Exhibit 2

Appendix A

A DRAFT SMP EXISTING CONDITIONS REPORT

Carlsbad Sustainability Mobility Plan

Draft Final Existing Conditions Report

December 2018

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City of Carlsbad

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1.0 Introduction and Planning Context

The Carlsbad Sustainable Mobility Plan will lay the foundation for improving mobility for all modes of travel, including pedestrians and bicyclists, within the City of Carlsbad. As part of the mobility improvements, the Carlsbad Sustainable Mobility Plan will identify ways to improve connectivity and safety, as well as identify ways to foster innovation. This represents the City's inaugural Sustainable Mobility Plan, building upon recommendations set forth in numerous plans proceeding this effort: the draft *Trails Master Plan* (2016), the Carlsbad *Coastal Mobility Readiness Plan* (2016), the *General Plan Mobility Element* (2015), the *Climate Action Plan* (2015), *Carlsbad Active Transportation Strategy* (2015), *Livable Streets Assessment* (2013), *Americans with Disabilities Transition Plan for Public Rights-of-Way* (2013), the *Pedestrian Master Plan* (2008), the *Bicycle Master Plan* (2007), and SANDAG's San Diego *Regional Safe Routes to School Strategic Plan* (2012).

In addition to building on the previously laid plans, the Sustainable Mobility Plan will update the 10-year-old *Pedestrian Master Plan* and the 11-year-old *Bicycle Master Plan*. It will also provide the opportunity for collaboration among the City of Carlsbad's Transportation, Parks, and Economic Development departments.

An existing conditions report is conducted on the front end of all major planning efforts, it allows for taking stock of the current environment and any legislative changes on either the federal, state and/or local level.

Currently, the City of Carlsbad has approximately 348 miles of publicly maintained roadway, 455 net miles of completed sidewalks and a total of approximately 111 miles of bicycle infrastructure. This specifically includes approximately 6 miles of Multi-Use Paths (Class I), 101 miles of bicycle lanes (Class II), and about 6 miles of bicycle routes (Class III).

In order to understand the existing conditions – the current physical and operational conditions of Carlsbad's mobility networks – a series of analyses were performed. The results of this analyses and public outreach will shape the overall recommendations which will be set forth in later chapters the Sustainable Mobility Plan.

1.1 Legislative Framework

Several statewide key planning efforts and legislative actions of the past decade have redefined the way community transportation planning is carried out, including Assembly Bill 32 *The Global Warming Solutions Act*, Senate Bill 375 *The Sustainable Communities and Climate Protection Act*, Assembly Bill 1358 *The Complete Streets Act*, and the regional San Diego Association of Governments' (SANDAG) *San Diego Forward: The Regional Plan*. A unifying theme among these documents is to achieve a more balanced, multimodal transportation system that increases travel mode options for all users, with an emphasis on active transportation and public transportation.

Assembly Bill 32 *The Global Warming Solutions Act* was adopted in 2006, which codified California's pursuit of a low-carbon, sustainable future. The Bill enacted a mandate of reducing California's greenhouse gas emissions to year 1990 levels by 2020, which would constitute a 15 percent overall reduction relative to baseline conditions.

In 2008, Senate Bill 375 was adopted, requiring California Metropolitan Planning Organizations (MPOs) to formulate a "sustainable communities strategy" (SCS) as part of their regional transportation plans, specifically identifying how the region will achieve targeted reductions in greenhouse gas emissions (GHG) from automobiles and light trucks.

Assembly Bill 1358 *The Complete Streets Act* went into effect in California on January 1, 2011, requiring the legislative body of a city or a county to plan for a balanced, multimodal transportation network that meets the needs of all roadway users – defined to include motorists, pedestrians, bicyclists, children, persons with disabilities, seniors, movers of commercial goods, and users of public transportation – in a manner that is suitable to the rural, suburban, or urban context of the general plan.

San Diego Forward – The Regional Plan outlines the future of San Diego County's transportation network and how it will accommodate the anticipated growth the area can expect by 2050. *San Diego Forward* demonstrates how SANDAG will invest in infrastructure to provide more transportation choices, while strengthening the economy, and promoting a healthy environment.

Due to these statewide and regional efforts, municipalities are required to equalize their transportation networks and meet the needs of all roadway users, while reducing the city's greenhouse gas emissions.

