommended supplemental resources for the kiosks include:

- Bicycle parking information
- Fold-up bicycle maps of the South Bay Bicycle Network
- Information regarding bicycle related activities in the area
- Bike safety information and other bicycle resources

Figure 11-13: Sample Kiosk Prototype

Figure 11-14: Sample Kiosk Prototype

Figure 11-15: Potential Placement of Sample Kiosk

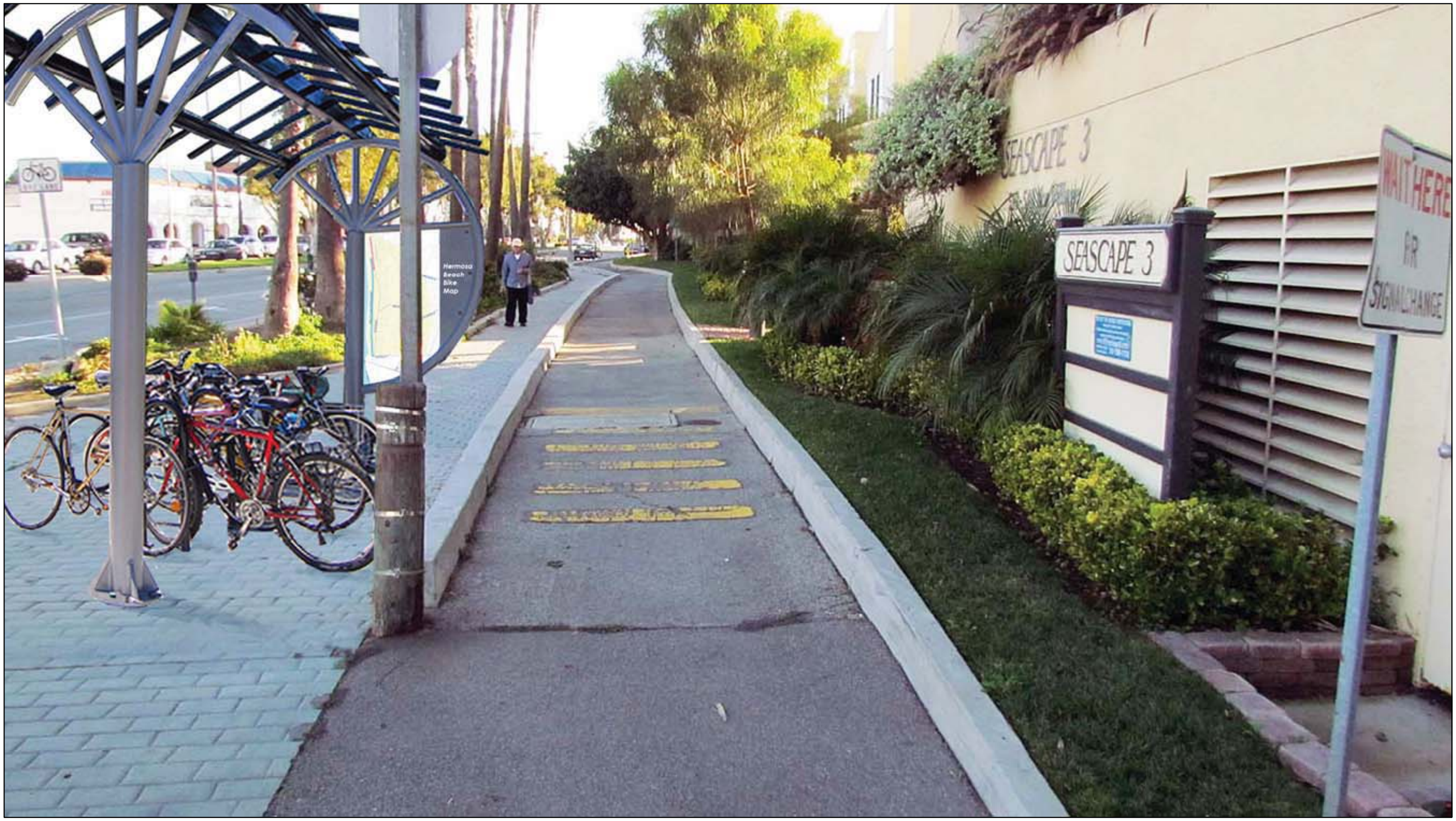

Photo Source: Dan Burden/WALC Institute for Vitality City

11.4 Collaborative Efforts

The South Bay participating cities should consider working with other nearby agencies to provide consistent bicycle wayfinding signage throughout the South Bay and the County of Los Angeles. This will allow bicyclists to easily navigate to and from bikeways in adjacent communities and create an overall seamless network. The South Bay participating cities should coordinate efforts with the following adjacent jurisdictions:

- City of Hawthorne
- City of Inglewood
- City of Lomita
- City of Los Angeles
- City of Palos Verdes Estates
- City of Rolling Hills Estates
- County of Los Angeles

The participating cities should also consider partnering with the following agencies to install wayfinding signage that will help bicyclists navigate to the South Bay bikeways:

- Los Angeles County Metropolitan Transportation Authority (Metro)
- Amtrak
- Metrolink

The participating cities should consider partnering with non-profit organizations, schools, and bicycle advocacy groups like the South Bay and Los Angeles County Bicycle Coalitions in a pursuit for funding opportunities and grants for wayfinding signage. Potential funds would help with capital and maintenance expenses associated with wayfinding signage. Partnerships often strengthen grant applications making them more likely to be selected.

Chapter 12

Funding

12 Funding

All levels of government contain programs that can potentially fund bicycle projects, programs, and plans. This section covers federal, state, and regional sources of bicycle funding. Many funding sources are highly competitive. Therefore, it is not possible to determine exactly which projects will receive funding from specific funding sources. **Table 12-1** serves as a general guide to funding sources. Staff should refer to current guidelines provided by the granting agency when pursuing any funding opportunity.

Table 12-1: Funding Sources

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Federally-Administered Funding									
Transportation, Community and System Preservation Program**	Varies, generally January or February.	Federal Transit Administration	$204 million nationally in 2009	20%	States, MPOs, local governments and tribal agencies	X	X	X	Implementation grants provide financial resources to enact activities that address transportation efficiency, while meeting community preservation and environmental goals. Policy and program examples include spending policies that direct funds to high-growth regions; urban growth boundaries to guide metropolitan expansion; and "green corridor" programs that provide access to highway corridors in areas targeted for efficient and compact development. Program officials are not currently accepting applications past 2011. In most years, Congress has identified projects to be selected for funding through the TCSP program. The South Bay cities should track the program over the long term and apply if the program is extended.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Federal Lands Highway Programs**	Not available	Federal Highway Administration	$1,019 million nationally in 2009		States	X	X		Grant funds are allocated for highways, roads, and parkways (which can include bicycle and pedestrian facilities) and transit facilities that provide access to or within public lands, national parks, and Indian reservations.
Rivers, Trails and Conservation Assistance Program	Aug 1 for the following fiscal year	National Parks Service	Program staff time is awarded.	Not applicable	Public agencies			X	RTCA staff provides technical assistance to communities to conserve rivers, preserve open space, and develop trails and greenways. The program provides only for planning assistance – there are no implementation monies available.
Paul S. Sarbanes Transit in Parks and Public Lands Program	Varies, Generally October.	Federal Transit Administration	$27 million nationally in 2009	Not available	Federal, State, local and tribal agencies that manage federal lands	X	X		Grant funds transportation modes that reduce congestion in parks and public lands.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Partnership for Sustainable Communities	Not applicable	Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT)	Varies	Not applicable	Varies by grant	X	X	X	Though not a formal agency, the Partnership for Sustainable Communities is a joint project of the EPA, the HUD, and the USDOT. One goal of the project is to expand transportation options that improve air quality and public health, which has already resulted in several new grant opportunities (including TIGER I and TIGER II grants). The participating cities should track Partnership communications and be prepared to respond proactively to announcements of new grant programs.
New Freedom Initiative**	Not available	U.S. Department of Health and Human Services (HHS)	Not available	Not applicable	Public agencies		X	X	Grant funds provide capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Pedestrian improvements include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Surface Transportation Program**	Not available	Federal Highway Administration	$6,577 million nationally in 2009	Not applicable	States and local governments	X	X	X	Grants fund projects on any federal-aid highway. Bicycle and pedestrian improvements include on-street facilities, off-street paths, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. Non-construction projects, such as maps, bicycle/pedestrian coordinator positions, and encouragement programs are eligible. The modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity.
Congestion Mitigation and Air Quality (CMAQ)**	Not available	Federal Highway Administration and Federal Transit Administration	$1,777 million nationally in 2009	Not applicable	States and Metropolitan Planning Organizations in air quality non-attainment and maintenance areas	X	X	X	Funds are allocated for transportation projects that aim to reduce transportation related emissions. Funds can be used for construction of bicycle transportation facilities and pedestrian walkways or for non-construction projects related to safe bicycling and walking (i.e. maps and brochures).

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Transportation Enhancements**	Not available	Federal Highway Administration	10 percent of State Transportation Program funds	Not applicable	States	X	X	X	Funds are a set-aside of Surface Transportation Program (STP) monies designated for Transportation Enhancement (TE) activities, which include the pedestrians and bicycles facilities, safety and educational activities for pedestrians and bicyclists, and the preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails).
Highway Safety Improvement Program**	October	Federal Highway Administration	$1,296 million nationally in 2009	Varies between 0% and 10%	City, county or federal land manager	X	X	X	Funds projects on publicly-owned roadways or bicycle/pedestrian pathways or trails that address a safety issue and may include education and enforcement programs. This program includes the Railroad-Highway Crossings and High Risk Rural Roads programs.
Community Development Block Grants	Varies between grants	U.S. Dept. of Housing and Urban Development (HUD)	$42.8 m	Varies between grants	City, county	X	X	X	Funds local community development activities such as affordable housing, anti-poverty programs, and infrastructure development. Can be used to build sidewalks and recreational facilities.
Recreational Trails Program**	October	CA Dept. of Parks and Recreation	$1.3 m in 2010	12%	Agencies and organizations that manage public lands	X	X	X	Provides funds to states for acquisition of easements for trails from willing sellers, maintenance and restoration of existing trails, construction of new paved or unpaved trails, and operation of educational programs to promote safety and environmental protection related to trails.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Federal Safe Routes to School**	Mid-July	Federal Highway Administration	Max. funding cap for infrastructure project: $1 million. Max funding cap for non-infrastructure project: 500,000	none	State, city, county, MPOs, RTPAs and other organizations that partner with one of the above.	X	X	X	Grant funds for infrastructure and non-infrastructure projects. Infrastructure projects are engineering projects or capital improvements that will substantially improve safety and the ability of students to walk and bicycle to school. Non-infrastructure projects are education/encouragement/enforcement activities that are intended to change community behavior, attitudes, and social norms to make it safer for children in grades K-8 to walk and bicycle to school.
Petroleum Violation Escrow Account	Not applicable	Department of Energy	Varies annually	None	Local and regional agencies		X	X	PVEA funds come from fines paid by oil companies in the 70s for violating oil price caps set by the federal government. Funds are used for projects that save energy, such as public transportation, computerized bus routing and ride sharing, home weatherization, energy assistance and building energy audits, highway and bridge maintenance, and reducing airport user fees.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Community Transformation Grant	July	Centers for Disease Control and Prevention	$50,000-10,000,000 per applicant	Not applicable	State and local governmental agencies, tribes and territories, and national and community-based organizations	X		X	Funding is available to support evidence and practice-based community and clinical prevention and wellness strategies that will lead to specific, measurable health outcomes to reduce chronic disease rates. Bicycle and pedestrian improvements are applicable as they encourage physical activity, which has been proven to reduce the risks of diseases associated with inactivity.
State-Administered Funding									
Bicycle Transportation Account	March	Caltrans	$7.2 million	Minimum 10% local match on construction	Public agencies	X	X	X	Funds bicycle projects that improve safety and convenience of bicycle commuters. In addition to construction and planning, funds may be used for right of way acquisition.
California Safe Routes to School	Varies	Caltrans	$24.5 million	10%	Cities and counties		X	X	SR2S is primarily a construction program to enhance safety of pedestrian and bicycle facilities near schools.
State Transportation Improvement Program (STIP)	December	Caltrans	Varies	None	Cities	X	X	X	The STIP is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the Transportation Investment Fund and other funding sources.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
State Coastal Conservancy	Rolling	State Coastal Conservancy	Varies	None	Public agencies, non-profit organizations	X	X	X	Projects must be in accordance with Division 21 and meet the goals and objectives of the Conservancy's strategic plan. More information can be found at http://scc.ca.gov/applying-for-grants-and-assistance/forms.
California Conservation Corps	On-going	California Conservation Corps	CCC donates labor hours	None	Federal and state agencies, city, county, school district, NPO, private industry		X	X	Funds projects that improve public access to and along the coast, natural resource protection and restoration in the coastal zone or affecting coastal areas, restoration of coastal urban waterfronts, protection of coastal agricultural land, and resolution of land use conflicts. CCC provides labor assistance on construction projects and annual maintenance.
Community Based Transportation Planning	March	Caltrans	$3 million	20%	MPO, RPTA, city, county		X		Eligible projects that exemplify livable community concepts including enhancing bicycle and pedestrian access.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Land and Water Conservation Fund	March	NPS, CA Dept. of Parks and Recreation	$2.3 million in CA in 2009	50% + 2-6% administration surcharge	Cities, counties and districts authorized to operate, acquire, develop and maintain park and recreation facilities	X		X	Fund provides matching grants to state and local governments for the acquisition and development of land for outdoor recreation areas. Lands acquired through program must be retained in perpetuity for public recreational use. Individual project awards are not available. The Department of Parks and Recreation levies a surcharge for administering the funds. The LCWF could fund the development of river-adjacent bicycle facilities.
Environmental Enhancement and Mitigation Program	October	California Natural Resources Agency	$10 million	None	Federal, State, local agencies and NPO		X	X	Support projects that offset environmental impacts of modified or new public transportation facilities. These projects can include highway landscaping and urban forestry projects, roadside recreation projects, and projects to acquire or enhance resource lands. EEMP funds projects in California, at an annual project average of $250,000. Funds may be used for land acquisition.
State Highway Operations and Protection Program (SHOPP)	Not Available	Caltrans	$1.69 million statewide annually through FY 2013/14	Not Available	Local and regional agencies		X	X	Capital improvements and maintenance projects that relate to maintenance, safety and rehabilitation of state highways and bridges.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Office of Traffic Safety (OTS) Grants	January	Caltrans	Varies annually - $82 million statewide in FY 2009/2010	None	Government agencies, state colleges, state universities, city, county, school district, fire department, public emergency service provider			X	Funds are used to establish new traffic safety programs, expand ongoing programs, or address deficiencies in current programs. Bicycle safety is included in the list of traffic safety priority areas. Grant funding cannot replace existing program expenditures, nor can traffic safety funds be used for program maintenance, research, rehabilitation, or construction. Evaluation criteria to assess needs include potential traffic safety impact, collision statistics and rankings, seriousness of problems, and performance on previous OTS grants.
Transportation Development Act (TDA) Article 3 (SB 821)	Not applicable	State of California and Ventura County Transportation Commission	Varies	Not applicable	Cities and counties		X	X	Funds are a percentage of the state sales tax given annually to local jurisdictions for bicycle and pedestrian projects. Funds may be used for engineering expenses leading to construction, right-of-way acquisition, construction and reconstruction, retrofitting existing facilities, route improvements, and bicycle support facilities.
Habitat Conservation Fund	October	CA Department of Parks and Recreation	$2 million	Requires a dollar-for-dollar match of grant funds	Cities, counties, and districts		X	X	Funds provide grants to protect fish, wildlife, and native plant resources, to acquire or develop wildlife corridors and trails, and to provide for nature interpretation programs and other programs which bring urban residents into park and wildlife areas.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Tire-Derived Product Grant Program	Varies	CA Department of Resources Recycling and Recovery (CalRecycle)	Varies	Not applicable	Public agencies and qualifying tribes			X	Promotes markets for recycled-content products derived from waste tires generated in California and decrease the adverse environmental impacts created by unlawful disposal and stockpiling of waste tires. Funds can be used to purchase materials for bicycle and pedestrian projects, including sidewalks/pathways, accessibility ramps, and traffic safety products.
Regional- and Local-Administered Funding									
Metro Call for Projects (CFP)	January	LA Metro	Varies annually	None	Public agencies that provide transportation facilities or services within Los Angeles County	X	X	X	Co-funds new regionally significant capital projects that improve all modes of surface transportation. Relevant categories include Bikeway Improvements; Regional Surface Transportation Improvements; Transportation Enhancement Activities; Transportation Demand Management; and Pedestrian Improvements.
Proposition A	N/A	LA County	Varies	None	Cities and unincorporated communities in LA County				A half-cent sales tax dedicated to transportation funding. One-fourth of the funds go to Local Return Programs. The monies help these entities develop and improve local public transit, paratransit, and related transportation infrastructure

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Proposition C	N/A	LA County	Varies	None	Cities and unincorporated communities in LA County				Revenues are allocated into categories including Rail & Bus Security; Commuter Rail, Transit Centers and Park and Ride Lots; Local Return; and, Transit Related Improvements to Streets and Highways. Supports projects and programs developed with Prop A funds.
Measure R	N/A	LA County	Varies	none	Cities and unincorporated communities in LA County	X	X	X	A half-cent sales tax to finance new transportation projects and programs, and accelerate many of those already in process.
Adopt-A-Trail Programs	Not applicable	Local trail commission or non-profit	Varies	Not applicable	Local governments		X	X	These programs used to fund new construction, renovation, trail brochures, informational kiosks and other amenities. These programs can also be extended to include sponsorship of trail segments for maintenance needs.
Design Arts Program	Varies by grant	National Endowment for the Arts	Varies	A nonfederal match of at least 1 to 1	Counties, local governments, public entities, or nonprofits	X		X	Provides grants to states and local agencies, individuals and nonprofit organizations for projects that incorporate urban design, historic preservation, planning, architecture, landscape architecture and other community improvement activities, including greenway development. Grants to organizations and agencies must be matched by a 50% local contribution. Agencies can receive up to $50,000.

Funding Source	Due Date*	Administering Agency	Annual Total	Matching Requirement	Eligible Applicants	Planning	Con-struction	Other	Notes
Other Funding Sources									
Community Action for a Renewed Environment	March	US EPA	Varies	Not Available	Applicant must fall within the statutory terms of EPA's research and demonstration grant authorities	X		X	Grant program to help community organize and take action to reduce toxic pollution in its local environment
Bikes Belong Grant	Multiple dates throughout year.	Bikes Belong	Not Available	50% minimum	Organizations and agencies		X	X	Bikes Belong provides grants for up to $10,000 with a 50% match that recipients may use towards paths, bridges and parks.
Volunteer and Public-Private Partnerships	Not Applicable	City, county, joint powers authority	Varies	Not Applicable	Public agency, private industry, schools, community groups		X	X	Requires community-based initiative to implement improvements.

** Due dates are subject to change due to pending authorization of a new federal transportation bill.*

*** Program is one of many programs authorized under SAFETEA-LU and current funding has only been extended through September 30, 2011.*

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Appendices

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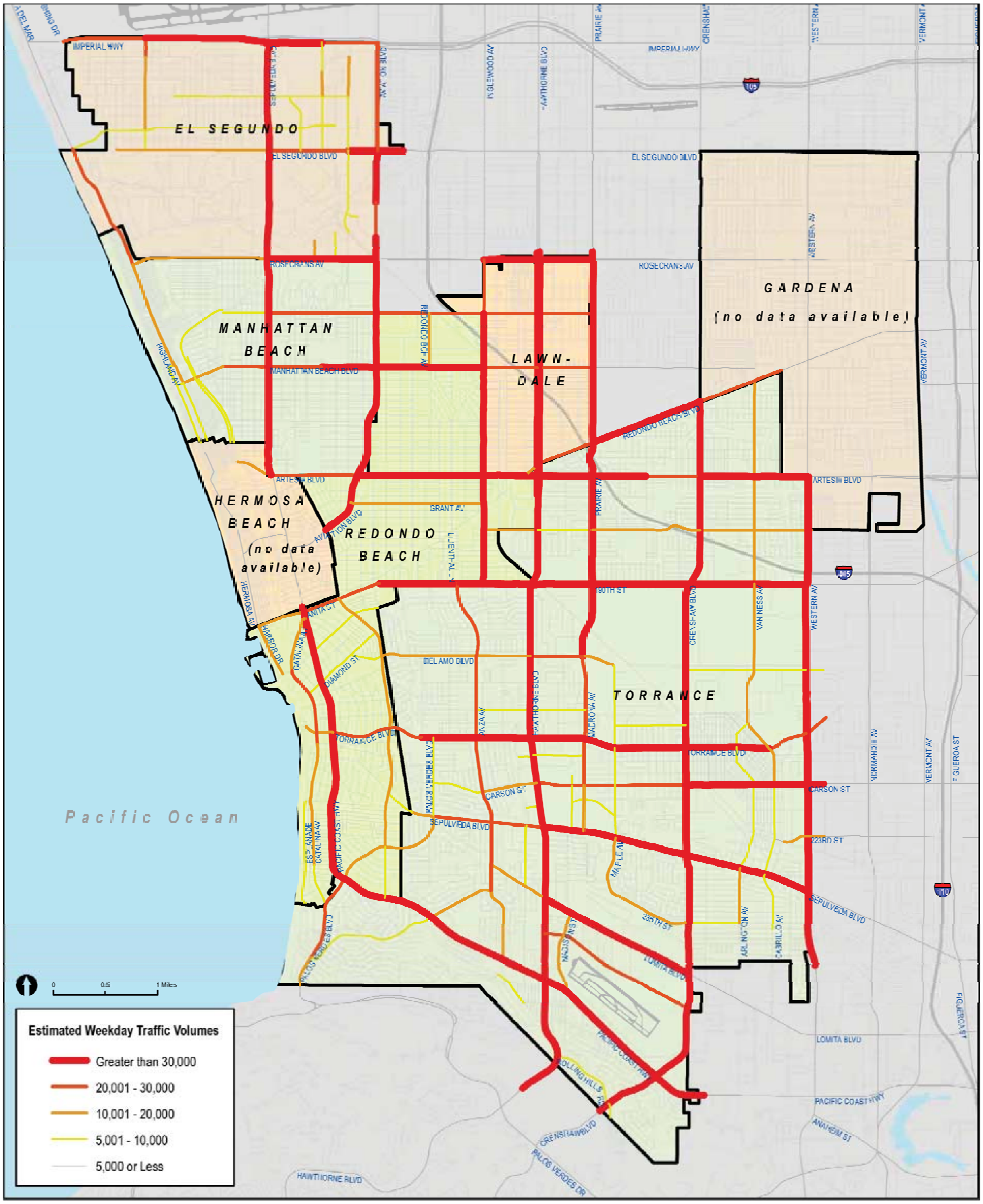
Appendix A: Large Scale Maps

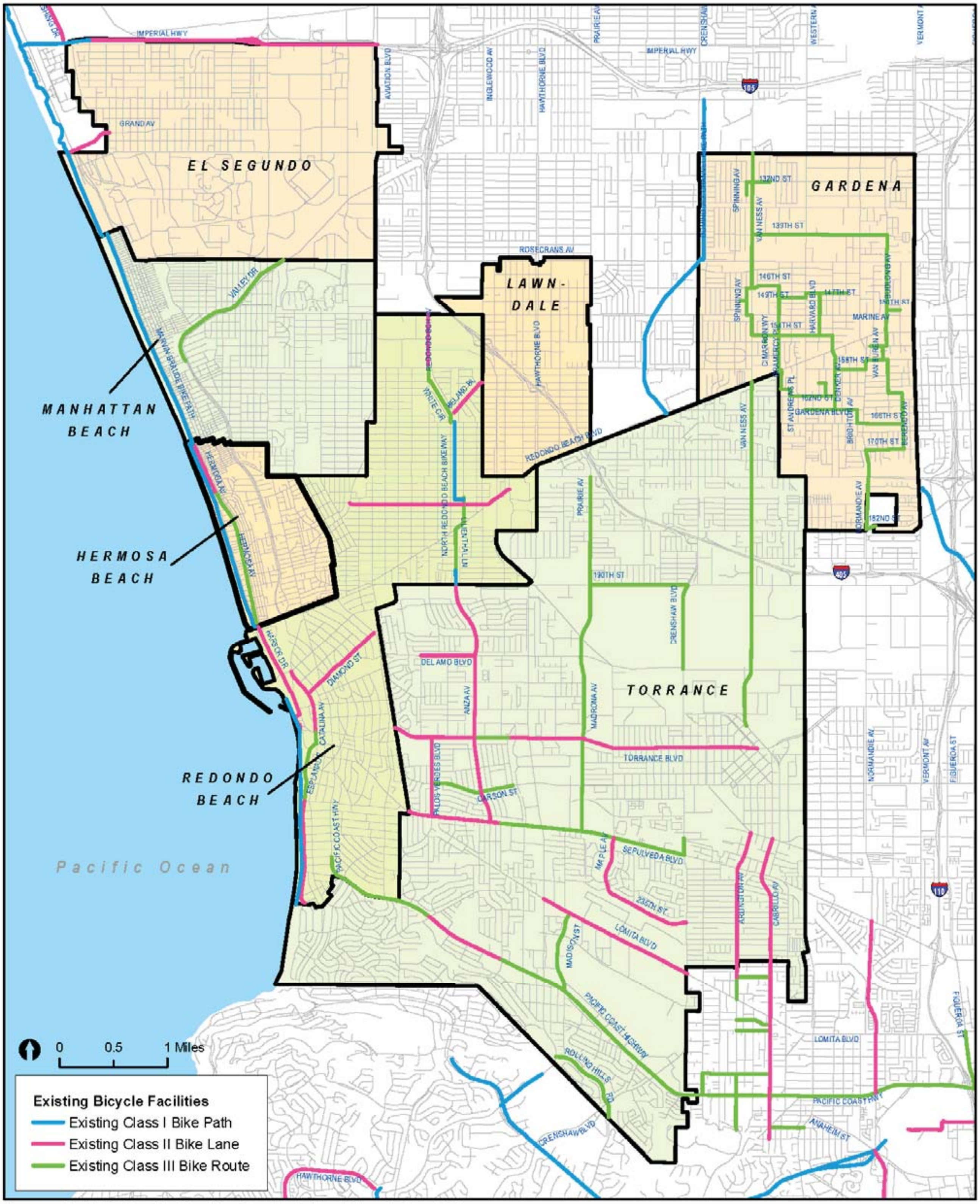


Appendix A-1: South Bay Region Estimated Weekday Traffic Volumes

South Bay Bicycle Master Plan

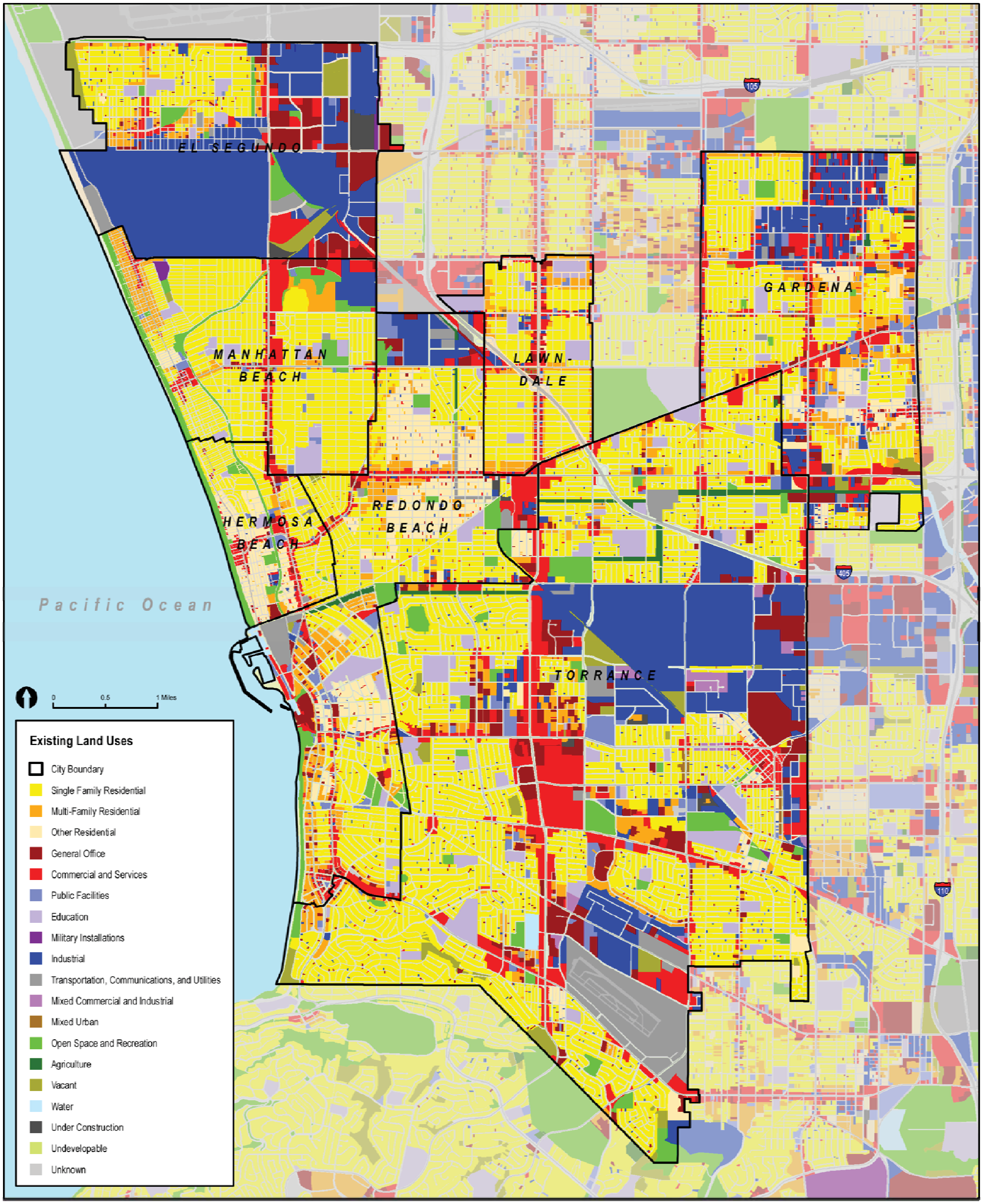
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: General Plan Circulation Elements for the Cities of El Segundo, Lawndale, Manhattan Beach, Redondo Beach and Torrance; Date: 1/1/2011



Appendix A-2: South Bay Region Existing Bicycle Facilities

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

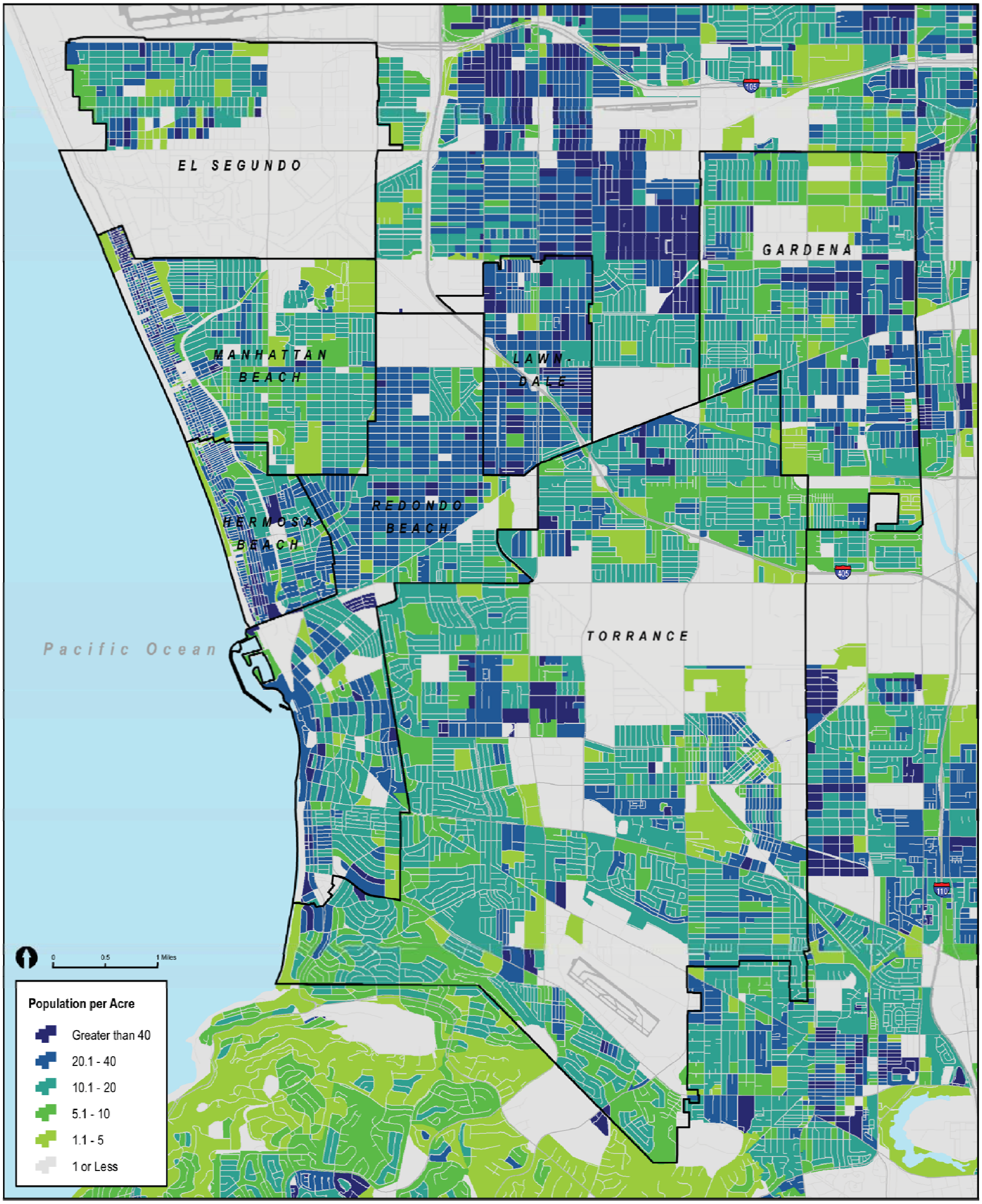


Appendix A-3: South Bay Region Existing Land Uses

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: SCAG (2008); Date: 1/1/2011

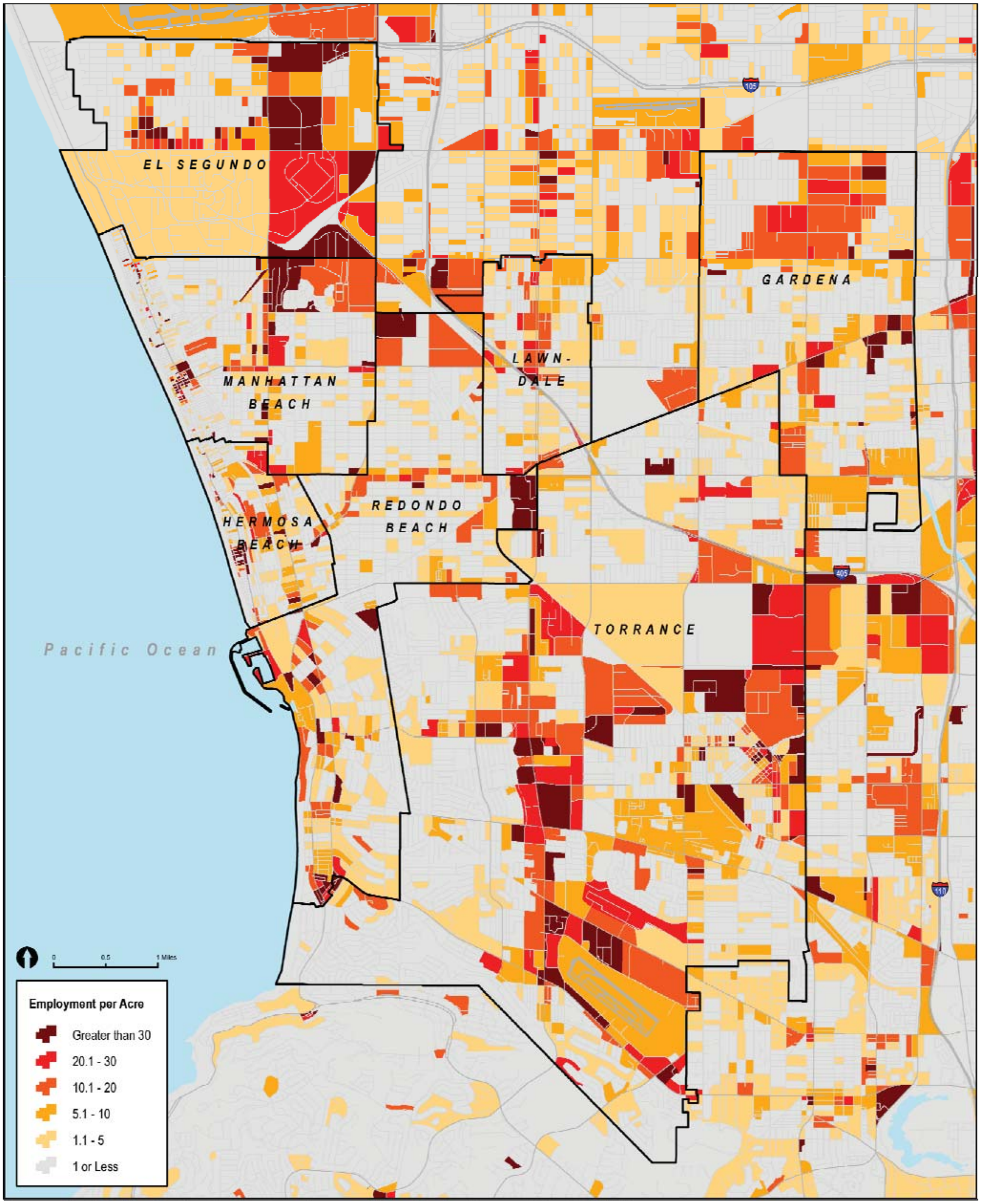


Appendix A-4: South Bay Region Population Density by 2000 Census Block

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2000); Date: 1/1/2011

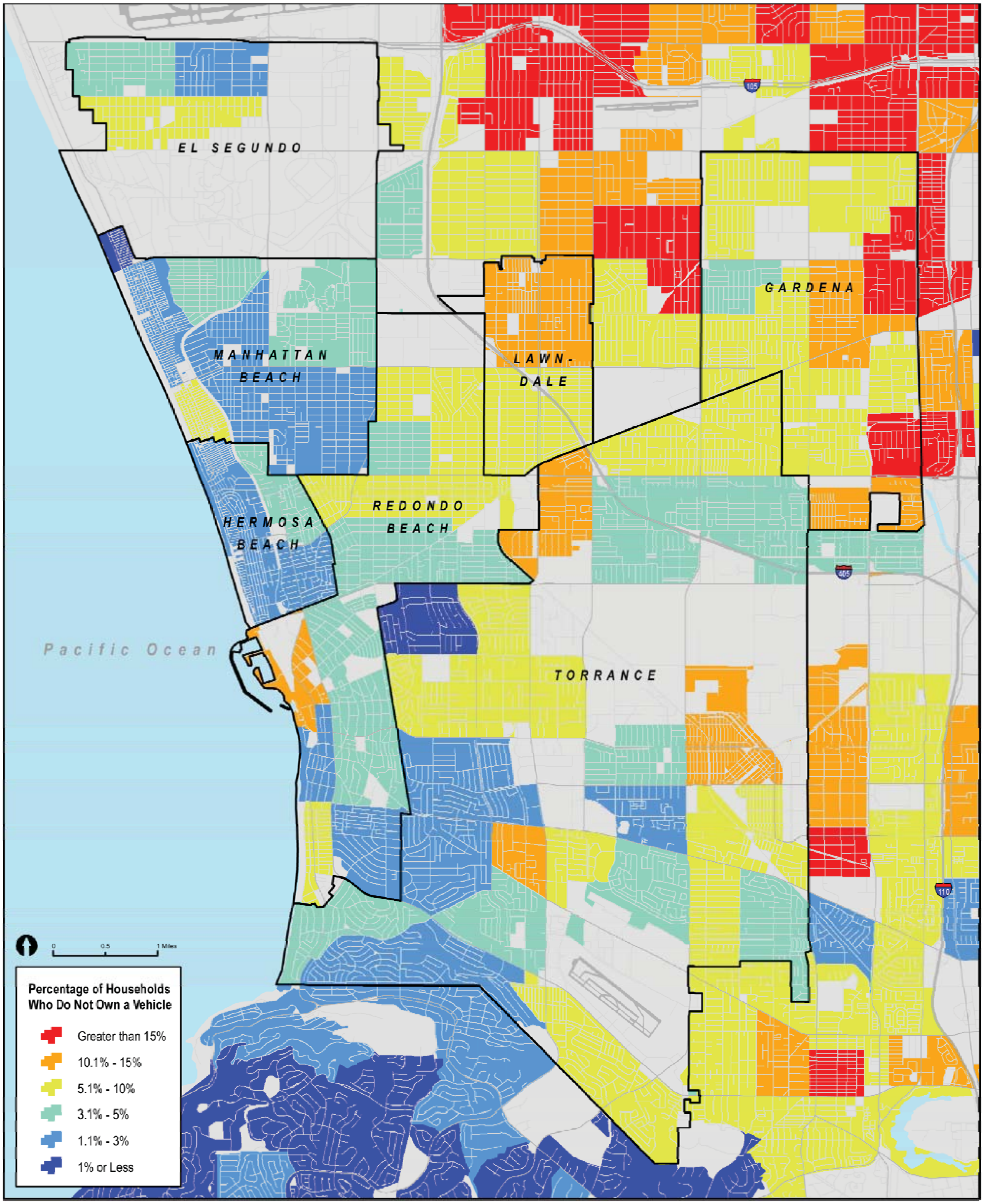


Appendix A-5: South Bay Region Employment Density by Census Block (2008)