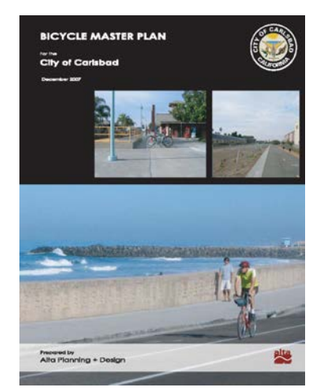
1.2 Document Review

This Chapter describes previous and on-going planning efforts and relevant documents in the City of Carlsbad, to provide context for the Sustainable Mobility Plan. The following documents were referenced:

- Bicycle Master Plan (2007)
- Pedestrian Master Plan (2008)
- ADA Transition Plan for Public Rights-of-Way (2013)
- City of Carlsbad Livable Streets Assessment (2013)
- City of Carlsbad Active Transportation Strategy (2015)
- Climate Action Plan (2015)
- General Plan Mobility Element (2015)
- Carlsbad Coastal Mobility Readiness Plan (2016)
- Draft Trails Master Plan (2016)
- Carlsbad Parking Management Plan (2017)
- Village & Barrio Master Plan (2018)

Bicycle Master Plan (2007)

In December of 2007, the City Council adopted the Bicycle Master Plan. This document sought to build upon the existing bicycle network by enhancing and expanding the bikeways, connecting gaps, addressing constrained areas and improving intersections.



A comprehensive approach was used to determine the bicycle needs throughout the City. Such efforts included a review of existing conditions, as well as a review of existing plans and policies, providing improvement recommendations, prioritizing implementation strategies, and organizing an effective public outreach strategy. The overarching goal for the Bikeway Master Plan is "*A City which promotes, encourages, and accommodates a variety of transportation modes as alternatives to the automobile*."

The following objectives and planning actions are outlined in the Carlsbad Bicycle Master Plan in support of this goal:

- To provide infrastructure and facilities necessary to accommodate pedestrians, bicycles and other non-automobile modes of transportation.
- Implement a bikeway network which serves all bicycle use groups, including commuters, recreational cyclists and those making utilitarian and school trips.
- Coordinate the location of bicycle routes with the Parks and Recreation Element and the Open Space and Conservation Element.
- Extend bicycle routes to cultural, educational and recreational facilities whenever possible.
- Design bicycle routes in accordance with "Bicycle Route Standards"
- Improve bicycle access to beach areas.
- Provide linkage to bus, pedestrian and bicycle routes from any new light rail commuter transit facility.
- Encourage passive and active use of the railroad right of way as trail linkage and bicycle pathway.
- Seek funding for bicycle transportation through regional, state and federal funding programs.
- Provide secure bicycle storage in activity centers and at major bus and transit stations.
- Encourage bicycling by publicizing local and commuter routes through installation of wayfinding signage.
- Continue routine street repair and maintenance activities, including regular sweeping of bikeways and shared use pathways.
- Install trail systems within existing and new industrial developments.
- Review, periodically, the Circulation Element Bicycle Route Map and revise, as necessary, to reflect existing roadway conditions and changed land uses.
- Provide education, encouragement and enforcement programs which promote the use of bicycling as a mode of transportation.
- Encourage school districts to implement safety programs for pedestrians and bicyclists within the public-school system.
- Develop and implement employer incentive programs to encourage the placement of strategic bicycle storage lockers, and the construction of safe and convenient bicycle facilities.
- Continue to ensure that construction and repair activities along the roadway network minimize disruption to bikeway facilities, ensure bicyclist safety at all times and provide alternative routes if necessary.
- Continue City of Carlsbad Police Department enforcement of bicycle-related violations by both motorists and bicyclists and emphasize positive enforcement for safe bicycling behavior by children.

At the time the Bicycle Master Plan was adopted the City of Carlsbad had a total of 94.4 miles of bikeway facilities, as can be seen in Table 1-1 below.

Table 1-1 Mileage of Existing Bicycle Facilities from 2007 Bicycle Master Plan

Facilities	Existing miles
Class I Bike Path	1.3
Class II Bike Lanes	88.7
Class III Bike Routes	4.4
Total	94.4

Source: City of Carlsbad Bicycle Master Plan (2007)

The Needs Analysis section of the Bikeway Master Plan examined land use and demand, commute patterns, trip reduction and air quality benefits, bicycle safety and accident analysis, and discussed citizen and community involvement.