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2008); Date: 1/7/2011

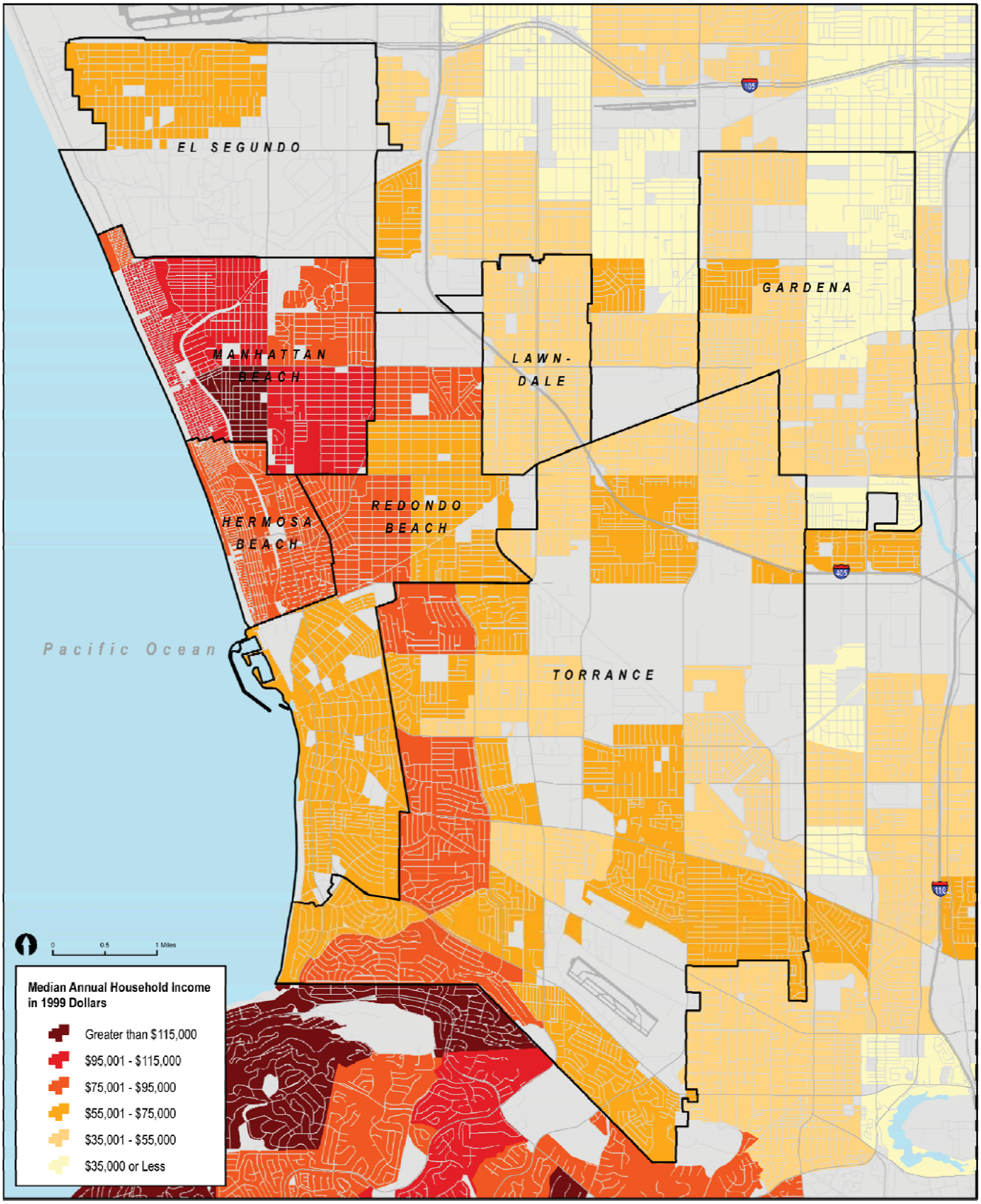


Appendix A-6: 2000 South Bay Region Households Who Do Not Own a Vehicle by Census Tract

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2000); Date: 1/1/2011

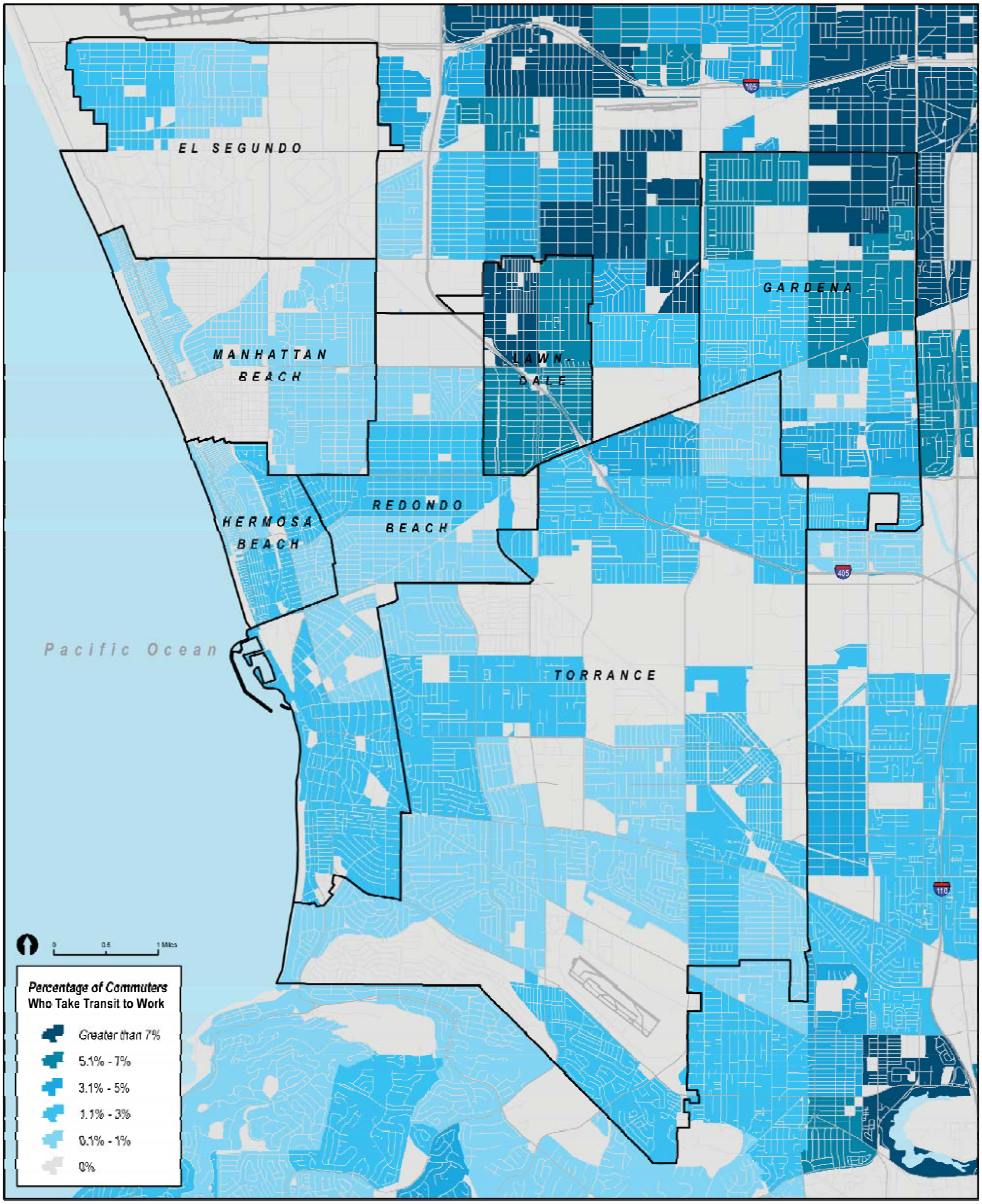


Appendix A-7: 2000 South Bay Region Median Annual Household Income by Census Tract (1999 Dollars)

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2000); Date: 1/1/2011

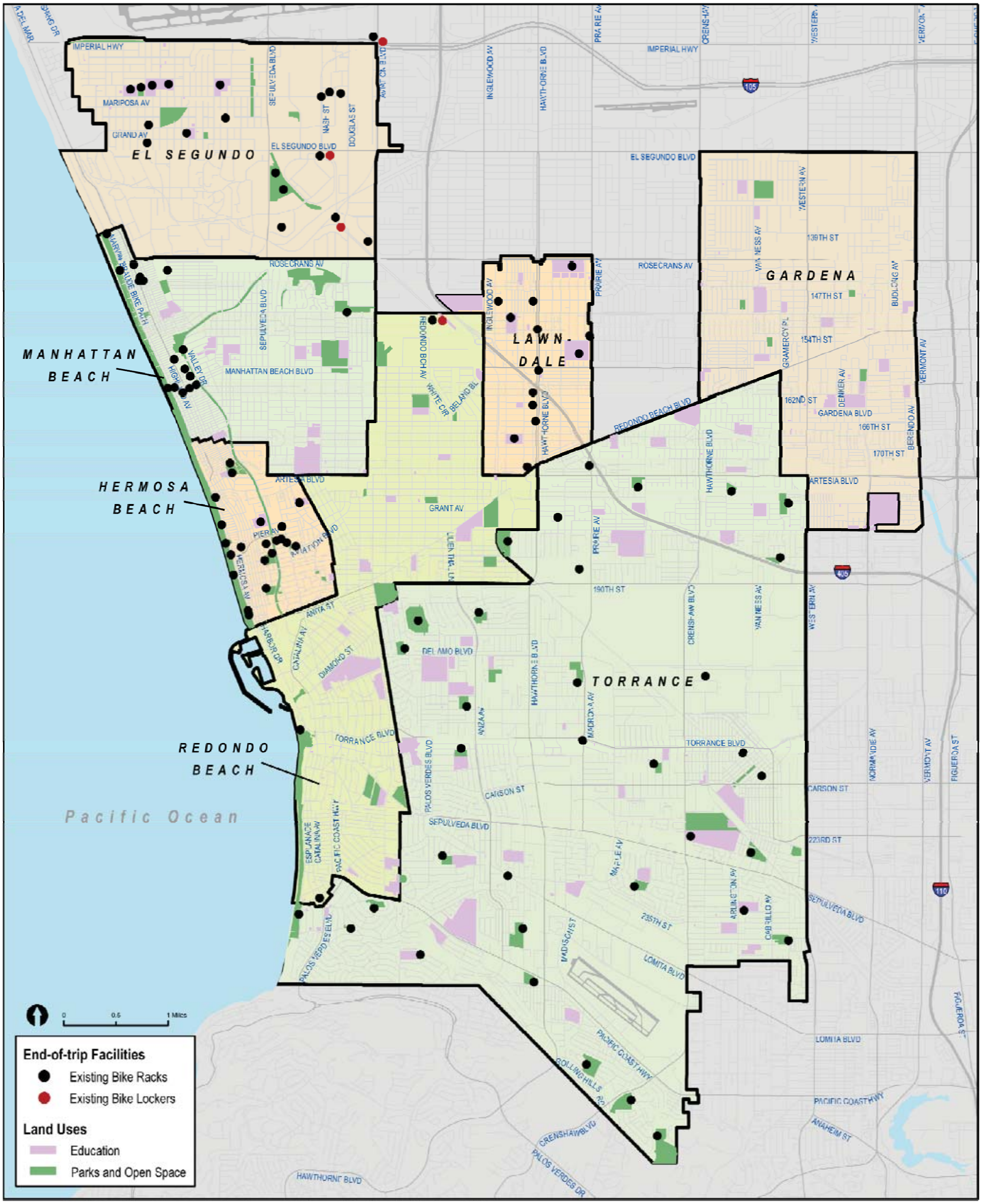


Appendix A-8: South Bay Region Commuters Who Take Transit to Work by Census Tract

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2000); Date: 1/1/2011

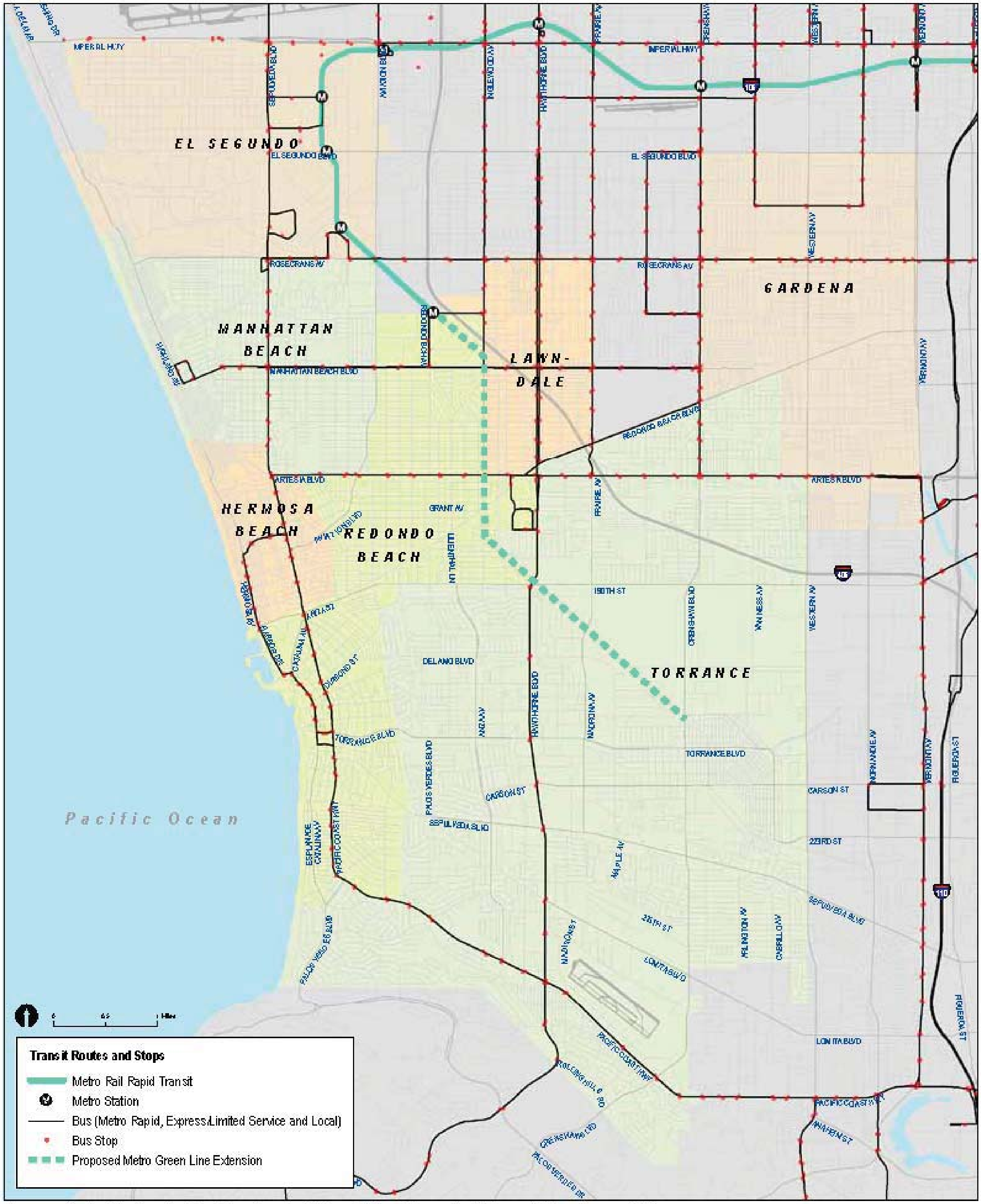


Appendix A-9: South Bay Region Existing End-of-Trip Facilities

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of El Segundo (2011); City of Hermosa Beach (2011); City of Lawndale (2011); City of Manhattan Beach (2011); City of Redondo Beach (2011); City of Torrance (2011)



Appendix A-10: South Bay Region Existing Metro-Operated Transit Routes and Stops

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: Metro (2010); Date: 1/1/2011

Appendix A-11: Commuter Express Line 438 Route

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

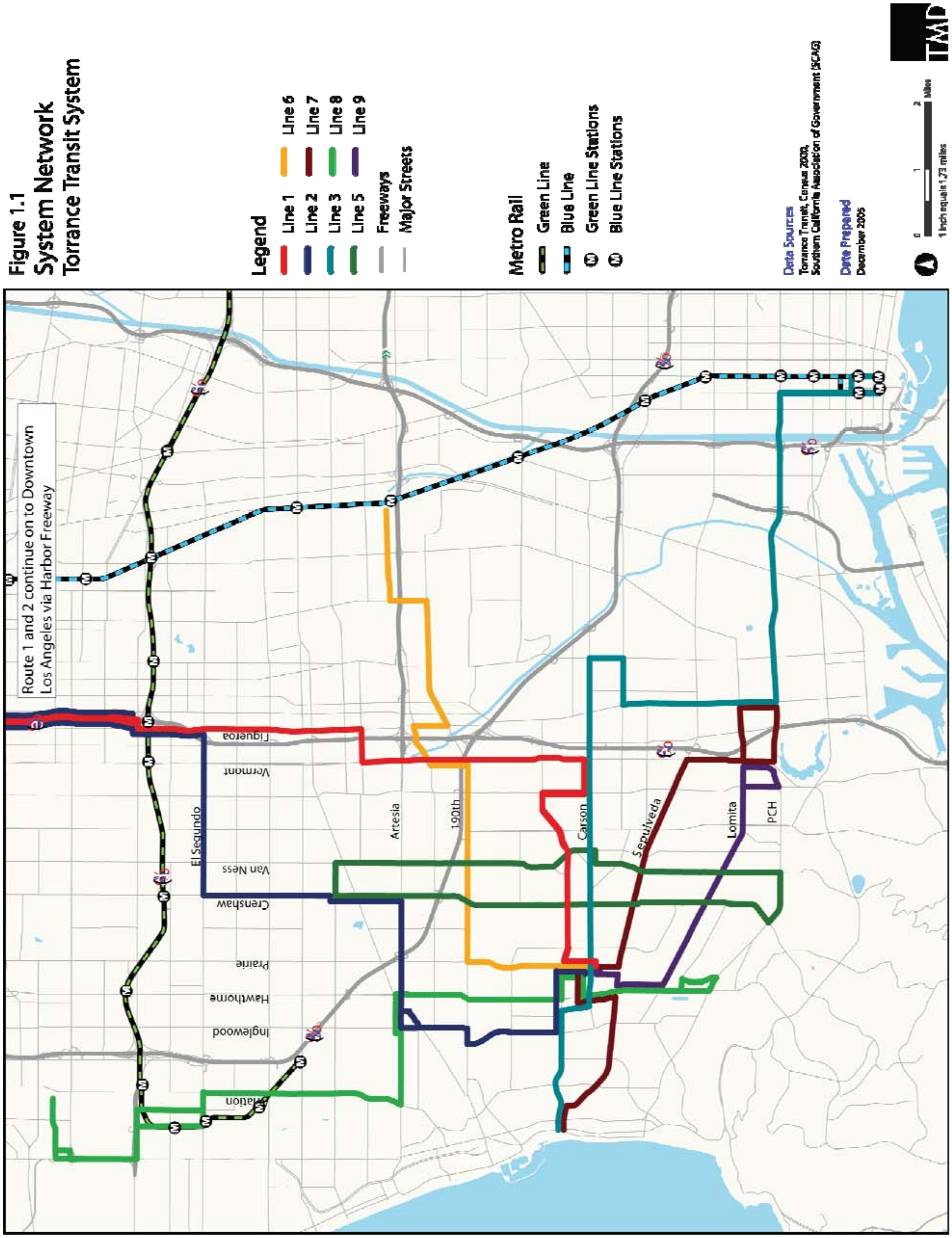
Source: Los Angeles Department of Transportation (2011)

Appendix A-12: Commuter Express Line 574 Route

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: Los Angeles Department of Transportation (2011)

Appendix A-13: Beach Cities Transit System Map

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Redondo Beach (2010)

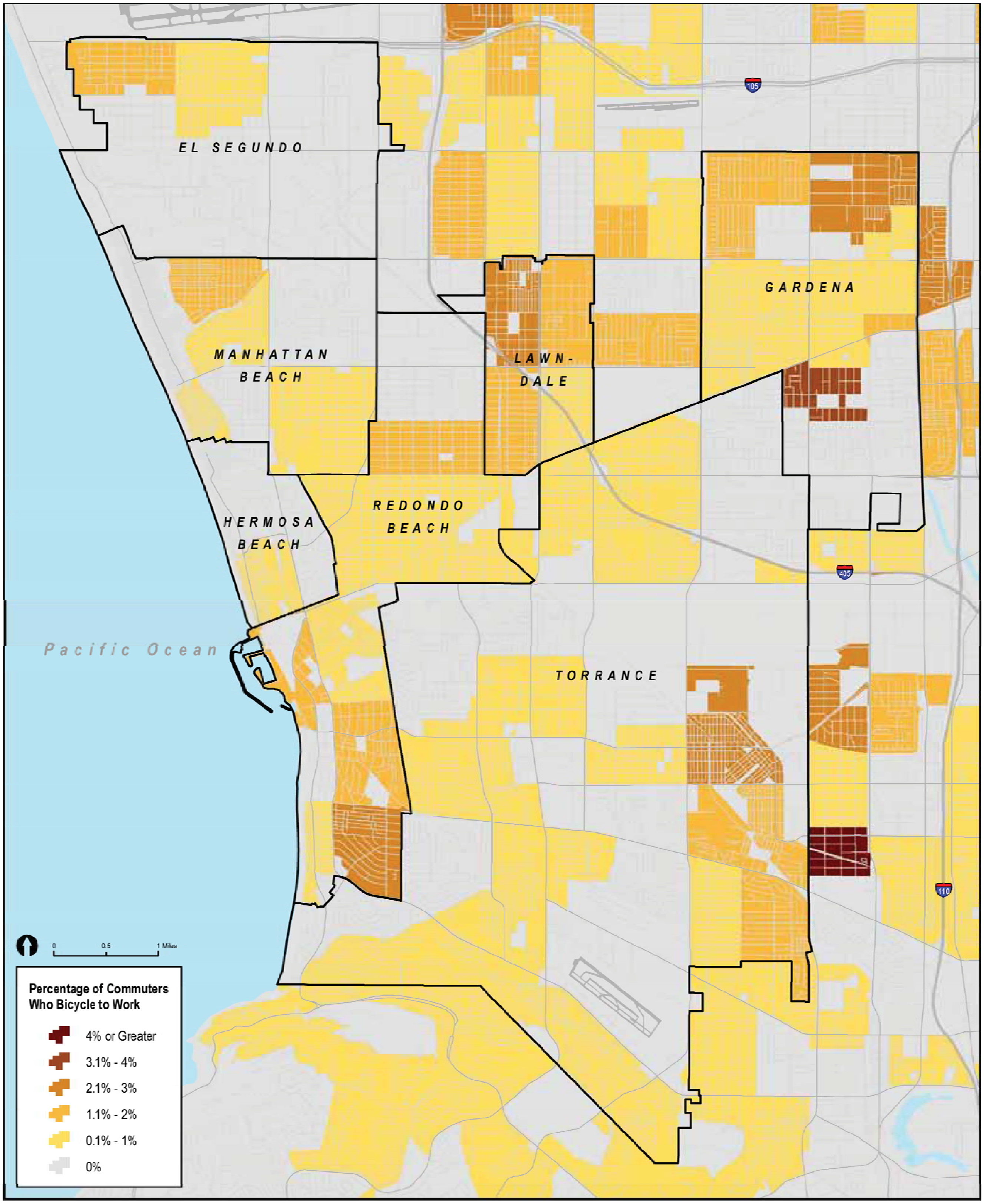


Appendix A-14: Torrance Transit System Map

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Torrance (2010)

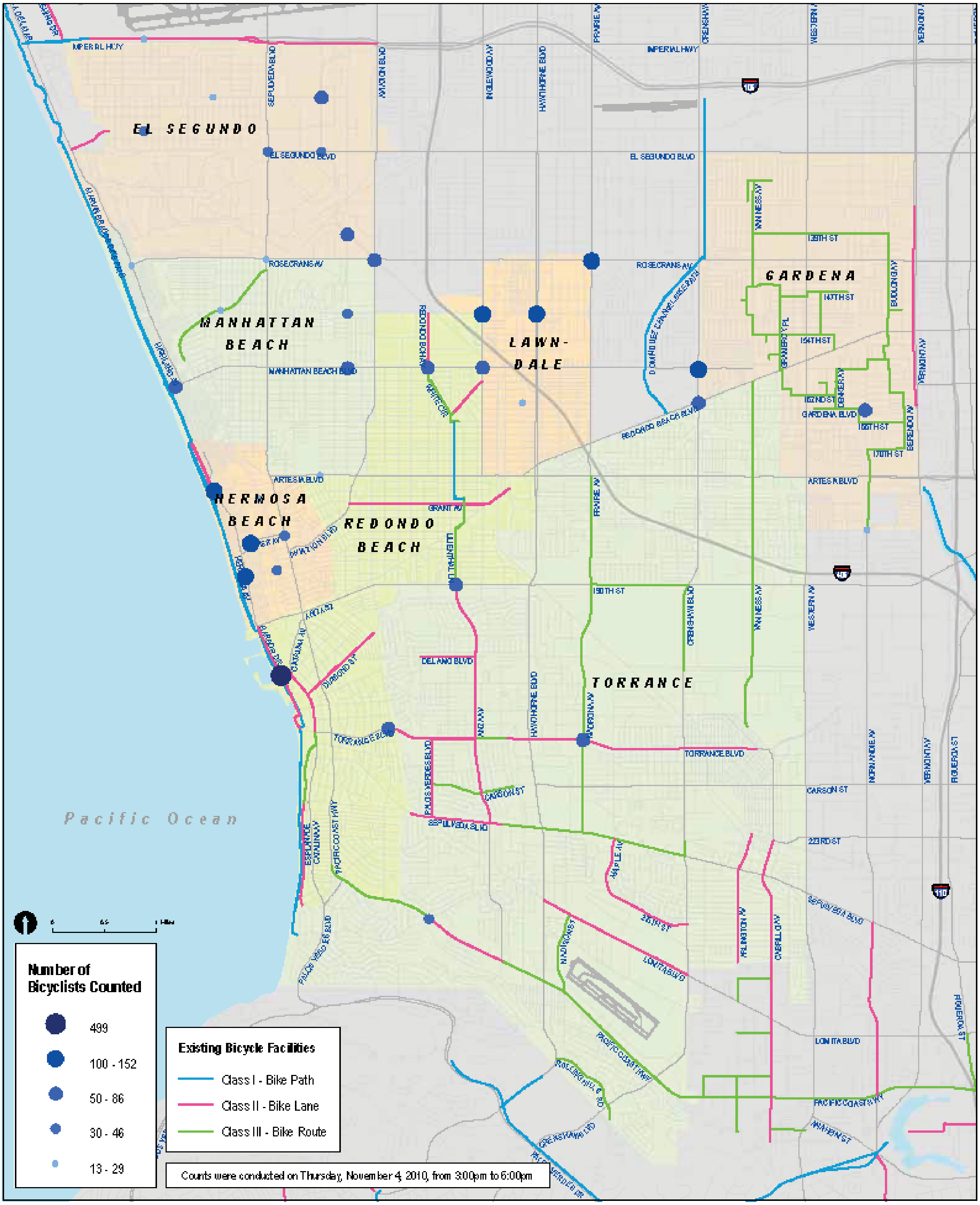


Appendix A-15: 2008 South Bay Region Commuters Who Bicycle to Work by Census Tract

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: US Census (2008); Date: 1/1/2011

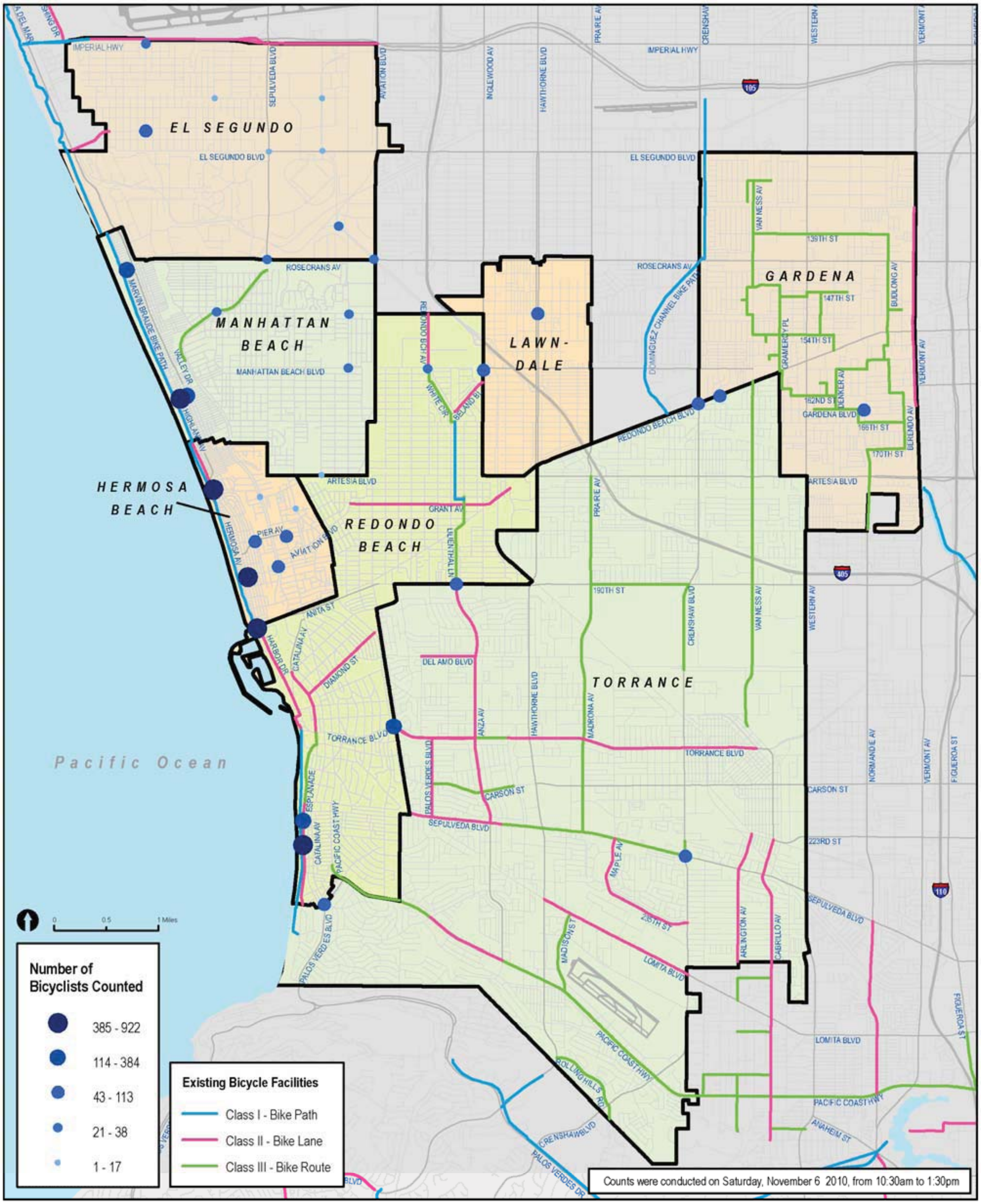


Appendix A-16: South Bay Region Weekday PM Peak Period Count of Bicyclists

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Date: 1/1/2011

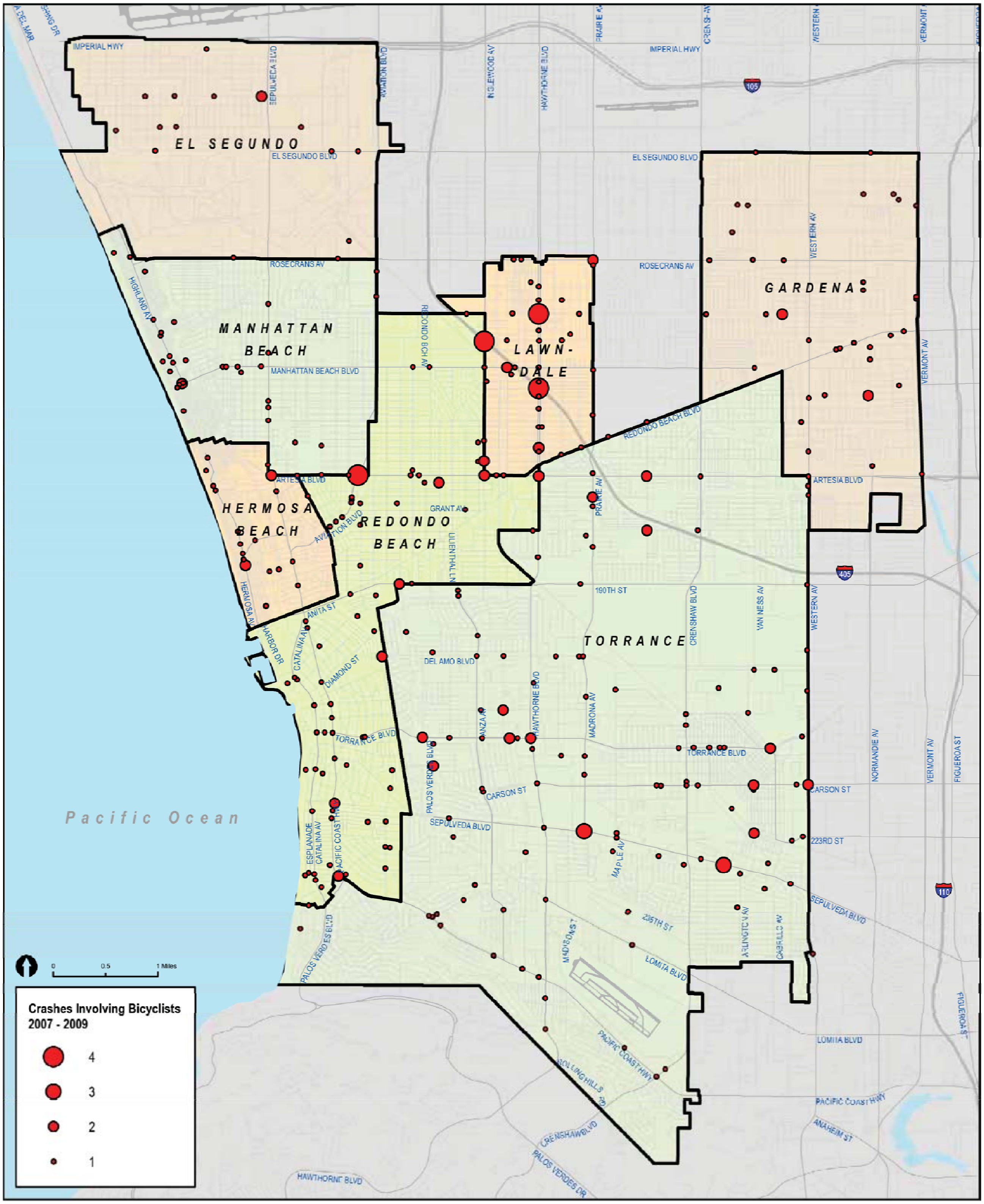


Appendix A-17: South Bay Region Weekend AM Peak Period Count of Bicyclists

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: Metro (2010); Date: 1/1/2011

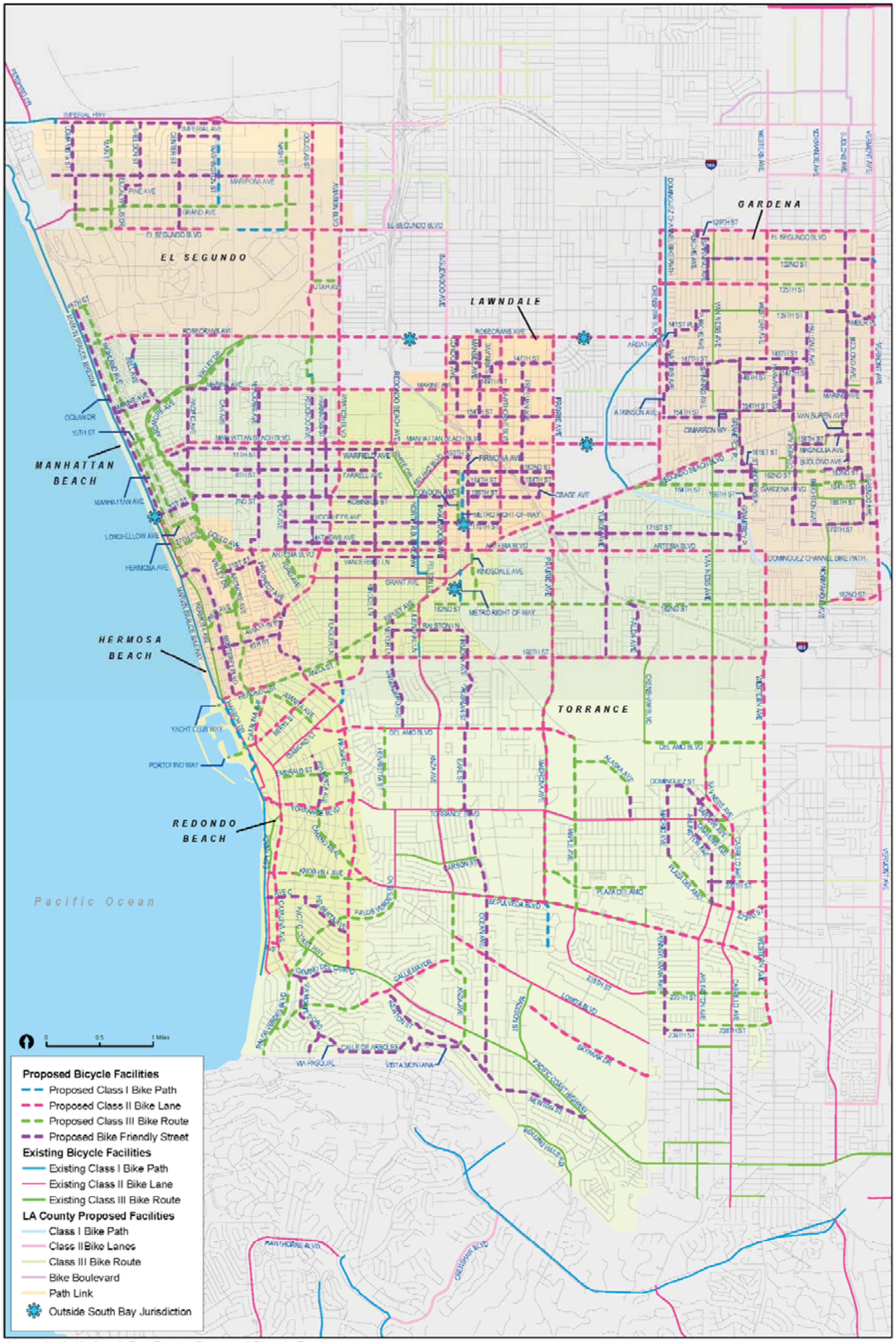


Appendix A-18: South Bay Region Bicycle Crashes (2007-2009)

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: SWITRS (2010); Date: 1/1/2011



Appendix A-19: South Bay Region Proposed Bicycle Facilities

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

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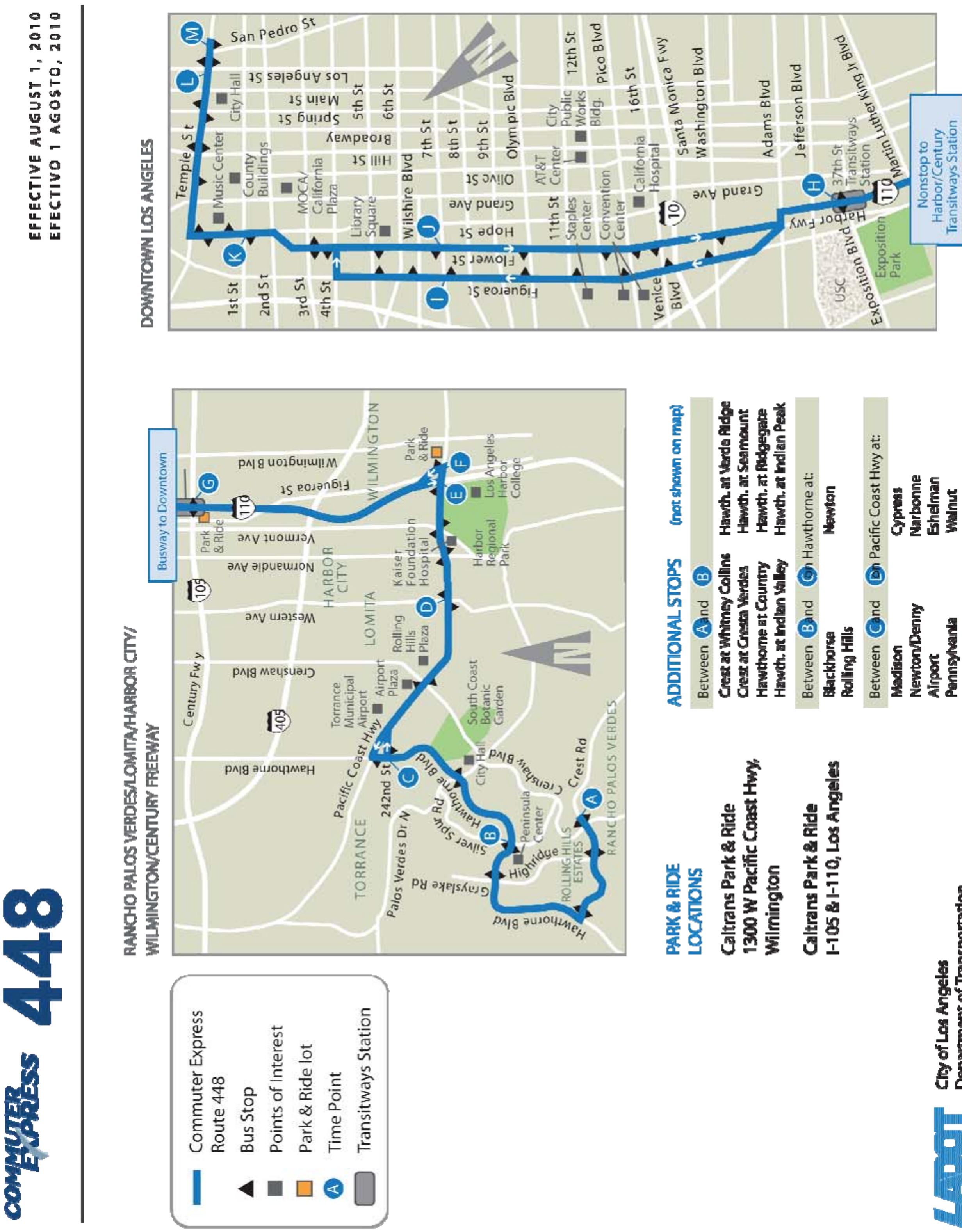
Appendix A-20: Lawndale Beat System Map

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Lawndale (201?)