The Bicycle Master Plan included commute patterns since, "one major objective of any bicycle facility enhancement or encouragement program is to increase the 'split' or percentage of people who choose to bike rather than drive or be driven." (page 5-1 to 5-2). At the time of the Bicycle Master Plan, the Journey to Work data for the City of Carlsbad showed that 1.5% of people commuting to work walked, 0.3% of people commuting to work rode their bicycle, 2.2% of people commuting to work took transit, and 78.1% of people commuting to work drove alone. (Table 5-1 Bicycle Master Plan).

Under the Bicycle Safety and Accident Analysis subsection, the characteristics of causal and experienced riders, as well as the characteristics of recreational and utilitarian trips, were laid out, as seen below in Table 1-2 and Table 1-3 from the adopted Bicycle Master Plan.

Table 1-2 Characteristics of Different Types of Cyclists and Trips

Casual Riders	Experienced Riders
Prefer off-street bike paths or bike lanes along low-volume, low-speed arterials	Can comfortably ride alongside higher-volume, higher-speed arterials without bike lanes. Prefers on-street facilities over off-street paths.
May have difficulty gauging traffic and may be unfamiliar with rules of the road. May walk bike across intersections.	Negotiates streets like a motor vehicle, including "taking the lane" and using left-turn pockets.
May use less direct route to avoid arterials with heavy traffic volumes.	Prefers a more direct route.
May ride on sidewalks and ride the wrong way on streets.	Avoids riding on sidewalks or on multi-use paths. Rides with the flow of traffic on streets.
Rides shorter distances of ten miles or fewer.	Cycles longer distances, often more than 25 miles, on a recreational route.

Source: City of Carlsbad Bicycle Master Plan (2007)

Table 1-3 Characteristics of Recreational and Utilitarian Trips

Recreational Trips	Utilitarian Trips
Directness of route not as important as visual interest, shade, or protection from wind.	Directness of route more important than visual interest, etc.
Loop trips may be preferred to backtracking.	Trips generally travel from residential to shopping or work areas and back.
Trips may range from short to over 50 miles.	Trips generally are 1-5 miles in length.
Short-term bicycle parking should be provided at recreational sites, parks, trailheads, and at other recreational activity centers.	Short-term and long-term bicycle parking should be provided at stores, transit stations, schools, workplaces.
Varied topography may be desired, depending on the skill level of the cyclist.	Flat topography is desired.
May be riding in a group.	Often ride alone.
May drive with their bicycles to the starting point of a ride.	Use bicycle as primary transportation mode for the trip. Maty transfer to public transportation. May or may not have access to a car for the trip.
Trips usually occur on the weekend or weekday afternoons.	Trips typically occur during morning and evening commute hours (commute to school and work). Shopping trips also occur on weekends.
Type of facility varies, depending on the skill level of cyclist.	Generally use on-street facilities, may use pathways if they provide easier access to destinations than on-street facilities.

Source: Carlsbad Bikeway Master Plan

The next chapter of the 2007 document, Recommended Bikeway Improvements, laid out the recommended bikeway network and the recommended support facilities and programs. The recommendations included increasing public bicycle parking and end-of-trip facilities, developing a Safe Routes to Schools program, bikeway maintenance and repair, ensuring bicycle detection at signalized intersections, implementing bikeway signage standards so all signs conform to MUTCD standards, and ensuring multi-modal connections. The Plan also included recommendations for education and encouragement programs.

The bikeway network recommendations focused on Class I, II, and III bikeways to expand and enhance the City's bikeway network. Table 1-4, below, taken from the Bicycle Master Plan details the specific locations for each project, the project extents, the class, length and cost.

Table 1-4 Estimated Construction Cost of Long-Term Recommended Bikeway Projects (2007)