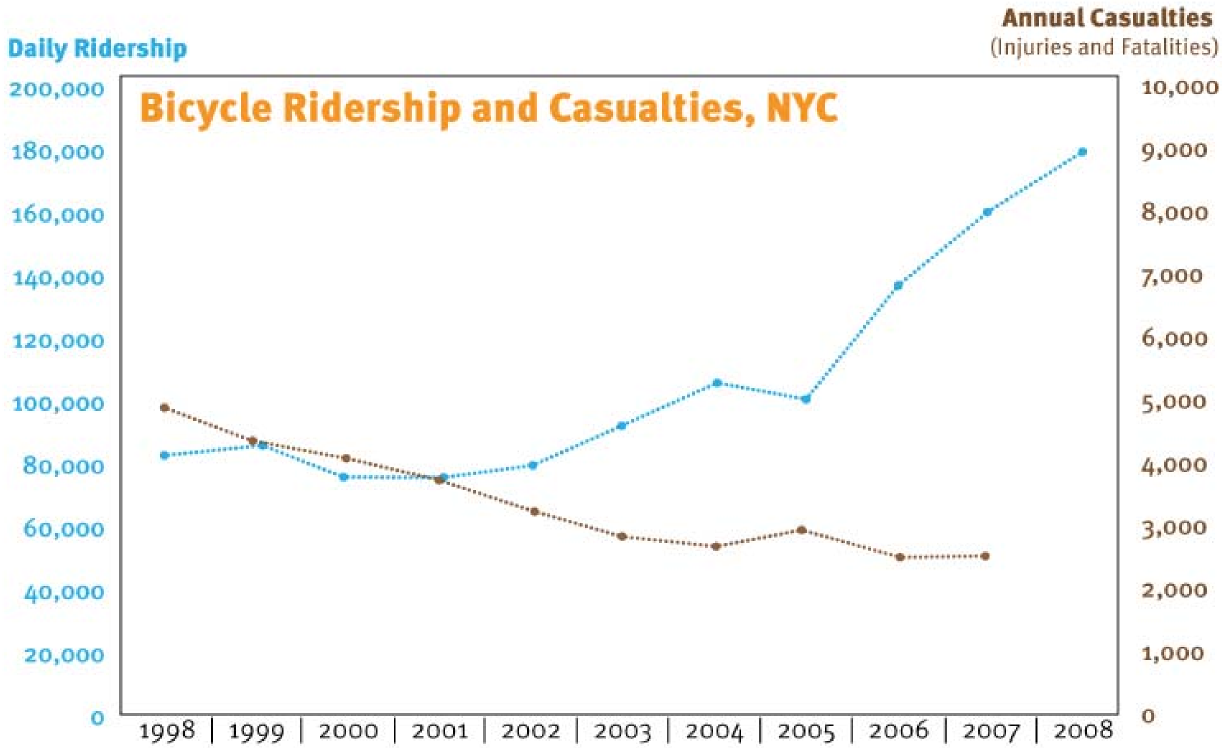
Appendix A-21: Commuter Express Line 448 Route

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: Los Angeles Department of Transportation (2011)

Appendix B: New York City Bicycle Collision vs Ridership Data



Source: City of New York Department of Transportation

Appendix C: Bicycle Facility Standards

The following table presents the minimum bicycle facility standard widths recommended by the California Highway Design Manual (CA HDM), the American Association of State Highway and Transportation Officials (AASHTO), the National Association of City Transportation Officials, as compared to the standards recommended as part of the South Bay Bicycle Master Plan.

Bicycle Facility Type	Organization Standards			
	CA HDM[35]	AASHTO[36]	NACTO[37]	South Bay
Class I Bike Path	2.4 meters (8 feet)	10 feet	N/A	8-10 feet
Class II Bike Lane	1.5 meters (5 feet)	5 feet	6 feet	6 feet (5 feet plus 1 foot buffer)

Class III Bicycle Routes are not included in this table as the minimum width is dependent on a variety of roadway conditions. The Manual on Uniform Traffic Control Devices provides guidance on the placement of shared lane markings on Class III Bike Routes in section 9C.07. The South Bay Bicycle Master Plan recommends that the South Bay participating cities follow MUTCD standards., which is at least 11 feet from the face of the curb.

The table below presents minimum standards for vehicular travel lanes and parallel parking lanes as compared to South Bay recommended minimum widths. The participating cities may use wider travel lanes where appropriate and feasible. In most cases, recommendations for facilities in this Plan will comply with AASHTO standards. In few constrained cases, facilities may require travel and parking lanes to drop slightly below AASHTO standards.

Lane Width Type	AASHTO[38]	South Bay
Vehicular Travel Lane	10 feet	9.5 feet
Parking Lane	8 feet	7.5 feet

[35] Source: CA HDM Section 1003

[36] Source: AASHTO Guide for the Development of Bicycle Facilities 4.6.4

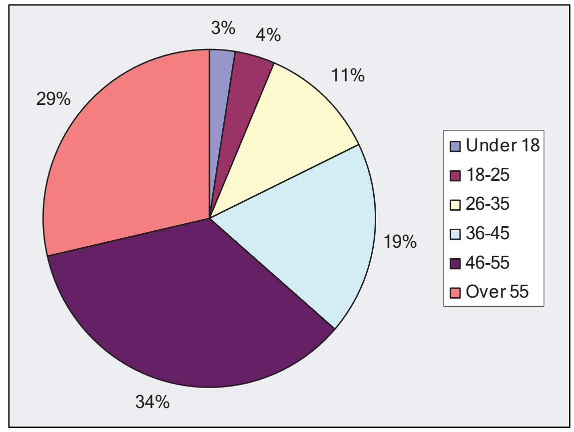
[37] Source: NACTO Urban Bikeway Design Guide

[38] Source: AASHTO A Policy on Geometric Design of Highways and Streets

Appendix D: Online Survey Analysis

Respondent Demographics

Most of the survey respondents live in one of the seven participating South Bay cities. Respondents who do not live in one of the participating cities live in other cities and communities nearby. Almost two-thirds of survey respondents also work in one of the participating South Bay cities.



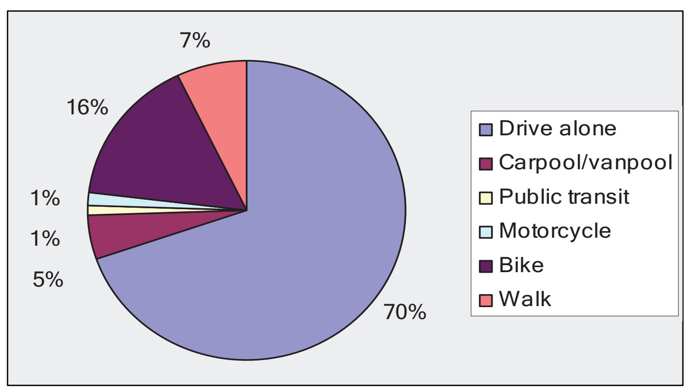
Survey Respondent Age Distribution

Over half of the respondents are over 46 years old, about one-fourth of which are over 55 years old. Relatively few young adults and youth responded to the survey (only three percent and four percent respectively) and many respondents stated in later questions that they are retired. This suggests that the survey was either distributed predominantly to older populations or the bicycling populations in the South Bay participating cities are generally older.

Respondent Bicycle Mode Characteristics

Almost three-quarters of survey respondents commute predominantly by driving alone, which is below the national average and above the averages for the State of California and the County of Los Angeles[39]. 16 percent of respondents commute primarily by bicycle and seven percent commute predominantly by walking, which means that a total of 23 percent of respondents get to work using active, non-motorized modes. This is a disproportionately high percentage as compared to the national averages of walking and bicycling to work, which is probably because people who ride a bicycle regularly are naturally more interested in participating in a survey about bicycling.

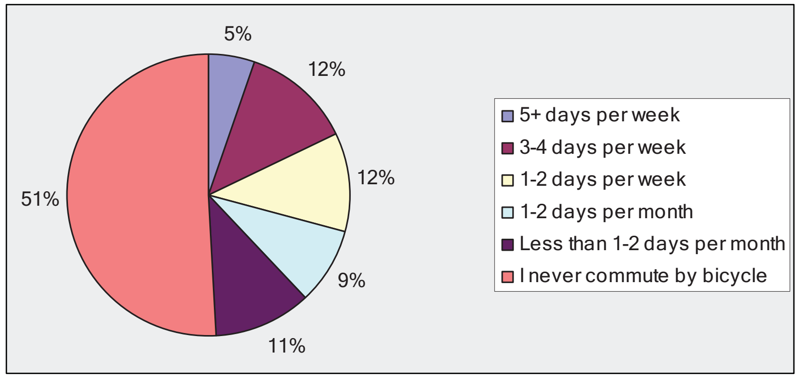
As further evidence that survey respondents are disproportionately bicyclists, nearly half of respondents said they commute by bicycle some of the time, just over one-third commute by bicycle at least once a month, and just under one-third commute by bicycle at least once a week. Also, 88 percent of respondents said they were comfortable riding in some traffic situations.



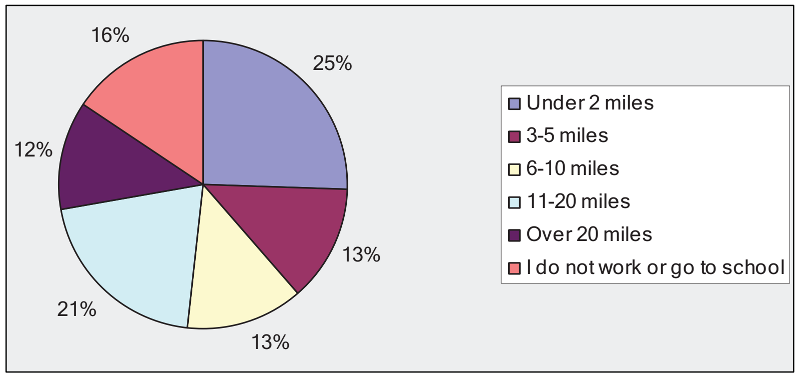
Survey Respondent Primary Commute Mode

[39] See individual City chapters for detailed commute to work data.

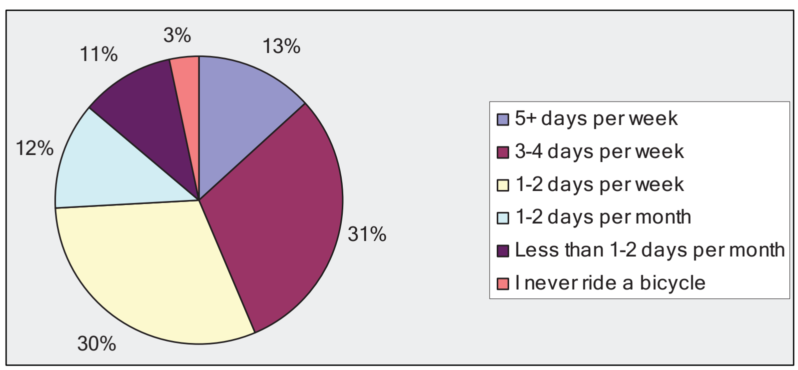
38 percent of respondents live less than five miles from work. It is likely that the short commute distance contributes to the disproportionate number of bike and walk commuters seen in the survey. Similarly, a relatively large proportion of respondents do not work or go to school (16 percent), which matches the relatively large proportion of respondents who are over 55, some of whom explicitly stated that they were retired.



Survey Respondent Days per Week Commuting by Bicycle



Survey Respondent Commute Distance



Survey Respondent Days per Week Riding a Bicycle (other than for commuting)

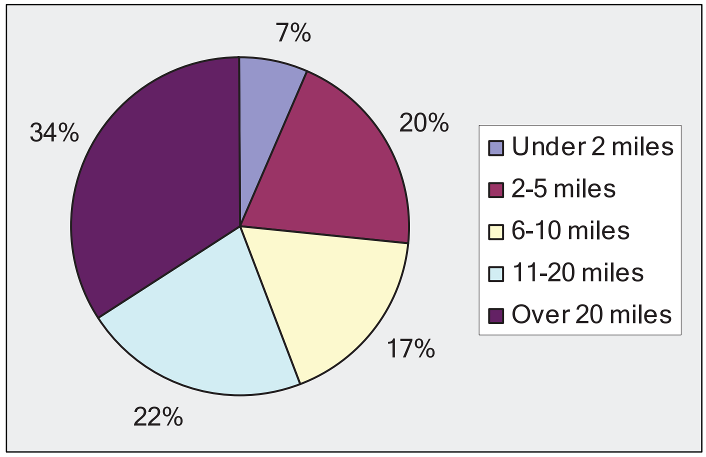
The survey asked respondents to estimate bicycle trips that were not commute trips, such as bicycle rides for exercise or to run errands. The frequency of bicycle trips was significantly higher for trips made by bicycle that were not to work or school. While over half of respondents said that they never ride to work, only three percent replied that they never ride for any purpose. Similarly, while almost thirty percent of respondents commute by bike at least once a week, almost three-quarters ride their bicycles at least once a week for trips other than for commuting.

Of the optional responses, the top reason survey respondents selected as why they bicycle was for exercise. Almost all of the survey respondents selected this as a reason. After exercise, the next most common response was bicycling to shop, run errands, or eat out, which 38 percent of respondents listed as a reason that they bicycle. The percentage of respondents bicycling for these utilitarian trips exceeds the percentage who reported that they bike to get to work or school (31%). This suggests that interventions that aim to increase bicycling, whether they are programs, infrastructure, or education, should target many destinations, not just job centers and schools, as well at many travel times, not just the peak commuting hours.

About one-third of survey respondents said that the average length of their bicycle trips is over 20 miles, while only seven percent responded that their bicycle trips average less than two miles. It is possible that since so many respondents ride for exercise, many of their bicycle rides are long.

Barriers to Bicycling

The survey asked respondents to note what prevents them from bicycling to work and from bicycling in general. It also asked respondents to rate the degree to which a number of conditions influence their decisions to bicycle.



Survey Respondent Average Bicycle Trip Length

A number of common themes emerged from the responses. Survey respondents highly value bicycle lanes. They cited lack of bicycle lanes as the biggest barrier that prevents them from biking to work. On a scale from 1 to 5, with 1 being the most important, respondents gave the presence of bicycle lanes a weighted average score of 1.7. Similarly, respondents commonly cited lack of bicycle paths and routes as barriers to riding and rated these as very important factors in their decision to ride, as well.

A second common theme is the behavior of motorists, which scored highly on respondents' ranking of conditions that influenced their decision to bicycle. Motorist behavior was specifically one of the most common reasons that participants chose not to bike. Similarly, respondents also considered vehicle volumes and speeds important factors in determining their decisions to ride.

Some of the conditions that respondents considered less important influences in their decisions to bicycle relative to the other options were integration with transit (only 36% think it is important) and behavior of other bicyclists (only 36% think it is important).

Table D-1, Table D 2, and **Table D-3** display the full responses regarding barriers to riding.

Table D-1: Barriers to Commuting by Bicycle

If you ride for exercise/recreation, what prevents you from commuting by bike?		
Answer Options	Response Percent	Response Count
Lack of off-street bike paths	31.7%	57
Lack of on-street bike lanes	46.1%	83
Lack of bike routes	35.6%	64
Lack of bike parking or storage	22.2%	40
My work/school does not have showers	22.2%	40
I do not have enough time	25.6%	46
I live too far away	22.8%	41
I have too much stuff to carry	33.3%	60
I have to transport children	10.0%	18
Other (please specify)		78
	answered question	180
	skipped question	97

Table D-2: Barriers to Riding in the South Bay

What keeps you from riding more often in the South Bay? Check all that apply.		
Answer Options	Response Percent	Response Count
Lack of bike paths	41.2%	107
Lack of bike lanes	52.7%	137
Lack of bike routes	40.8%	106
Insufficient bike parking or storage	25.4%	66
Insufficient lighting	11.2%	29
Vehicle volumes/speeds	41.2%	107
Behavior of motorists	46.5%	121
Behavior of other cyclists	7.3%	19
I do not feel safe	18.8%	49
I travel with small children	11.2%	29
I don't have enough time	24.6%	64
My destinations are too far away	15.0%	39
Health issues/concerns	1.9%	5
Weather	16.2%	42
	answered question	260
	skipped question	17

Table D-3: Factors that Influence Decisions to Ride a Bicycle

Please rank to what degree the following conditions affect your decision to ride a bicycle:						
Answer Options	(1) Very Important	(2) Somewhat important	(3) Neutral	(4) Somewhat unimportant	(5) Not Important	Weighted Score
Presence of off-street bike paths	95	84	41	19	19	2.2
Presence of on-street bike lanes	143	80	16	7	12	1.7
Presence of bike routes	96	89	48	9	16	2.1
Condition of bikeway/roadway (i.e. pavement quality)	119	88	36	3	12	1.8
Traffic volumes/speeds	128	95	23	5	7	1.7
Behavior of motorists	140	77	30	3	8	1.7
Behavior of other cyclists	36	58	94	28	42	2.9
Amount of street lighting	33	76	80	40	29	2.8
Access to bike parking and storage	43	91	66	34	24	2.6
Ability to combine bicycle trips with transit trips	30	64	79	35	50	3.0
Travel time	55	92	68	17	26	2.5
Available information/knowledge of bike routes	41	91	77	22	27	2.6
Weather	73	86	55	25	19	2.3
					answered question	258
					skipped question	19

Bicycle Infrastructure and Programs

The survey invited participants to indicate where they would like to see new bicycle facilities and asked them to rank their interest in a number of bicycle programs. 186 of the 279 respondents gave specific feedback on where they would like to see bicycle facilities. The most popular programs were public awareness campaigns, maps and guides, and bicycle information websites. **Table D-4** displays the full responses on bicycle programs.

Table D-4: Bicycle Program Interest

Please rate your interest in the following bicycle programs:				
Answer Options	(1) Not interested	(2) Somewhat interested	(3) Very interested	Weighted Score
Riding skills and safety courses for adults	123	89	46	1.7
Riding skills and safety courses for children	102	69	87	1.9
Safe Routes to School programs for children	75	68	115	2.2
Public awareness campaigns	34	81	143	2.4
Special events	61	130	67	2.0
Maps and guides	42	102	114	2.3
Bicycle information websites	29	114	115	2.3
Commuter incentive programs	61	82	115	2.2
Information and maps delivered to my home	97	107	54	1.8
Booths at public events	81	138	39	1.8
			answered question	258
			skipped question	19

Appendix E: BTA Compliance Tables

Table E-1: El Segundo BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	49-54	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	41-42	
	c) A map and description of existing and proposed bikeways.	46-47, 58-61	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	47-48, 63-65	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	47-48, 63-65	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	47-48, 63-65	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	48-49, 56-58, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	49, 14-16, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 44-45	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	66-67	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	49, 66	

Table E-2: Gardena BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	83-89	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	77-79	
	c) A map and description of existing and proposed bikeways.	80-82, 92-95	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	82, 96-98	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	82, 96-98	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	82, 96-98	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	83, 90-91, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 83, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 80	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	100-103	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	83, 99-100	

Table E-3: Hermosa Beach BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	121-127	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	113-115	
	c) A map and description of existing and proposed bikeways.	118-119, 10-134	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	119-120, 134-136	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	119-120, 134-136	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	119-120, 134-136	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	120, 128-129, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 121, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 116-117	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	138-140	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	120, 137-138	

Table E-4: Lawndale BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	155-161	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	149-151	
	c) A map and description of existing and proposed bikeways.	153-154, 164-167	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	153-155, 168-170	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	153-155, 168-170	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	153-155, 168-170	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	155, 162-164, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 155, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 152	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	171-173	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	155, 170-171	

Table E-5: Manhattan Beach BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	189-195	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	181-183	
	c) A map and description of existing and proposed bikeways.	185-186, 198-201	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	185-187, 202-204	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	185-187, 202-204	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	185-187, 202-204	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	187-188, 196-198, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 188-189, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 184-185	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	206-209	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	188, 205-206	

Table E-6: Redondo Beach BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	229-235	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	219-220	
	c) A map and description of existing and proposed bikeways.	224-226, 238-243	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	226-227, 244-247	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	226-227, 244-247	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	266-227, 244-247	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	227-228, 236-238, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 229, 449-450	

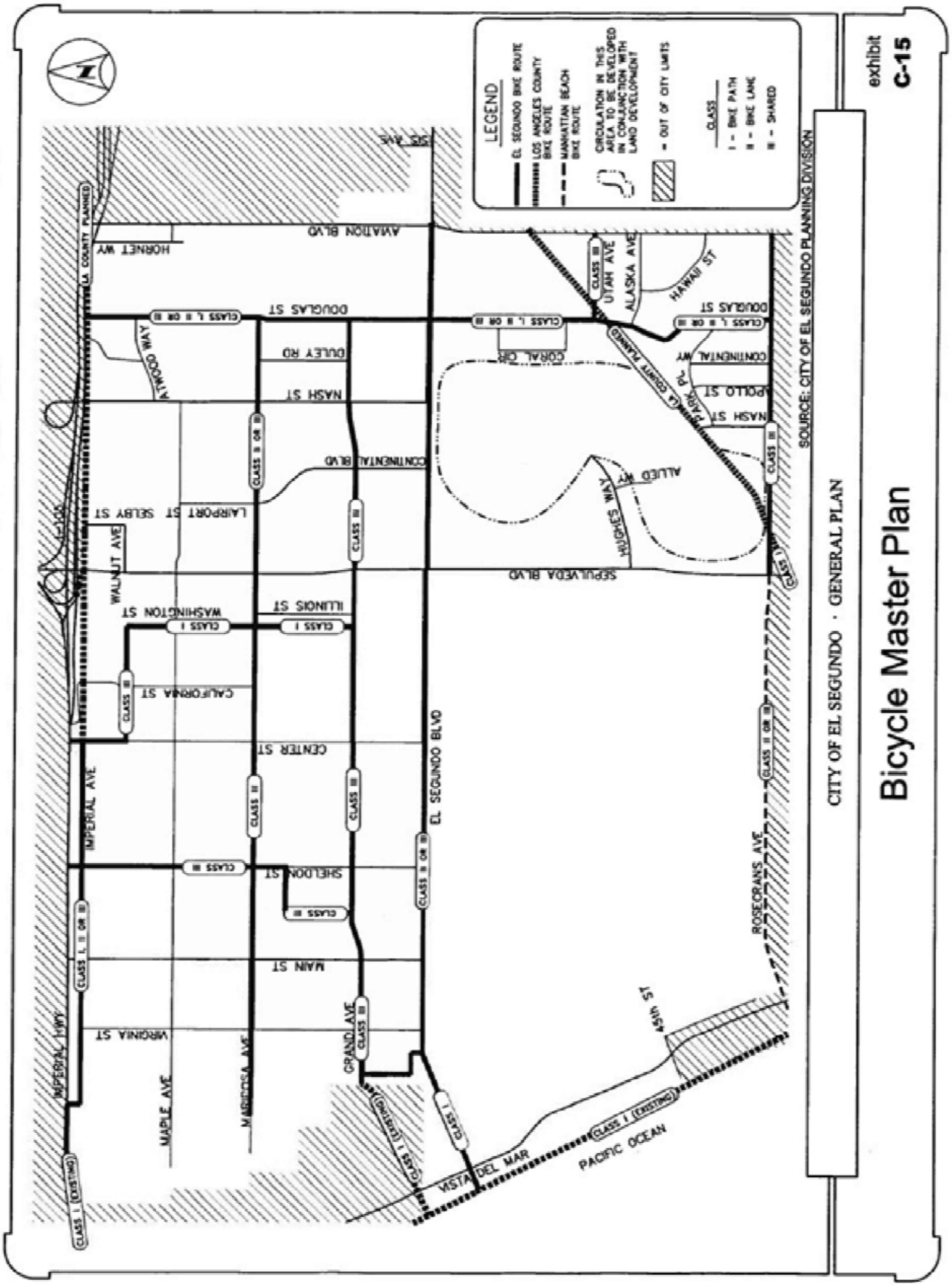
Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 221-223	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	248-251	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	228, 245-248	