Segment Name	Start	End	Class	Length (miles)	Cost ($)
Recommended Class I Bike Paths					
Carlsbad Boulevard Bike Path at Ponto	Palomar Airport Road	Poinsettia Lane at Ponto	I	1.5	$4,940,000
Coastal Rail Trail	N. City Limit	S. City Limit	I	5.0	$7,500,000*
Total Class I Cost				*6.5*	*$12,440,000*
Recommended Class II Bike Lanes					
Hillside Drive/Highland Drive	Tamarack Avenue	Kelly Drive	II	1.5	$60,000
Avenida Encinas	Palomar Airport Road	Poinsettia Station	II	1.0	$50,000
Palomar Airport Road	Paseo Del Norte	Carlsbad Boulevard	II	0.3	$30,000
Total Class II Cost				*2.8*	*$140,000*
Recommended Class III Bike Routes					
Monroe Street (Lancer Way)	Carlsbad Village Drive	Hillside Drive	III	1.3	$13,000
Las Flores/Highland Drive	Jefferson Street	Tamarack Avenue	III	0.8	$8,000
Chestnut Avenue	Coastal Rail Trail	Interstate 5	III	0.4	$4,000
Avenida Encinas	Cannon Road	Palomar Airport Road	III	0.9	$9,000
Laguna Drive	Jefferson Street	State Street	III	0.3	$3,000
Chinquapin Avenue	Coastal Rail Trail	Jefferson Street	III	0.2	$2,000
Gabbiano Lane	Batiquitos Drive	Batiquitos Lagoon	III	0.3	$3,000
Total Class III Cost				*4.2*	*$42,000*

Notes:
1) Costs provided in 2007 dollars. Cost estimate details are provided in Appendix F of the Carlsbad Bicycle Master Plan.
* Estimate Provided by City of Carlsbad Public Works Department.

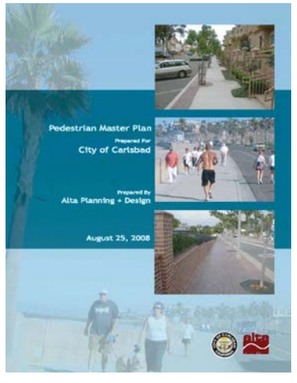
Recommended Network Facility Enhancement Projects		
Location	**Description**	**Cost**
State Street at Carlsbad Boulevard	Install Bicycle Warning Signage	$5,000
Tamarack Avenue at I-5	Install Bicycle Warning Signage	$5,000
Palomar Airport Road at I-5	Install Bicycle Warning Signage	$5,000
Total Facility Enhancement Projects Cost		*$15,000*
Total System Cost		$12,637,000

Notes:
1) Cost of acquiring right-of-way is not included.
2) Bike lane improvements assumed to be signage and striping only.
3) Bike route improvements assumes to be signage only.

Source: City of Carlsbad Bicycle Master Plan (2007)

Finally, included in this Chapter is the implementation process for the recommended projects and programs, as well as possible funding sources.

Pedestrian Master Plan (2008)



In August of 2008, the City Council adopted the Pedestrian Master Plan. This document is intended to guide the future development and enhancement of pedestrian facilities within the City aimed at making walking an integral mode of transportation in the City of Carlsbad.

A comprehensive approach was used to develop this plan: the benefits of walking were examined, goals, objectives and policies were established, the existing condition was inventoried and pedestrian needs were analyzed. In addition, projects and programs were recommended, an implementation timeline was suggested and funding sources were identified.

The vision of the Pedestrian Master Plan is multi-pronged. It envisioned a future City of Carlsbad where:

- People can conveniently walk to their destinations
- People feel safe walking
- Facilities are provided for people from all age groups
- People with disabilities are more easily mobile
- Visitors are attracted to the enhanced walking environment
- Commercial streets are exciting places to visit.

In support of this vision, the plan laid out goals, objectives and policies in the following areas: Streets and Traffic Control, Alternative Modes of Travel, Overall Land Use Patterns, Residential, Commercial, Village, Transportation Corridor.

In the existing conditions section, the plan inventories the linear miles of sidewalk, the number of curb ramps, miles of trails, existing streetlights, as well as the types crosswalks in the City. The breakdown of the existing infrastructure is as follows:

- Sidewalks: There are 500 linear miles of sidewalks in the City. Approximately 305 miles of a total 339 miles of publicly-maintained roadways, provide sidewalks within the roadway cross-section, along one or two sides of the roadway.
- Curb ramps: There are 4,623 curb ramps in the City, with less than 1 percent in poor condition or non-compliance. A map identifies the areas with missing curb ramps.
- Trails: The Citywide Trail network covers approximately 95 miles. There are 73.2 miles consisting of sidewalks and bike lane connections, 22 miles of trail. This includes 17.7 miles of unpaved trails, and 4.3 miles of paved trails.
- Street Lights: There are 7,355 lights, nearly 71 percent of the existing sidewalk network is within 100 feet of a street light.
- Crosswalks: The majority of crosswalks are transverse crosswalks; however, high visibility crosswalks are employed in various locations.

The pedestrian needs analysis revealed “high pedestrian need” locations. These locations were the entire northwest quadrant of the City, the western coastal area of the City between Cannon Road and Batiquitos Lagoon, several locations along El Camino Real, at Aviara Parkway/Alga Road and at La Costa Avenue, and a large area surrounding the intersection of La Costa Avenue and Rancho Santa Fe Road.

More discrete Pedestrian Priority Areas were identified within these larger “high pedestrian need” locations. A list of recommended projects was developed for future implementation within the Pedestrian Priority Areas. The projects were divided into two categories: citywide improvements and location specific improvement. In order to identify the location specific improvements, a prioritization process, which included public outreach, the needs analysis and field reviews, was conducted.

The recommended citywide improvements consist of: sidewalk gap infill, American with Disabilities Act (ADA) improvements, adding signage and striping to signalized intersections, uncontrolled crosswalk improvements, signage improvements to bring signs up to current MUTCD standards, and developing a Safe Routes to School program.

There are 15 location specific projects, as can be seen below in Table 1-5. The listing of the projects does not reflect implementation priority.

Table 1-5 Top 15 Priority Pedestrian Projects (2008)

Top 15 Priority Projects
1. Plaza Camino Real Transit and Shopping Center
2. Jefferson Street Corridor
3. Carlsbad Boulevard (Buena Vista Lagoon Crossing)
4. Buena Vista Elementary
5. Carlsbad Village and Transit Center
6. Chestnut Avenue Corridor
7. Harding Street Corridor
8. Carlsbad High and Surrounding Schools
9. Jefferson Elementary
10. Calaveras Elementary & Middle Schools
11. Kelly Elementary
12. South Carlsbad Boulevard Corridor
13. Palomar Airport Road Corridor
14. Aviara Elementary and Middle School
15. La Costa Canyon High and Surrounding School

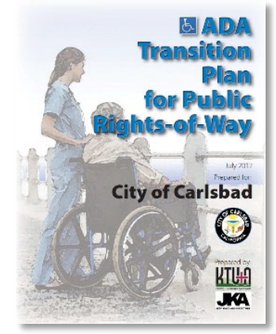
Source: Pedestrian Master Plan (2008)

The infrastructure improvements recommended for these locations consist of: wayfinding signage, sidewalk infill, bus stop improvements, signal timing adjustments, parking restriping, curb extensions, installing a crosswalk and a railway crossing among other suggested improvements.

The recommended activity programs in the Pedestrian Master Plan are intended to complement the proposed improvements. The programs are a mix of public awareness and education programs. The pedestrian awareness programs include a trail blast fitness program, walk to school week, public service announcements, walking maps and guides, and other promotional events. The education programs include a safety education, enforcement education, senior citizen and disabled pedestrian education, teen and adult education video, as well as a Safe Routes to Schools program and enforcement of pedestrian laws program.

The implementation and funding section of the Pedestrian Master Plan discusses the cost of the various infrastructure projects and programs, as well as possible funding sources.

ADA Transition Plan for Public Right-of-Way (2012)



The Americans with Disabilities Act (ADA), enacted in 1990, extends comprehensive civil rights protections to all people with disabilities. The *ADA Transition Plan for Public Right-of-Way* outlines a comprehensive approach to removing public barriers to walking by mapping out a program that will transition the City of Carlsbad to comply with ADA and Title 24 requirements. This Transition Plan was created specifically for documenting the accessibility compliance of pedestrian facilities within the public rights-of-way. A prioritized, phased and transitional approach established by the Plan will allow the municipality to dedicate public funds to remove these barriers on a recurring basis.

The primary goal of the project is to provide a complete and accurate survey of walking facilities within the public right-of-way in the designated tier areas that can then be addressed as part of a broader strategic "Transition Plan." The supporting objectives of the Plan are to:

• Assure that public funds are allotted to public use areas where the greatest number of persons can take advantage of these improvements.

• Prioritize the types of destinations and origins where a higher than normal level of physically challenged or aging persons may exist.

• Understand that higher levels of pedestrian activity are typically located near tourist destinations, public facilities, parks, beaches, major employment, school or shopping destinations. Areas with higher levels of walking activity, need to be considered high priorities for the removal of barriers to public travel.