Table E-7: Torrance BTA Requirement Check List

Approved	Requirement	Page(s)	Notes/Comments
	a) The estimated number of existing bicycle commuters in the plan area and the estimated increase in the number of bicycle commuters resulting from implementation of the plan.	270-275	
	b) A map and description of existing and proposed land use and settlement patterns which shall include, but not be limited to, locations of residential neighborhoods, schools, shopping centers, public buildings, and major employment centers.	261-263	
	c) A map and description of existing and proposed bikeways.	264-268, 279-283	
	d) A map and description of existing and proposed end-of-trip bicycle parking facilities. These shall include, but not be limited to, parking at schools, shopping centers, public buildings, and major employment centers.	265-269, 285-287	
	e) A map and description of existing and proposed bicycle transport and parking facilities for connections with and use of other transportation modes. These shall include, but not be limited to, parking facilities at transit stops, rail and transit terminals, ferry docks and landings, park and ride lots, and provisions for transporting bicyclists and bicycles on transit or rail vehicles or ferry vessels.	265-269, 285-287	
	f) A map and description of existing and proposed facilities for changing and storing clothes and equipment. These shall include, but not be limited to, locker, restroom, and shower facilities near bicycle parking facilities.	265-269, 285-287	
	g) A description of bicycle safety and education programs conducted in the area included within the plan, efforts by the law enforcement agency having primary traffic law enforcement responsibility in the area to enforce provisions of the Vehicle Code pertaining to bicycle operation, and the resulting effect on accidents involving bicyclists.	269, 277-279, 303-314	
	h) A description of the extent of citizen and community involvement in development of the plan, including, but not limited to, letters of support.	14-16, 270, 449-450	

Approved	Requirement	Page(s)	Notes/Comments
	i) A description of how the bicycle transportation plan has been coordinated and is consistent with other local or regional transportation, air quality, or energy conservation plans, including, but not limited to, programs that provide incentives for bicycle commuting.	32-38, 264	
	j) A description of the projects proposed in the plan and a listing of their priorities for implementation.	290-293	
	k) A description of past expenditures for bicycle facilities and future financial needs for projects that improve safety and convenience for bicycle commuters in the plan area.	270, 289-290	

Appendix F: Participating City Existing Bicycle Plan Maps



Appendix F-1: City of El Segundo Bicycle Master Plan

Source: City of El Segundo (1992)

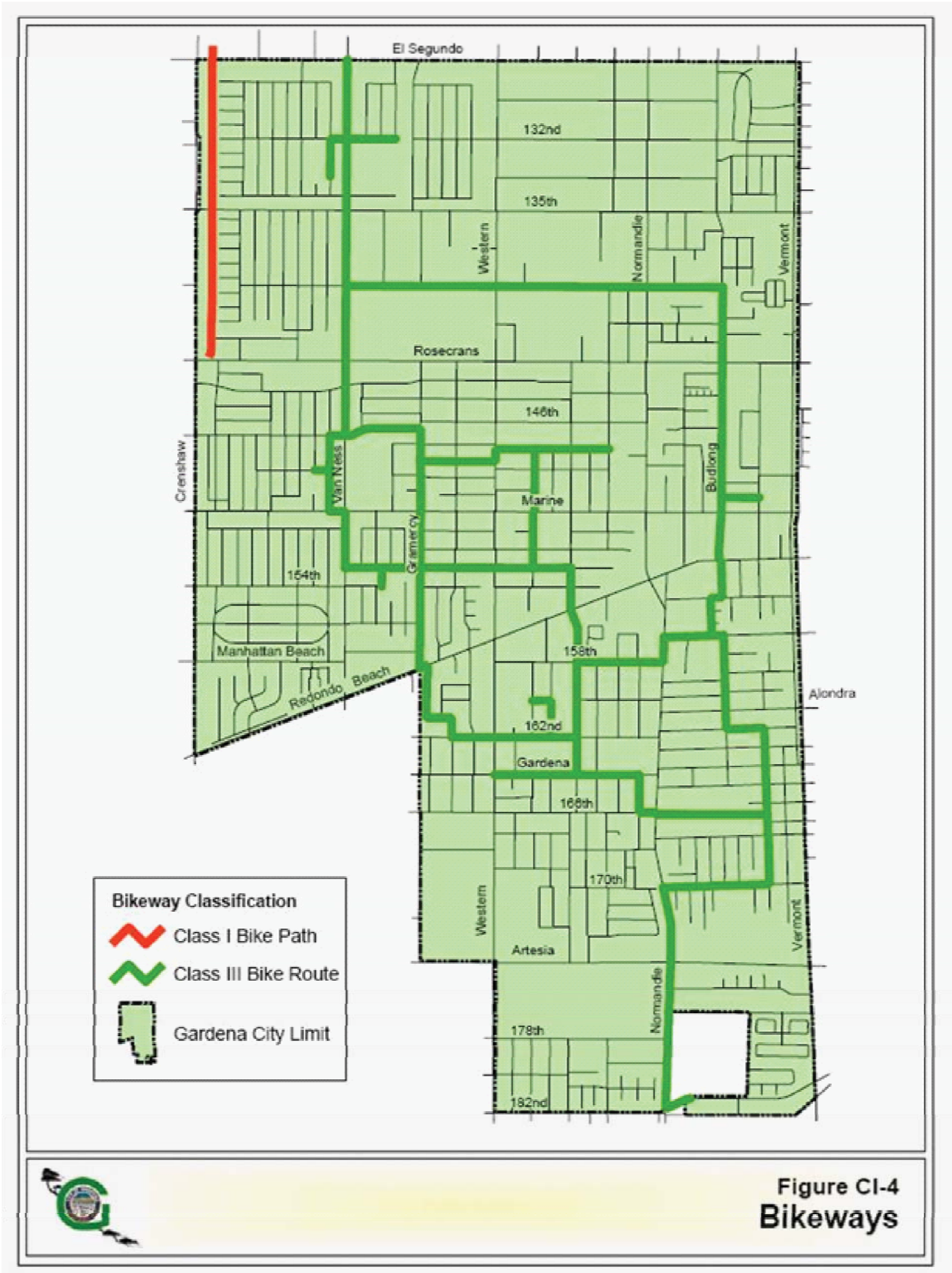


Figure CI-4
Bikeways

Appendix F-2: City of Gardena Bikeways Map

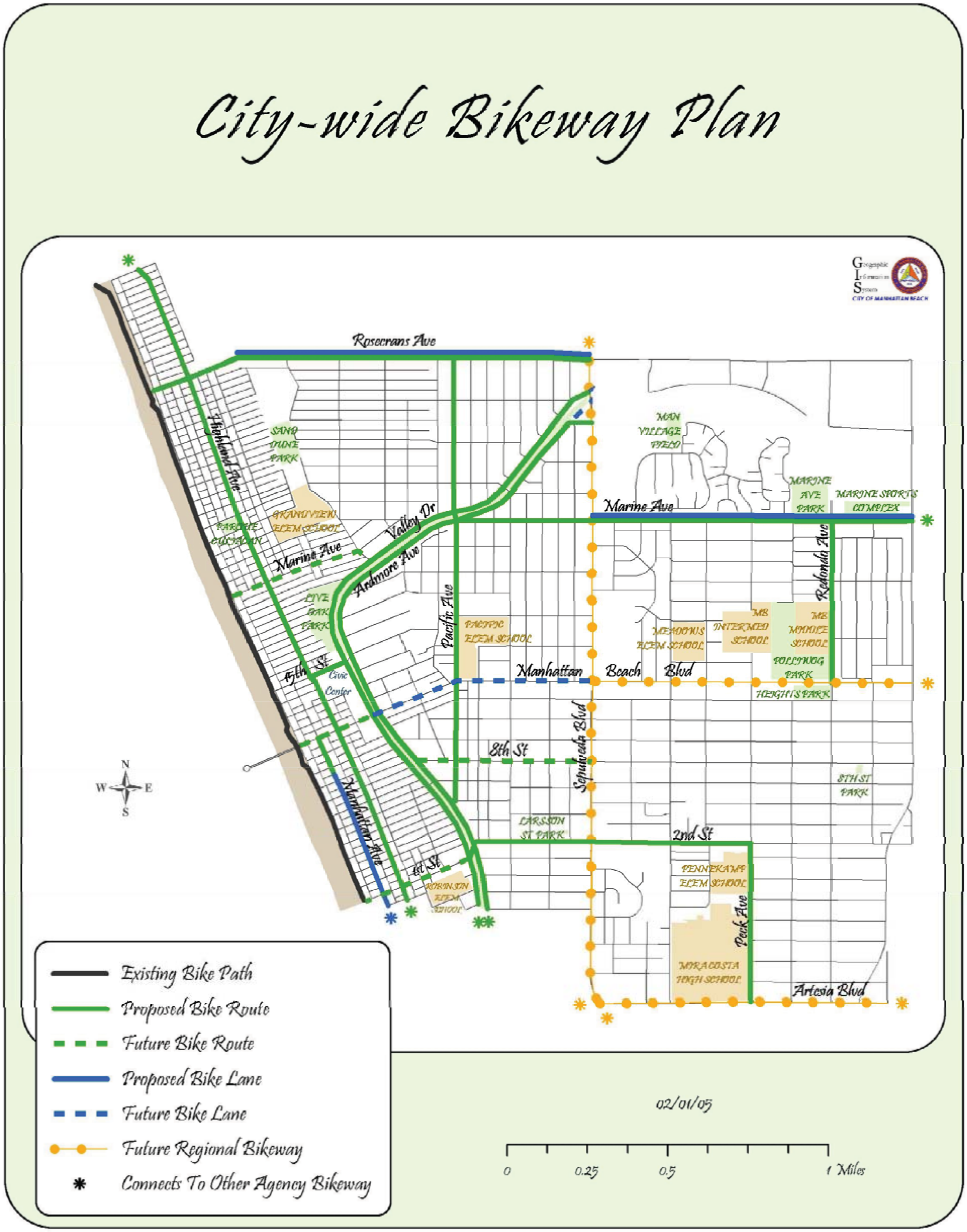
South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Gardena (2008)

Appendix F-3: City of Hermosa Beach Proposed Bike Master Plan

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Hermosa Beach (2002)

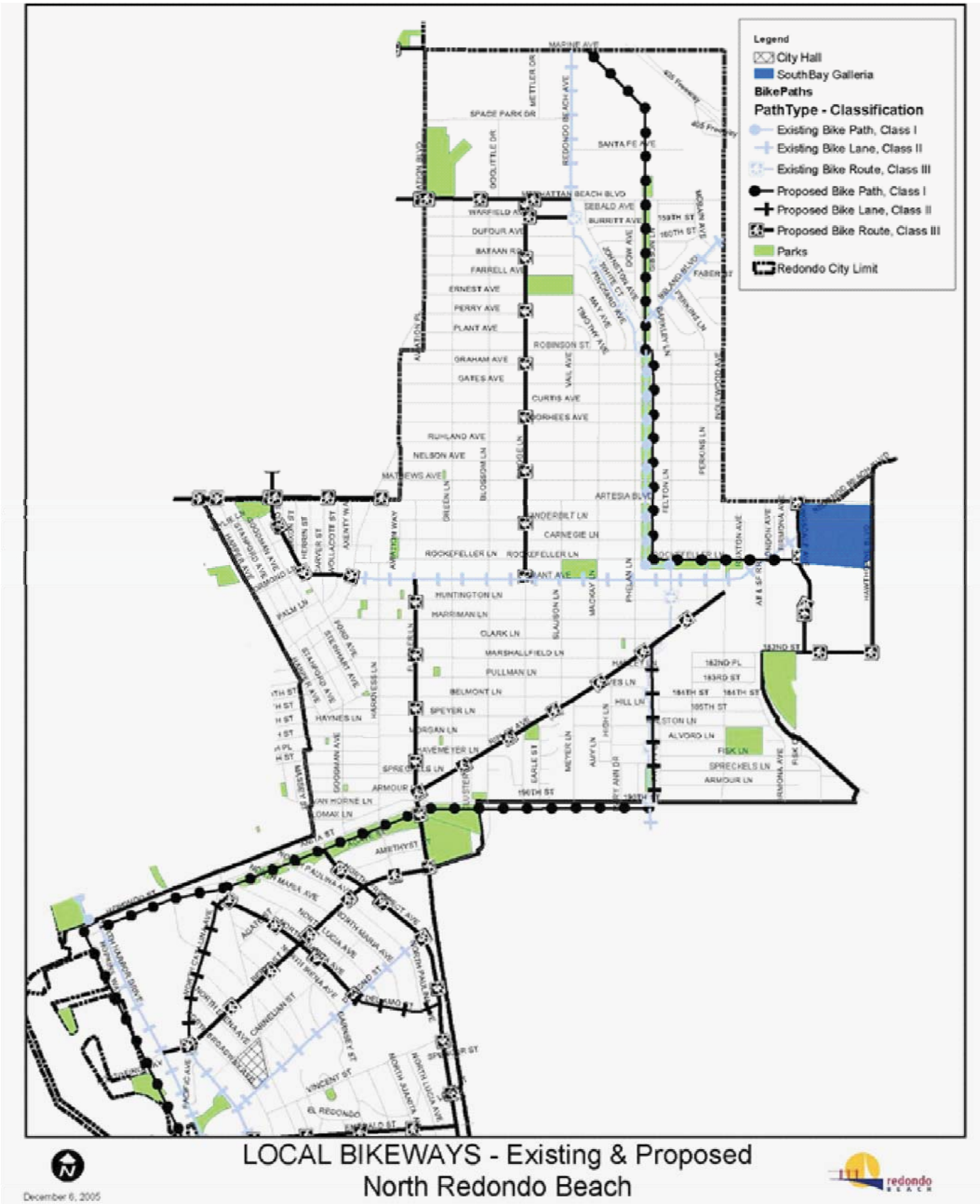


Appendix F-4: Manhattan Beach City-wide Bikeway Plan

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Manhattan Beach (2005)

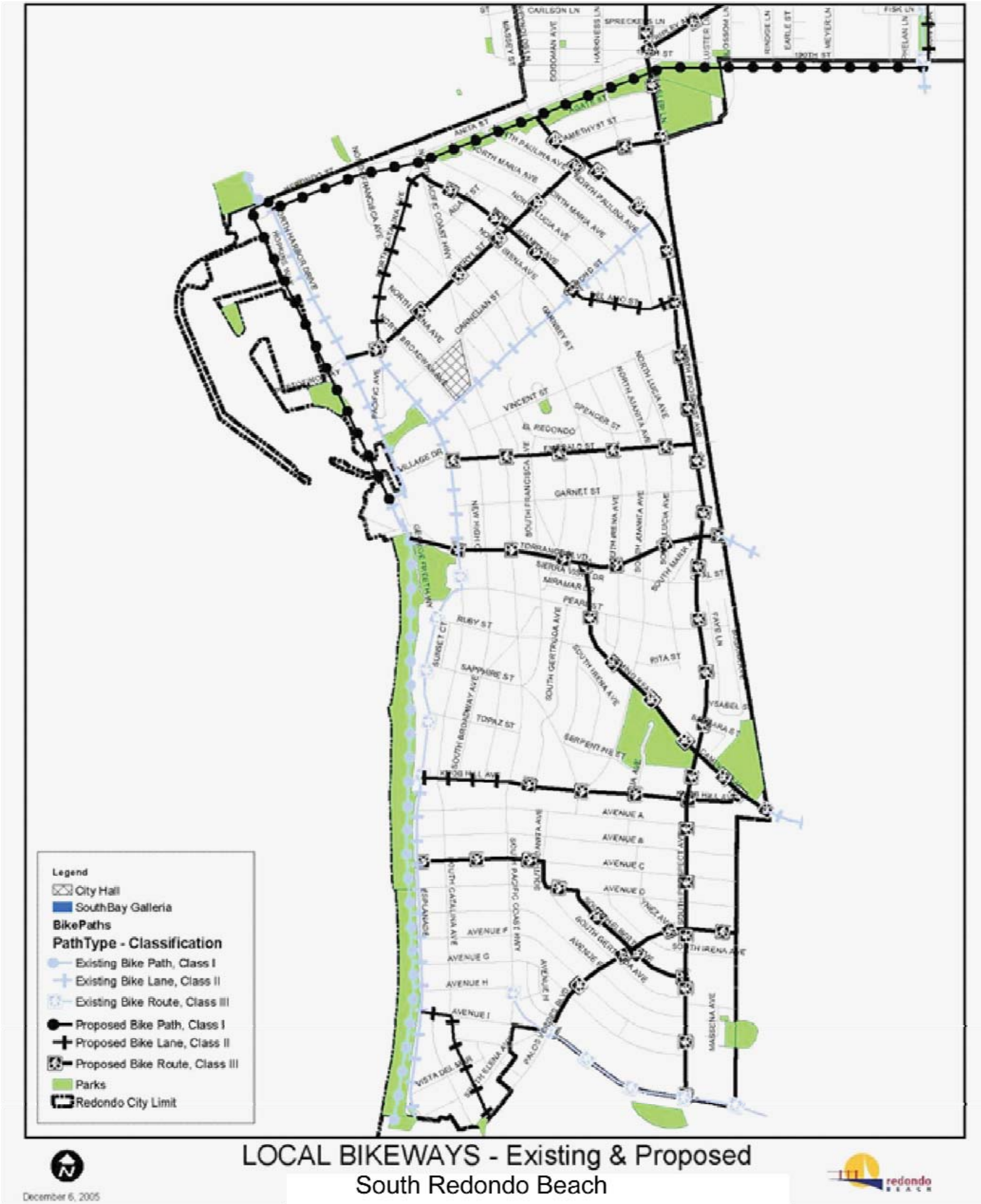


Appendix F-5: City of Redondo Beach Existing and Proposed Bikeways Map

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Redondo Beach (2008)

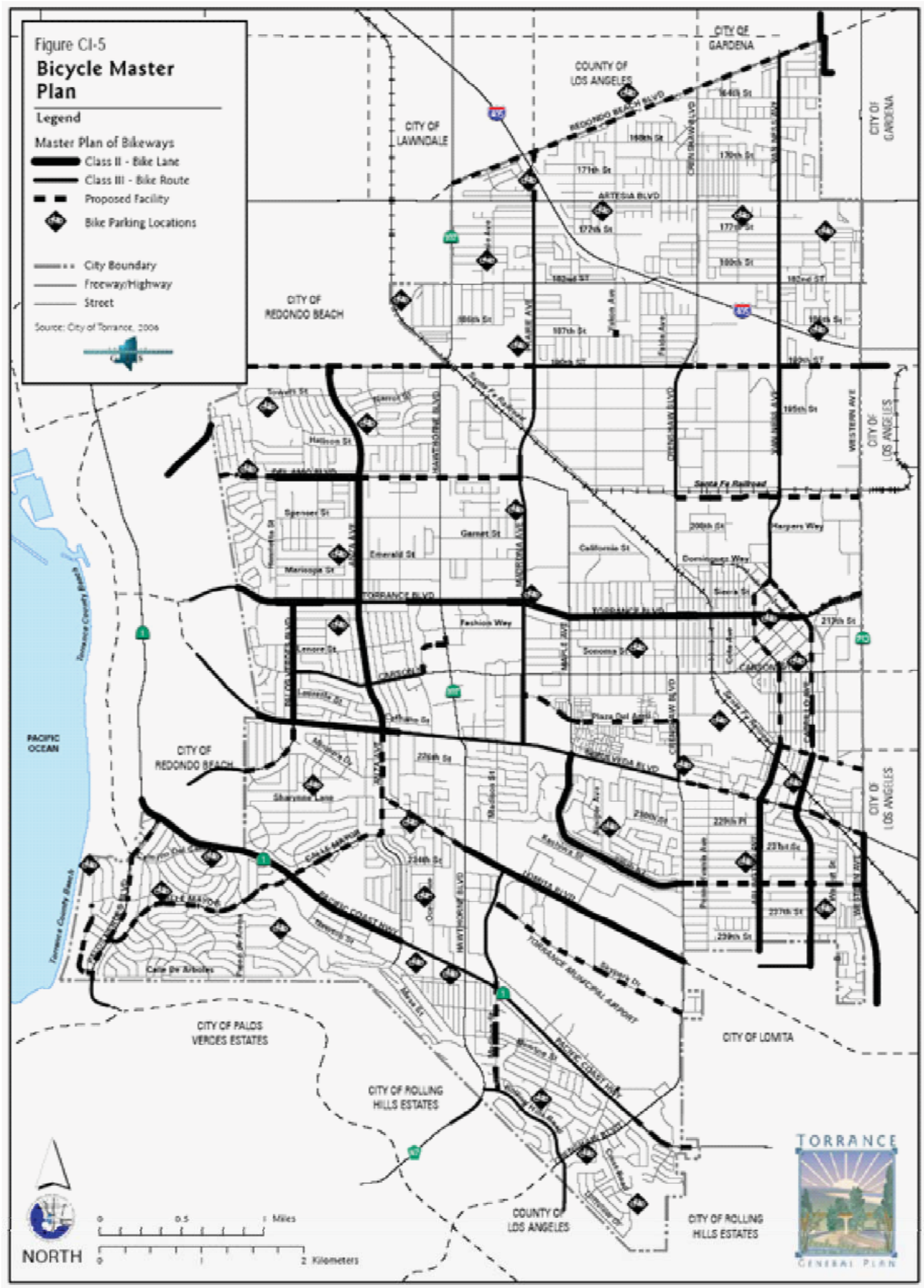


Appendix F-6: City of Redondo Beach Existing and Proposed Bikeways Map

South Bay Bicycle Master Plan

El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Source: City of Redondo Beach (2008)



Appendix F-7: City of Torrance Bicycle Master Plan

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance
Source: City of Torrance (2008)

Appendix G: City Municipal Code Bicycle Parking Related Sections

City	Municipal Code Section
El Segundo	**15.15.5 (I)** No bicycle spaces are required at single-family and two-family dwellings. Multi-family residential establishments shall provide bicycle spaces that total to 10 percent of the required vehicle parking spaces for projects with six or more units. **15.15.6 (B)** Nonresidential uses are required to provide a minimum of four spaces for buildings up to 15,000 square feet plus a minimum of five percent of the required vehicle spaces for the portion above 15,000 square feet and a maximum of 25 spaces. **15.16.3 (A)** Nonresidential development of 25,000 square feet or more and all projects within the Urban Mixed-Use Zone must provide bicycle route and facility information including regional/local bicycle maps and bicycle safety information. **15.16.3 (B)** Nonresidential development of 50,000 square feet or more must comply with subsection A (provide bicycle route and facility information) and must provide bicycle racks or other secure bicycle parking spaces. A bicycle parking facility may also be a fully enclosed space or locker accessible only to the owner or operator of the bicycle, which protects the bike from inclement weather. Specific facilities and location must be provided to the satisfaction of the Director of Planning and Building Safety. If nonresidential development of 50,000 square feet or more provide shower and locker facilities for bicycle riders, the number of preferential parking spaces required may be reduced by up to three percent and the total number of required spaces may be reduced up to one percent.