• Identify the specific improvements needed at intersections, ramps and walkways, to provide better connectivity, increase public safety and to remove obstacles that impede those with and without physical challenges.

• Recognize opportunities where Federal ADA and California Title 24 corrective actions would benefit walkability and urban design quality.

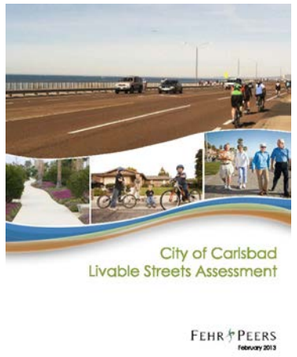
• Recommend a phased approach that will allow for a logical and economically viable method to implement a broad range of Tier One and Tier Two projects.

• Suggest guidelines to be used by the City of Carlsbad in the future for retrofitting or replacing public rights-of-way barriers to travel.

• Deliver a computer database and GIS mapping products that will allow the City to modify and update the work products of this transition plan.

A Pedestrian Master Plan was prepared for the City of Carlsbad in 2008. The focus of this study was to provide a guide for future development and enhancement of the pedestrian experience throughout the City. Although there is some overlapping information between the Pedestrian Master Plan and this ADA Transition Plan, the ADA Transition Plan provides a detailed plan to bring pedestrian facilities within the public right-of-way (curb ramps, path-of-travel, pedestrian signal actuators, etc.) into conformance with current state and federal ADA codes and regulations.

City of Carlsbad Livable Streets Assessment (2013)



In 2012, Livable Streets was a Carlsbad City Council priority and strategic focus area for further enhancing Carlsbad's outstanding quality of life. It was partially used as a way to incorporate the feedback received from the Envision Carlsbad General Plan Update process regarding the challenges, values, needs and wants of the community.

The Carlsbad Livable Streets assessment brought all twelve City departments together, allowing for coordination between departments, funding, resources, plans, policies, procedures and decision making. It also identified livable streets best practices from other communities and looked at what the City could do to improve upon existing practices.

The best practices were divided into four distinct categories: Legal & Policy, Design Innovation, Funding, and Maintenance & Operations. The Best Practices review included twelve communities.

The cities of Arlington, VA, Redwood City, CA, Fort Collins, CO and Minneapolis, MN were included in the Legal & Policy review. The cities of Charlotte, NC and New York, NY were included in the Design Innovation review. Boulder, CO, Washington, DC and Austin, TX were included in the Funding section. In the fourth category, Maintenance & Operation, Denver, CO, San Francisco, CA, and Seattle, WA were included.

Additionally, as part of this process, leadership of all twelve city departments met for a series of meetings. Each meeting was facilitated and had a series of question prompts.

The question prompts, though multi-pronged, essentially asked the participants to define livable streets and give local examples, share a departmental livable street accomplishment, share department specific barriers to livable streets, and finally share the most important livable street outcome and indicators.

With regard to defining livable streets, the responses fell into three categories: physical characteristics, functional characteristics, and experiential characteristics. Bressi Ranch, Carlsbad Village and La Costa Avenue were identified several times by departmental leadership as local examples of livable streets.
The success stories were also organized in the four implementation categories, and these successes include:

- Legal & Policy: Carlsbad Residential Traffic Management Program; Enforcement through Education
- Design Innovation: Bressi Ranch Master Plan; Engineering Countermeasures; Carlsbad Village Redevelopment; Improving Trails Connectivity; Improving Curb Lane Depressions; Dual Right Turn Lanes
- Funding: Storefront Improvement Grant; In-Lieu Parking; Budget Autonomy; Street Maintenance
- Maintenance & Operations: Ongoing Monitoring Efforts; Speed Feedback Signs; Video Detection

With regard to the barriers or challenges to livable streets, most responses fell into the livable streets implementation categories:

- Legal & Policy: Public Approval; Conflicts with Existing Policies & Plans; Enforcement Issues
- Design Innovation: Safety by Design; Physical Barriers; Types of Countermeasures
- Funding: Funding Shortfalls
- Maintenance & Operations: Cross-Departmental/Agency Collaboration

The final question prompt asked department leaders to identify the outcomes they would like to see implemented for livable streets to be successful in the City of Carlsbad. These answers could be grouped into three categories: the development of programs & protocols, functional indicators, and experiential indicators.

With regard to the development of programs & protocols, department leaders asked for a streamlined protocol for developing projects and coordinating, funding projects through the CIP process, and for securing growing funding through external sources. In terms of functional indicators, departments identified metrics which could be measured, such as Greenhouse Gas reductions, increased connections, and increased pedestrian activity. The final category, experiential indicators, related to the feel of the streets and residents' perceptions, to have people feel comfortable and safe on the street and feel that they have a good quality of life.

The final section of the report, Performance Measures, evaluates how the City is performing, including key highlights and areas of enhancement. In the Legal & Policy category, the City of Carlsbad has been proactive in implementing livable streets in the City but does not have an adopted livable streets policy. The opportunity for enhancement in this category is to develop and adopt a livable streets policy.

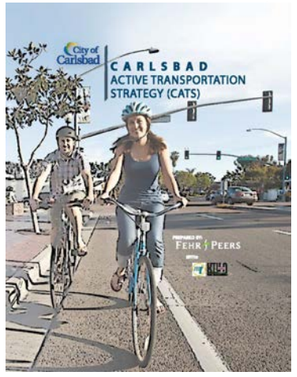
In the Design Innovation category, the City has several examples of successful livable streets design innovations. The main opportunity for enhancement in this category is to develop a livable streets priority program for implementing projects and tying these projects to the Capital Improvement Program.

In the Funding category, highlights include recent successes in funding livable streets improvements. The main opportunity for enhancement in this category is to develop a livable streets program to secure future funding.

In the Maintenance & Operations category, highlights include the department leaders who have taken initiative to improve coordination among departments for developing and implementing and monitoring livable streets projects. The main opportunity for enhancement in this category is to improve coordination between departments by developing an organization approach.

The report concludes with immediate and near-term action items and projected completion dates. All of the near-term action items were scheduled to be completed by June 2014.

City of Carlsbad Active Transportation Strategy (2015)



The Carlsbad Active Transportation Strategy (CATS) is divided into five chapters: Where We Have Been, Gap Analysis, Roadmap to Livable Streets, Priority Projects, Measures of Effectiveness.

The first chapter, Where We Have Been, identifies the plans and policies which have been adopted by the City of Carlsbad that affect the Livable Streets effort. In addition, it lists the projects included in the current Capital Improvement Program (CIP). The CIP identifies funded capital projects which will be implemented over the subsequent 15 years. The chapter also identifies the twelve departments which have a responsibility for a portion of street design and graphically displays this information.

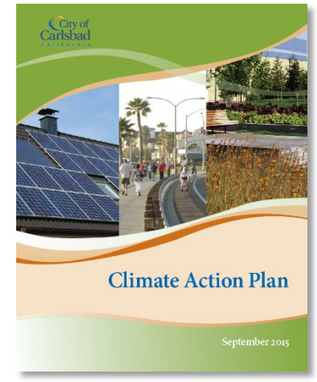
The second chapter, Gap Analysis, identifies three types of gaps and their locations, as they relate to Livable Streets in the City of Carlsbad. The first type of gap, physical gaps, refer to missing links in the existing active transportation network. The second type of gap, operational gaps, refer to areas in the network which may not be performing satisfactorily for bicyclists, pedestrians, and transit users. The third type of gap, procedural gaps, identify missed opportunities to incorporate Livable Streets infrastructure improvements.

The third chapter, Roadmap to Livable Streets, describes how the implementation of livable streets should be formalized so it becomes a repeatable process that can be applied on all projects moving forward independent of staff changes at the City which affect institutional knowledge. The chapter also discusses the workbook which was developed to prioritize future Livable Streets projects, and grant funding opportunities. This chapter describes statewide funding sources, regional funding sources, SANDAG Funding and funding through the Job Access and Reverse Commute Program.

The fourth chapter, Priority Projects, identifies five projects as priority projects. The projects were selected based on the gap analysis and the analysis conducted in the previous chapters. The projects are: Chestnut Avenue, Carlsbad Village, Valley Street, various Trail Crossings, and Agua Hedionda Lagoon (Park Drive). Each project is accompanied by a detailed project sheet showing the exact location of the specific improvements.

The final chapter, Measures of Effectiveness, identifies metrics to use when revisiting a project after its been implemented to determine whether its performing as originally intended. This section reviews some best practices and proposes five measures of effectiveness to review for the City of Carlsbad's projects.