City	Municipal Code Section
Hermosa Beach	**17.44. 210** Parking Plans – parking for development may be reduced based on a Parking Plan approved by the planning commission based on various factors including bicycle and foot traffic. **17.38.550(I)(5)** Specific Plan Area No. 11 zone - (encompasses parcels fronting Pier Avenue between Valley Drive and Hermosa Avenue excluding parcels fronting Hermosa Avenue). Secure bicycle parking facilities shall be supplied at the rate of one space per seven employees or 3,000 square feet of floor area. Bicycle facilities installed onsite shall not be placed within required pedestrian ways. Where facilities cannot be accommodated onsite as determined by the community development director or planning commission, the developer shall pay a commensurate fee adopted by the city for the provision and installation of bicycle parking facilities along Pier Avenue in a manner determined by the public works director. 'Secure' facilities means firmly attached devices in well-lit locations, protected from rain if feasible. **17.48.030** Transportation demand and trip reduction measures **B(1)** Nonresidential development of 25,000 square feet or more shall provide bicycle route and facility information, including regional/local bicycle maps, bicycle safety information, and a listing of facilities available for bicyclists at the site. **B(2)** Nonresidential development of 50,000 square feet or more shall comply with subsection B(1) of this section and shall provide bicycle racks or other secure bicycle parking to accommodate four bicycles per the first 50,000 square feet of nonresidential development and one bicycle per each additional 50,000 square feet of nonresidential development. Calculations which result in a fraction of 0.5 or higher shall be rounded up to the nearest whole number. A bicycle parking facility may also be a fully enclosed space or locker accessible only to the owner or operator of the bicycle, which protects the bike from inclement weather. Specific facilities and location (e.g., provision of racks, lockers, or locked room) shall be to the satisfaction of the city. **B(3)** Nonresidential development of 100,000 square feet or more shall comply with subsections B(1) and (2) of this section, and shall provide safe and convenient access from the external circulation system to bicycle parking facilities onsite.

City	Municipal Code Section
Lawndale	**17.56.120** C-3 unlimited commercial zone – Video arcades **B(4)** Bicycle racks shall be provided within 25 feet of any game arcade and must provide a total of at least two bicycle stalls for every four games located within the arcade. Bicycle racks shall not be located in any required landscape areas, entrances, exits, walkways to buildings, driveways, within any legally required parking space, public way, or in such a fashion as to obstruct any entrance or exit to any premises. **17.92.030** Transportation demand and trip reduction measures **B(1)** Nonresidential development of 25,000 square feet or more shall provide bicycle route and facility information, including regional/local bicycle maps and bicycle safety information, and a list of existing of facilities available bicyclists at the site. **C(3)** Nonresidential development of 50,000 square feet or more shall comply with subsection (B) of this section and shall provide bicycle racks or other secure bicycle parking to accommodate four bicycles per the first 50,000 square feet of nonresidential development and one bicycle per each additional 50,000 square feet of nonresidential development. A bicycle parking facility may also be a fully enclosed space or locker accessible only to the owner or operator of the bicycle, which protects the bike from inclement weather. Specific facilities and location (e.g., provision of racks, lockers, or locked room) shall be to the satisfaction of the City. **D** Nonresidential development of 100,000 square feet or more shall comply with subsections (B) and (C) of this section, and shall provide safe and convenient access from the external circulation system to bicycle parking facilities onsite.
Manhattan Beach	**10.64.080** Bicycle Parking **A.** Where Required **-** Bicycle parking spaces shall be provided as required by this section; the provisions of Section 10.64.020 shall apply. **B.** Number Required. 1. Public and Semipublic Use Classifications: as specified by use permit. 2. Commercial Use Classifications: Five percent of the requirement for automobile parking spaces, except for the following classifications, which are exempt: a. Ambulance Services; b. Animal Boarding; c .Animal Grooming; d. Catering Services; e. Commercial Filming; f. Horticulture, Limited; g. Funeral and Interment Services; h. Vehicle/Equipment Sales and Services (all classifications). 3. Industrial Use Classification. None. **C.** Design Requirements. For each bicycle parking space required, a stationary object shall be provided to which a user can secure both wheels and the frame of a bicycle with a user-provided six-foot (6’) cable and lock. The stationary object may be either a freestanding bicycle rack or a wall-mounted bracket.

City	Municipal Code Section
Redondo Beach	**10-2.2406** Development standards **(a)** Nonresidential development of 25,000 square feet or more shall provide bicycle route and facility information, including regional/local bicycle maps and bicycle safety information, and a list of existing of facilities available bicyclists at the site. **(b)** Nonresidential development of 50,000 square feet or more shall comply with subsection (a) of this section and shall provide bicycle racks or other secure bicycle parking to accommodate four bicycles per the first 50,000 square feet of nonresidential development and one bicycle per each additional 50,000 square feet of nonresidential development. A bicycle parking facility may also be a fully enclosed space or locker accessible only to the owner or operator of the bicycle, which protects the bike from inclement weather. Specific facilities and location (e.g., provision of racks, lockers, or locked room) shall be to the satisfaction of the City. **(c)** Nonresidential development of 100,000 square feet or more shall comply with subsections (a) and (b) of this section, and shall provide safe and convenient access from the external circulation system to bicycle parking facilities onsite.
Torrance	**910.3.2** Development Standards **a)** Nonresidential development twenty-five thousand (25,000) square feet or more shall provide the following: **1)D)** A bulletin board, display case or kiosk displaying transportation information located where the greatest number of employees are likely to see it. Information on the board, case or kiosk shall include, but is not limited to bicycle route and facility information, including regional/local bicycle maps and bicycle safety information. **1)E)** A listing of facilities available for carpoolers, vanpoolers, bicyclists, transit riders and pedestrians at the site. **b) 3)** Nonresidential development of fifty thousand (50,000) square feet or more shall comply with subsection a) above and shall provide bicycle racks or other secure bicycle parking to accommodate four (4) bicycles for the first fifty thousand (50,000) square feet of nonresidential development and one (1) bicycle rack for each additional fifty thousand (50,000) square feet of nonresidential development. Calculations which result in a fraction of 0.5 or higher shall be rounded up to the nearest whole number. A bicycle parking facility may also be a fully enclosed space or locker accessible only to the owner or operator of the bicycle, which protects the bike from inclement weather. **c)4)** Nonresidential development of one hundred thousand (100,000) square feet or more shall comply with subsections a) and b) above, and shall provide safe and convenient access from the external circulation system to onsite bicycle parking facilities.

Appendix H: Bicycle Count Data

Table H-1: South Bay Bicycle Counts Thursday, November 4, 2010 3:00 p.m. to 6:00 p.m.

Count Location	Number of Bicyclists						
	Males	Females	Child Under 13	On Sidewalk	With Helmet	Wrong Way	Total
El Segundo							
Center St / Mariposa Ave	17	0	2	9	10	3	**19**
Douglas St / Green Line Station (near Park Place)	49	7	1	32	20	2	**57**
El Segundo Blvd/ Nash St (Green Line Station)	34	2	2	23	9	4	**38**
El Segundo Blvd / Sepulveda Blvd	32	1	1	25	26	0	**34**
Main St / Grand Ave	37	7	2	34	17	0	**46**
Main St / Imperial Highway	25	1	1	13	3	2	**27**
Mariposa Ave / Nash St (Green Line Station)	54	1	0	38	24	2	**55**
Rosecrans Ave / Aviation	48	2	0	37	42	0	**50**
Rosecrans Ave / Sepulveda Blvd	20	1	0	21	14	0	**21**
Gardena							
Crenshaw Blvd / Manhattan Beach Blvd	90	14	2	97	85	1	**106**
Normandie Ave / Gardena Blvd	49	2	0	49	46	0	**51**
Redondo Beach Blvd / Crenshaw Blvd	53	12	1	62	51	25	**66**
Normandie Ave / 182nd St	26	1	0	22	20	0	**27**
Hermosa Beach							
Valley Dr / 8th St	31	7	2	24	8	2	**40**
Hermosa Ave / 8th St	122	30	0	93	8	0	**152**
Hermosa Ave / 24th St	103	14	2	43	7	4	**119**
Monterey Ave / Pier Ave	97	21	6	109	33	22	**124**
Pacific Coast Highway / Pier Ave	28	4	0	29	28	4	**32***
Valley Dr / 21st St	8	2	15	6	16	16	**25**
Lawndale							
Grevillea Ave / 163rd St	13	1	1	5	0	0	**15**
Manhattan Beach Blvd/Inglewood Ave	72	8	0	74	70	1	**80**
Marine Ave/Hawthorne Blvd	119	4	11	127	110	0	**134**
Marine Ave / Inglewood Ave	89	8	7	96	95	0	**104**
Rosecrans Ave / Prairie Ave	93	7	0	96	83	0	**100**

Count Location	Number of Bicyclists						
	Males	Females	Child Under 13	On Sidewalk	With Helmet	Wrong Way	Total
Manhattan Beach							
Artesia Blvd / Peck Ave	10	3	0	8	1	0	**13**
Highland Ave / Rosecrans Ave	18	2	0	12	5	0	**20**
Manhattan Beach Blvd / Redondo Ave	34	3	18	18	30	0	**55**
Manhattan Beach Blvd / Manhattan Ave	58	15	2	50	3	4	**75**
Marine Ave / Redondo Ave	28	2	0	18	11	1	**30**
Valley Dr / Pacific Ave	22	4	3	15	1	1	**29**
Redondo Beach							
Harbor Dr / Beryl St	380	114	5	343	28	4	**499**
Prospect Ave / Torrance Blvd	67	8	11	44	41	1	**86**
Redondo Beach Ave / Manhattan Beach Blvd	47	4	4	27	12	2	**55**
Torrance							
190th St / Anza	54	6	0	37	33	0	**60**
Torrance Blvd / Madrona Ave	43	3	6	27	30	0	**52**
Pacific Coast Highway / Calle Mayor	43	1	0	16	25	1	**44**

*The counts at this location were from 4:00 p.m. to 6:00 p.m.

Table H-2: South Bay Bicycle Counts Saturday, November 6, 2010 10:30 a.m. to 1:30 p.m.

Count Locations	Number of Bicyclists						
	Males	Females	Child Under 13	On Sidewalk	With Helmet	Wrong Way	Total
El Segundo							
Center St / Mariposa Ave	3	0	1	3	3	0	**4**
El Segundo Blvd/ Nash St (Green Line Station)	12	2	0	10	9	10	**14**
El Segundo Blvd / Sepulveda Blvd	7	0	2	8	7	0	**9**
Main St / Grand Ave	51	10	4	40	21	2	**65**
Main St / Imperial Highway	30	1	0	7	0	1	**31**
Mariposa Ave / Nash St (Green Line Station)	17	0	0	10	8	3	**17**
Rosecrans Ave / Aviation	30	2	0	24	20	8	**32**
Rosecrans Ave / Sepulveda Blvd	19	9	0	7	1	1	**28**
Douglas St / Green Line Station (near Park Place)	20	1	0	12	2	0	**21**
Gardena							
Normandie Ave / Gardena Blvd	33	6	5	40	36	1	**44**
Redondo Beach Blvd / Arcturus Ave	38	3	2	39	11	5	**43**
Redondo Beach Blvd / Crenshaw Blvd	53	3	0	49	38	2	**56**
Hermosa Beach							
Hermosa Ave / 8th St	294	87	4	130	13	1	**385**
Hermosa Ave / 24th St	584	280	58	619	0	0	**922**
Monterey Ave / Pier Ave	40	15	4	40	12	1	**59**
Pacific Coast Highway / Pier Ave	57	12	8	50	57	0	**77**
Valley Dr / 8th St	59	20	4	41	10	1	**83**
Valley Dr / 21st St	5	1	1	2	0	0	**7**
Prospect Ave / 18th St	1	0	0	0	0	0	**1**
Lawndale							
Manhattan Beach Blvd/Inglewood Ave	39	8	0	37	30	0	**47**
Marine Ave/Hawthorne Blvd	70	4	12	84	65	31	**86**
Manhattan Beach							
Artesia Blvd / Peck Ave	11	6	0	10	4	0	**17**
Highland Ave / Rosecrans Ave	111	26	0	21	6	0	**137**
Manhattan Beach Blvd / Redondo Ave	31	5	0	19	11	0	**36**

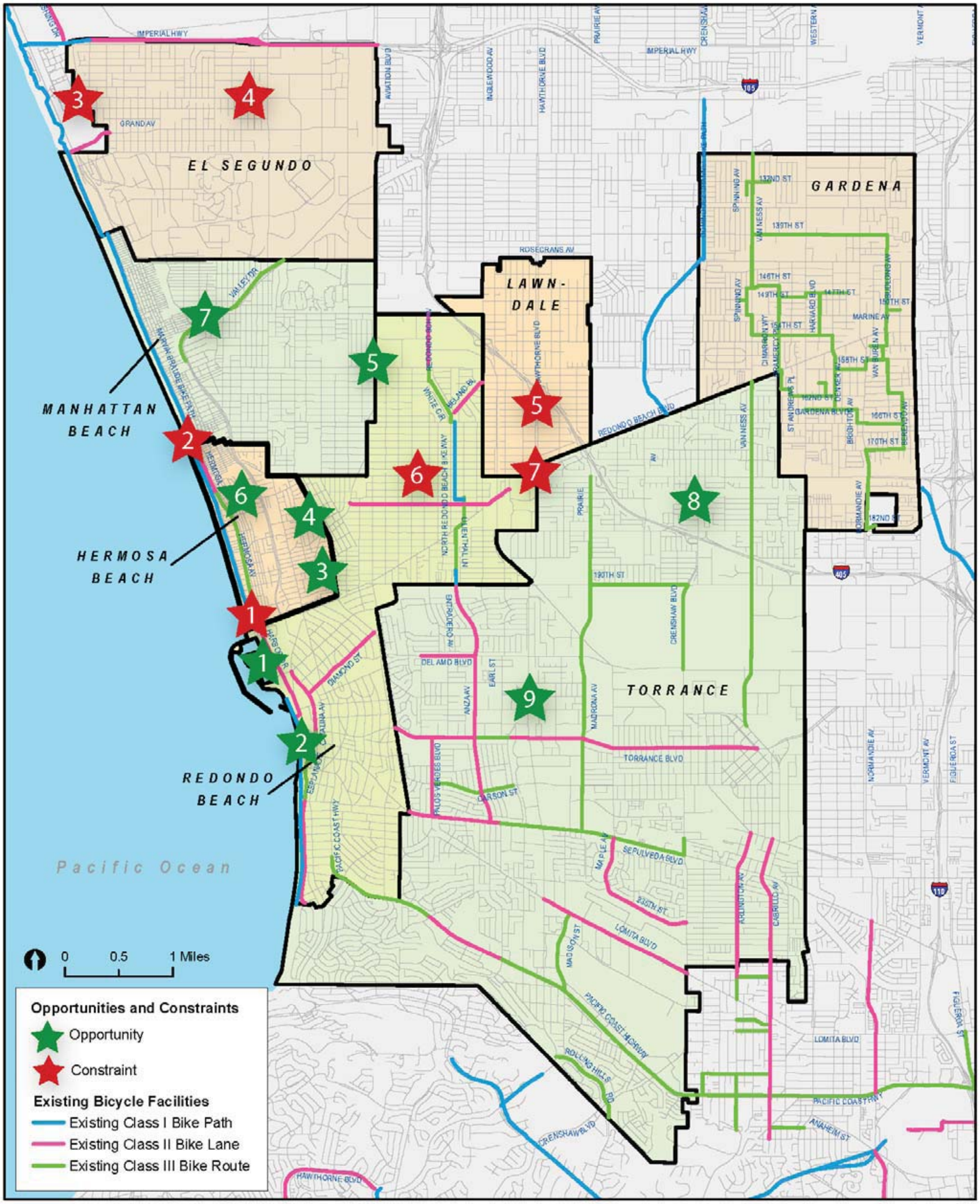
Count Locations	Number of Bicyclists						
	Males	Females	Child Under 13	On Sidewalk	With Helmet	Wrong Way	Total
Manhattan Beach Blvd / Manhattan Ave	149	45	29	107	54	8	**223**
Manhattan Beach Blvd / The Strand	433	124	32	335	10	38	**589**
Valley Dr / Pacific Ave	19	5	3	15	2	0	**27**
Marine Ave / Redondo Ave	18	3	2	13	6	0	**23**
Redondo Beach							
Esplanade / Avenue C	249	76	0	67	12	8	**325**
Herondo Street / The Strand	461	236	35	528	0	0	**732**
Marvin Braude Bikeway (The Strand) / Ave. F	310	126	24	277	0	0	**460**
Prospect / Torrance	92	16	6	47	32	14	**114**
Redondo Beach Ave / Manhattan Beach Blvd	30	7	1	27	18	1	**38**
Torrance							
190th St / Anza	32	7	14	33	26	14	**53**
Palos Verdes Blvd / Catalina Ave	58	14	10	31	14	6	**82**
Sepulveda Blvd / Crenshaw Blvd	35	6	4	29	40	0	**45**

Appendix I: Opportunities and Constraints

There are several opportunities and constraints in implementing bicycle facilities in the South Bay Region. Opportunities and constraints for new bicycle facilities are discussed below. They are also shown on the map following the table below.

ID Number	Opportunities and Constraints
Opportunities	
1	Proposed Class I on Harbor Drive: See Vitality City's Livability Plan for further detail.
2	Proposed Class II on Catalina: See Vitality City's Livability Plan for further detail.
3	Proposed Bike Friendly Street on Prospect Avenue in Hermosa Beach: See Vitality City's Livability Plan for further detail.
4	Proposed Class II on Aviation Blvd in Hermosa Beach: Hermosa Beach's section of Aviation Blvd is particularly rich with retail and commercial uses. Bike facilities could greatly improve the area's visibility and access. See Vitality City's Livability Plan for further detail.
5	Proposed Class II on Aviation Blvd in Redondo Beach and Manhattan Beach: This major thoroughfare provides significant connectivity between residences and major employment centers and thus will encourage increased bike commuting to these destinations. See Vitality City's Livability Plan for further detail.
6	Proposed Class III on Valley/Ardmore in Hermosa Beach: While this plan recommends a Class III route, the Vitality City Livability Plan recommends additional options. See the Vitality City Livability Plan for further detail and opportunities.
7	Proposed Class III on Valley/Ardmore in Manhattan Beach: While this plan recommends a Class III route, the Vitality City Livability Plan recommends additional options. See the Vitality City Livability Plan for further detail and opportunities.
8	Crenshaw Boulevard in Torrance: While it is not feasible to propose bicycle lanes on Crenshaw Boulevard at the time of this Plan, there may be opportunity in the future if the street undergoes reconstruction or other changes that would provide adequate space. There may also be opportunity to proposed parallel facilities as Crenshaw Boulevard is an important regional connection.
9	Hawthorne Boulevard in Torrance: While it is not feasible to propose bicycle lanes on Hawthorne Boulevard at the time of this Plan, there may be opportunity in the future if the street undergoes reconstruction or other changes that would provide adequate space. There may also be opportunity to propose parallel facilities as Hawthorne Boulevard is an important regional connection.
Constraints	
1	"The Wall" on the Strand at Hermosa Beach / Redondo Beach: This wall severs the Marvin Braude Bikeway at the Hermosa Beach-Redondo Beach border. South-bound bicyclists are forced to make a sharp 90-degree and are led out to the bike lanes on Harbor Drive. This plan recommends the removal of the wall and that parking lot 13 in Redondo Beach be partially utilized to accommodate a short extension of the Class I facility that will lead to Harbor Drive in a safer and more navigable way.
2	The stairs on the Strand between Hermosa Beach and Manhattan Beach: This constraint is also

	noted as being outside this plan's jurisdiction because those stairs (along with the rest of the Strand with the exception of Hermosa Beach) are operated by the State and maintained by the County of Los Angeles. However, this plan urges the cities to remedy the disruption caused by the stairs. This remedy could come in several forms ranging from a bike-friendly ramp that connects the two sections of the Strand to signage that warns cyclists of the disruption and safely guides them to facilities along Hermosa Ave.
3	Proposed Class I in El Segundo east of the waste processing plant: This facility would require the City to gain approval from Los Angeles Department of Water and Power (LADWP) as this land is LADWP right-of-way. The facility would run underneath the right of way of high-tension power lines. An example of such a facility can be seen in Redondo Beach along the North Redondo Beach Bikeway.
4	Proposed Class I in El Segundo between Walnut and Holly: This facility would require the City to gain approval from Los Angeles Department of Water and Power (LADWP) as this land is LADWP right-of-way. The facility would run underneath the right of way of high-tension power lines. An example of such a facility can be seen in Redondo Beach along the North Redondo Beach Bikeway.
5	Proposed Class II along Hawthorne Blvd in Lawndale: This facility poses some unique constraints in terms of space availability. This is a busy thoroughfare that is dense with commercial and retail uses. This Plan recommends the consideration of a Class II facility along Hawthorne Blvd to the extent feasible. One option to consider would be to utilize the necessary space along the center parking landscaped median rather than removing on street parking or travel lanes.
6	Proposed Class II on Artesia Blvd in Redondo Beach: Artesia Blvd between Aviation Blvd and the city's eastern boundary has undergone an extensive streetscape improvement in recent history. These improvements included an extensively landscaped center median and bulb-outs. As such, this facility is one that can be considered in any future streetscape improvements that might be implemented along Artesia in the years to come.
7	Proposed Class II along Redondo Beach Boulevard from Hawthorne Boulevard to Artesia Boulevard in Lawndale/Redondo Beach: This segment experiences high vehicular traffic volumes due to the South Bay Galleria, which creates a challenging environment for bicyclists. Upon plan implementation, Lawndale and Redondo Beach should work together to design a facility that provides safety for bicyclists.



Appendix I: Opportunities and Constraints in the South Bay Region

South Bay Bicycle Master Plan
El Segundo - Gardena - Hermosa Beach - Lawndale - Manhattan Beach - Redondo Beach - Torrance

Appendix J: Recommended Bicycle Parking Standards

Short-term Bicycle Parking

Short –term bicycle parking comes in the form of bicycle racks that are meant for storing bicycles up to two hours. Bicycle rack designs should include racks that provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. This will provide a high degree of security and support for the bicycle. Recommended bicycle rack types include the inverted U rack (commonly known as the U rack), flat top rack, post and ring rack, and custom racks that provide the security mentioned above.

Inverted U	Flat Top	Circular (Horseshoe)	Custom
			

Long-term Bicycle Parking

Commuters and other bicyclists that plan to stay at their destinations more than two hours require more secure bicycle parking. Long-term bicycle parking should be in the form of:

- Covered, lockable enclosures with permanently anchored racks for bicycles;
- Lockable bicycle rooms with permanently anchored racks; or
- Lockable, permanently anchored bicycle lockers.

Bicycle lockers can hold up to two bicycles and come in a variety of materials, such as metal and polyethylene.

Metal	Metal Triangular	Polyethylene
		

High Volume Bicycle Parking

Where bicycle parking demand is high, more formal structures and larger facilities should be provided. Several options for high-volume bicycle parking are outlined below.

On-Street Bike Parking Corral

A relatively inexpensive solution to providing high-volume bicycle parking is to convert one or two on-street motor vehicle parking spaces into on-street bicycle parking. Bike racks are installed in the street and protected from motor vehicles with removable curbs and bollards. These facilities move bicycles off the sidewalks, and leave space for sidewalk café tables or pedestrians. Bicycle parking does not block sightlines like motor vehicles do, so it may be possible to locate bicycle parking in no-parking zones near intersections and crosswalks.

Bike parkingcCorral in Portland, Oregon

Bike Oasis

Bike Oases are installed on curb extensions and consist of attractive covered bike parking and an information panel. Portland's Bike Oases, for example, provide parking space for ten bikes. Bike and walking maps are installed on the information panel.

Bike oasis parking area in Portland, Oregon

Bike Station

Bike Stations serve as one-stop bicycle service centers for bicycle commuters. They include 24-hour secure bicycle parking and may provide additional amenities such as a store to purchase items (helmets, raingear, tubes, patch kits, bike lights, and locks), bicycle repair facilities, showers and changing facilities, bicycle rentals, and information about biking. Some Bike Stations provide free bike parking, while others charge a fee or require membership.

Bike Stations have been installed in several cities in California, including Long Beach, San Francisco, Los Angeles and Berkeley, as well as in Chicago, and Seattle.

The following amenities should be considered for the Bike Station:

- Attended bicycle parking
- Bicycle rental establishment
- Accessory shop
- Bicycle repair shop
- Changing rooms
- Shower and locker facilities

Bike station in Long Beach, California

Bicycle Parking Styles Not Recommended

Bicycle rack styles are not recommended if they do not provide two points of contact with the bicycle so that it can be locked from both the front wheel/frame and the rear wheel. Examples of rack styles not recommended include wheel bender and wave racks. Because both types of racks do not provided two points of contact, parked bicycles are not supported and can fall, which can potentially cause damage to the bicycle. Without two points of contact there are fewer places to lock the bicycle, which reduces the amount of security the racks provide. Wave racks in particular are also not recommended because the lack of two points of contact cause bicycles to tip over and reduce the capacity of the racks.

Wheel Bender Racks

Wave Racks

Appendix K: Prioritization Methodology

Each criterion contains information about a facility and its ability to address an existing or future need in the participating South Bay city. The resulting project ranking determines each project's relative importance in funding and scheduled construction.

Prioritization Criteria

The following criteria are used to evaluate each proposed bicycle facility, its ability to address demand and deficiencies in the existing bicycle network., and its ease of implementation The criteria is organized into "utility" and "implementation" prioritization factors.

Utility Prioritization Factors

Utility criteria include conditions of bicycle facilities that enhance the bicycle network. Each criterion is discussed below.

Gap Closure

Gaps in the bicycle network come in a variety of forms, ranging from a "missing link" on a roadway to larger geographic areas without bicycle facilities. Gaps in the bikeway network discourage bicycle use because they limit access to key destinations and land uses. Facilities that fill a gap in the existing and proposed bicycle network are of high priority.

Connectivity to Existing Facilities

Proposed bikeways that connect to existing bicycle facilities in the participating South Bay city and to the greater South Bay network increase the convenience of bicycle commuting. Proposed facilities that fit this criterion are of high importance to the participating South Bay city.

Connectivity to Regional Proposed Facilities

Proposed bikeways in Los Angeles County will eventually become existing bicycle facilities and thus facilities that link to them will enhance future connectivity. This will continue to enhance bicycle travel in the participating South Bay city.

Connectivity to Activity Centers

Activity centers include major commuter destinations, such as commercial and employment centers and downtowns. These locations generate many trips which could be made by bicycle if the proper facilities were available. Bicycle facilities on roadways that connect to activity centers are of priority to the participating South Bay city.

Connectivity to Multi-Modal Transportation Centers

Bicycle facilities that link to modes of public transportation increase the geographical distance that bicyclists are able to travel. Proposed bicycle facilities that connect to transit stops and centers, and park-and-ride lots improve bicyclist mobility and are therefore key pieces of the bicycle network.

Safety

Bicycle facilities have the potential to increase safety by reducing the potential conflicts between bicyclists and motorists, which often result in collisions. Proposed facilities that are located on roadways with past bicycle-automobile collisions are important to the City.

Public Input

The participating South Bay city solicited public input through community workshops and an online survey. Facilities that community members identified as desirable for future bicycle facilities are of priority to the network because they address the needs of the public.

Underserved Communities

Low-income households often cannot afford to own a vehicle. Providing bicycle facilities to areas that may be dependent on the bicycle as a form of transportation is important to the participating South Bay city.

Implementation Prioritization Factors

Implementation criteria address the ease of implementing each proposed project. Each criterion is discussed below.

Project Cost

Projects that are less expensive do not require as much funding as other projects and are therefore easier to implement. Projects that cost less are of higher priority to the participating South Bay city.

Parking Displacement

In order to fit bicycle facilities in the existing right-of-way, on-street parking must be removed on some streets. Because this is not desirable, those projects that do not require parking displacement are of importance to the City.

Project Ranking

Table K-1 shows how the criteria described in the previous section translate into weights for project prioritization and ranking. Weights are based on direct, secondary, or no service at all. Direct service means that a facility intersects with a facility/destination, whereas secondary access occurs when the primary facility runs in close proximity to an existing facility/destination.

Table K-1: Proposed Facility Weight and Scoring

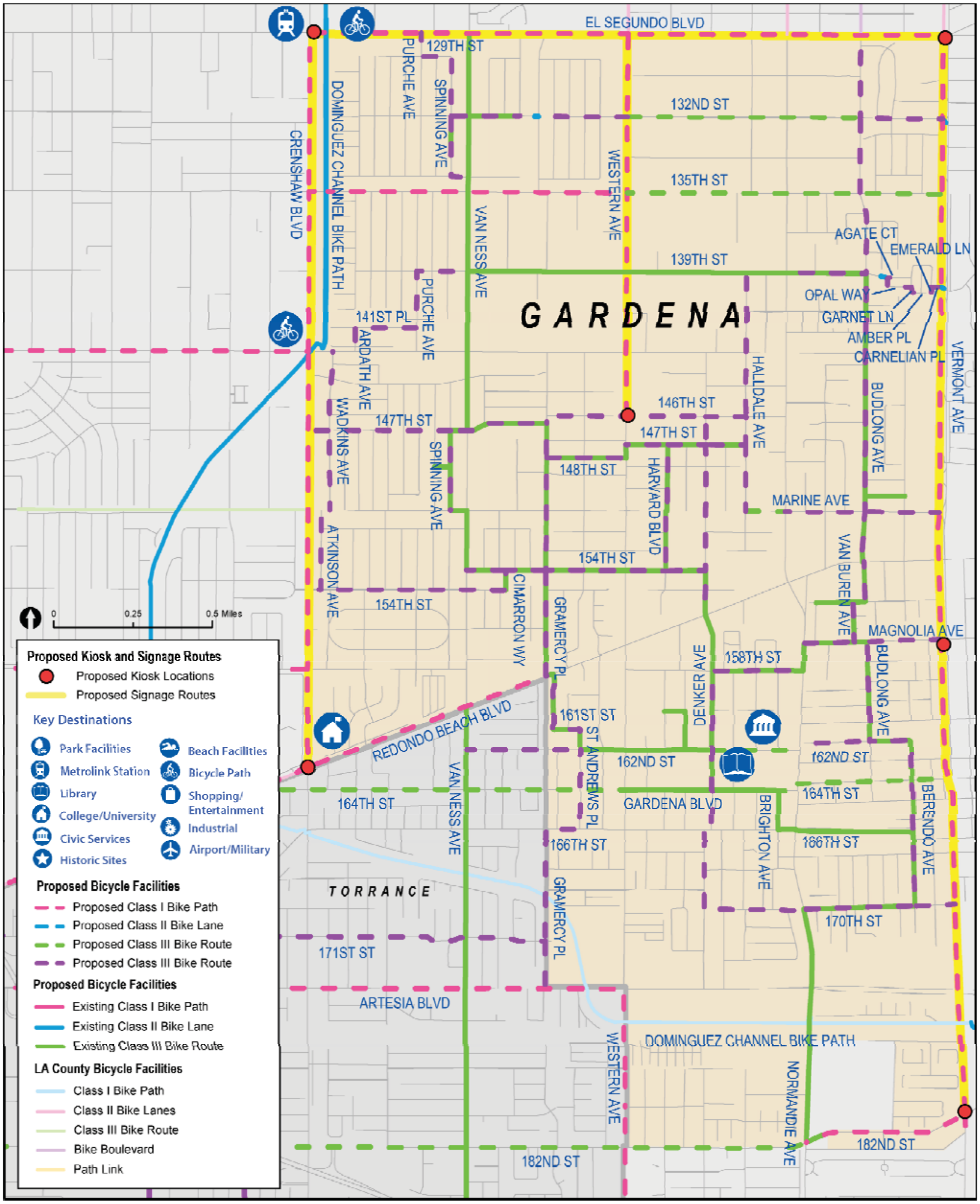
Criteria	Score	Multiplier	Total	Description
Utility Prioritization Factors				
Gap Closure	2	3	6	Fills a network gap between two existing facilities
	1	3	3	Fills a network gap between an existing facility and a proposed facility
	0	3	0	Does not directly or indirectly fill a network gap
Connectivity: Existing	2	3	6	Provides direct access to an existing bicycle facility
	1	3	3	Provides secondary connectivity to an existing bicycle facility
	0	3	0	Does not directly or indirectly access an existing bicycle facility
Connectivity: Regional Proposed	2	1	2	Provides direct access to a regional proposed bicycle facility
	1	1	1	Provides secondary connectivity to a regional proposed bicycle facility
	0	1	0	Does not directly or indirectly access a regional proposed bicycle facility
Connectivity: Activity Centers	2	2	4	Provides direct access to a major trip-generating destination
	1	2	2	Provides secondary connectivity to a major trip-generating destination
	0	2	0	Does not directly or indirectly access an Activity Center
Connectivity: Multi-Modal	2	2	4	Provides direct access to a multi-modal transportation center
	1	2	2	Provides secondary connectivity to a multi-modal transportation center
	0	2	0	Does not directly or indirectly access a multi-modal transportation center
Safety	2	1	2	Provides a bicycle facility on a roadway that experienced 3 or more bicycle collisions between 2007-2009
	1	1	1	Provides a bicycle facility on a roadway that experienced 1-2 bicycle collisions between 2007-2009
	0	1	0	Provides a bicycle facility on a roadway that did not experience any bicycle collisions between 2007-2009
Public Input	2	1	2	Roadway was identified by the public as a desirable for a future facility multiple times
	1	1	1	Roadway was identified by the public as desirable for a future facility once
	0	1	0	Roadway was not identified by the public as desirable for a future facility
Underserved Communities	2	1	2	Serves census tract areas in which over 10.1 percent of households do not own a vehicle
	1	1	1	Serves census tract areas in which 3.1 to 10 percent of households do not own a vehicle
	0	1	0	Serves census tract areas in which 3 percent or less of households do not own a vehicle
Implementation Prioritization Factors				
Project Cost	2	1	2	Will cost less than $25,000 to implement

Criteria	Score	Multiplier	Total	Description
	1	1	1	Will cost between $25,001 and $75,000 to implement
	0	1	0	Will cost over $75,000 to implement
Parking Displacement	2	1	2	Does not require any parking removal
	1	1	1	Requires removal of some on-street parking stalls
	0	1	0	Requires removal of all on-street parking stalls

Appendix L: Proposed Kiosk and Signage Routes

Appendix L-1: Proposed Kiosk Locations and Signage Routes in El Segundo

South Bay Bicycle Master Plan



Appendix L-2: Proposed Kiosk Locations and Signage Routes In Gardena

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Appendix L-3: Proposed Kiosk Locations and Signage Routes in Hermosa Beach

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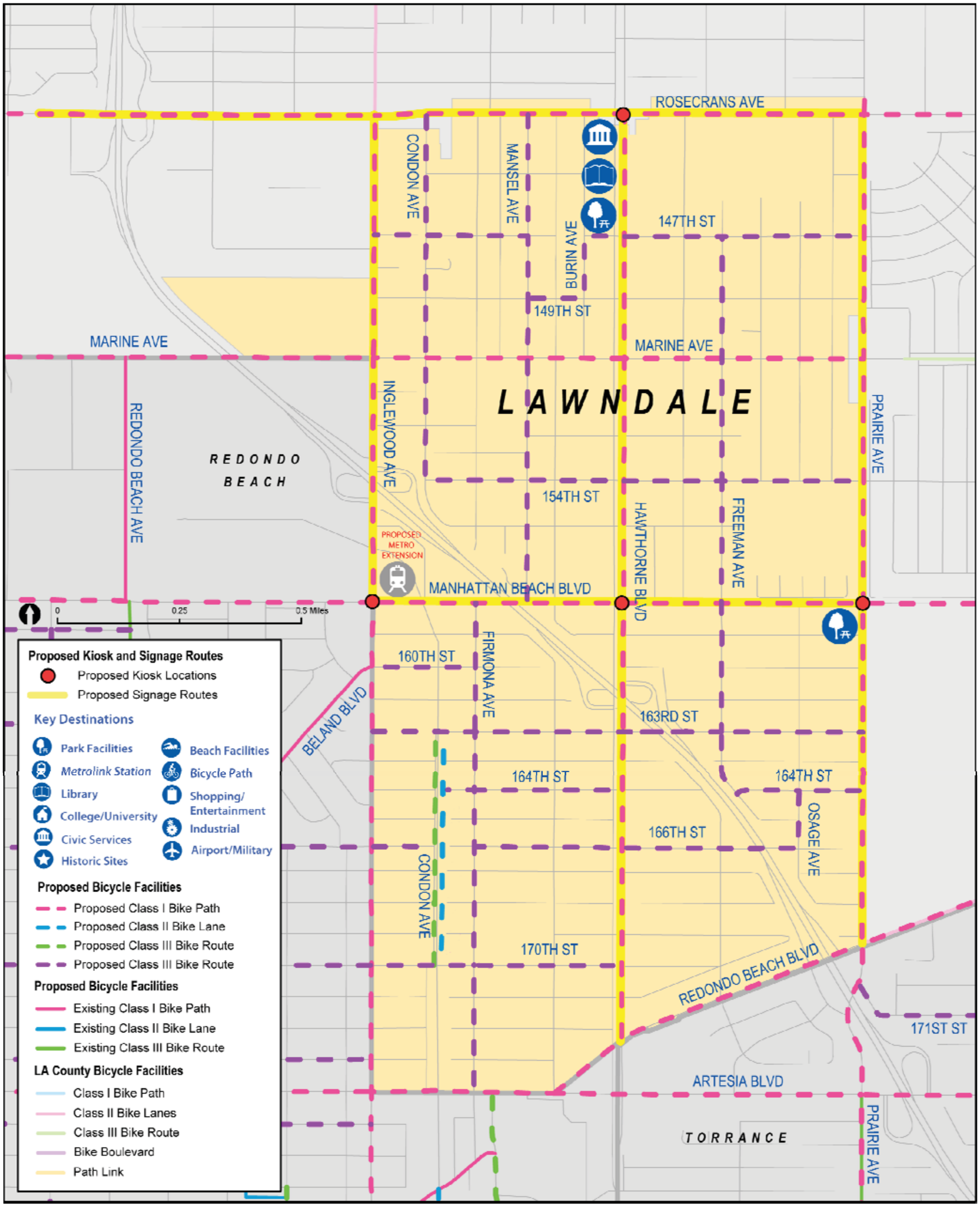

Appendix L-4: Proposed Kiosk Locations and Signage Routes in Lawndale

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Appendix L-5: Proposed Kiosk Locations and Signage Routes in Manhattan Beach

South Bay Bicycle Master Plan

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Proposed Kiosk and Signage Routes
Proposed Kiosk Locations
Proposed Signage Routes
Key Destinations
Park Facilities
Metrolink Station
Library
College/University
Civic Services
Historic Sites
Beach Facilities
Bicycle Path
Shopping/ Entertainment
Industrial
Airport/Military
Proposed Bicycle Facilities
Proposed Class I Bike Path
Proposed Class II Bike Lane
Proposed Class III Bike Route
Proposed Class III Bike Route
Proposed Bicycle Facilities
Existing Class I Bike Path
Existing Class II Bike Lane
Existing Class III Bike Route
MARINE AVE
REDONDO AVE
HARKNESS ST
AVIATION BLVD
REDONDO BEACH AVE
INGLEWOOD AVE
154TH ST
LAWN-DALE
HAWTHORNE BLVD
MANHATTAN BEACH BLVD
WARFIELD AVE
WHITE CIR
BELAND BLVD
160TH ST
162ND ST
FARRELL AVE
164TH ST
REDONDO BEACH
166TH ST
ROBINSON ST
CONDON AVE
GREENLINE
FIRMONA AVE