Climate Action Plan (2015)



The City of Carlsbad has long been a steward of environmental sustainability. In 2007, the City of Carlsbad City Council adopted a set of sustainability and environmental guiding principles (Resolution No. 2007-187) to help guide city investments, activities, and programs. Additionally, sustainability emerged as a key theme during the Envision Carlsbad community outreach process, and reflected as a Core Value of the Community Vision. City Council adopted the Climate Action plan in 2015.

The 6th Core Value in Envision Carlsbad is Sustainability and aims to *"Build on the city's sustainability initiatives to emerge as a leader in green development and sustainability. Pursue public/private partnerships, particularly on sustainable water, energy, recycling, and foods."*

In September 2015, the City of Carlsbad Adopted the Climate Action Plan (CAP) that outlines actions that the city will undertake to achieve its proportional share of the state greenhouse gas (GHG) emissions reductions. The CAP is designed to reduce the City of Carlsbad's greenhouse gas (GHG) emissions and streamline environmental review of future development projects in the city in accordance with the California Environmental Quality Act (CEQA).

The CAP has been prepared concurrently with the city's updated General Plan and includes actions to carry out the General Plan's goals and policies, consistent with the Community Vision articulated during Envision Carlsbad. The CAP is also correlated with the Environmental Impact Report (EIR) on the General Plan, with the CAP GHG reduction target synchronized with the EIR.

The CAP includes goals, policies, and actions for Carlsbad to reduce GHG emissions and combat climate change and includes:

- An inventory of Carlsbad's citywide and local government GHG emissions;
- Forecasts of future citywide and local government GHG emissions;
- A comprehensive, citywide strategy and actions to manage and reduce GHG emissions, with emission targets through 2035; and
- Actions that demonstrate Carlsbad's commitment to achieve state GHG reduction targets by creating enforceable measures, and monitoring and reporting processes to ensure targets are met.

The timeframe for the Plan extends from the date of adoption through 2035.

The CAP is intended to be a tool for policy makers, community members and others to guide the implementation of actions that limit Carlsbad's GHG emissions. Ensuring that the mitigation measures in the CAP translate from policy language to on-the-ground results that are critical to the success of the CAP.

General Plan Mobility Element (2015)

A component of the larger General Plan, the mobility element is required by state law. The introduction includes the background and purpose, and notes that the primary transportation issues facing the City of Carlsbad relate to protecting and enhancing the community's quality of life, as reflected in the core values of the Carlsbad Community Vision. The report goes on to state that the community's vision includes, "better pedestrian and bicycle connections between neighborhoods, destinations, and different parts of the community, and a balanced transportation system rather than a singular focus on automobile movement."

The Mobility Element outlines the context of the existing transportation system which includes streets, trails, transit, truck routes, and the McClellan-Palomar airport. The bulk of the Mobility Element is dedicated to the Livable Streets Vision and Strategies section. This section acknowledges that when all factors are taken into consideration – geographic setting, adjacent land use, and desired use of each facility – each street is unique within the City. Using these factors as the building blocks, the Mobility Element then categorizes all the streets by typology and what modes each typology could accommodate.

There are 26 roadway typologies:

- Freeways
- Arterial Streets
- Identity Streets
- Village Streets
- Arterial Connector Streets
- Neighborhood Connector Street
- Employment/Transit Connector Streets
- Coastal Streets
- School Streets
- Industrial Streets
- Local/Neighborhood Streets
- Bicycle/Pedestrian Pathway
- Streets within ½ Mile of a Transit Center

Excerpts of the street typology chart are shown below as examples; the complete table can be found online under the City of Carlsbad's General Plan Mobility Element.

Table 1-6 Street Typology & Accommodated Modes from the General Plan Mobility Element: Village Streets

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	SUBJECT TO MMLOS STANDARD (Y/N)	STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES
Village Streets		
	N	• Primary purpose is to move people throughout the Village; providing access to businesses, residences, transit and recreation within the Village area. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Promote pedestrian and bicycle connectivity through short block lengths • Bicycle lanes should be provided • Bicycle boulevards can be considered • Pedestrians should be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk) • Mid-block pedestrian crossings and traffic calming devices should be considered, but only at locations with high pedestrian activity levels or major destinations/attractions • On-street parking may be provided
	Y	
	Y	
	N	

Source: City of Carlsbad General Plan Mobility Element (2015)

Table 1-7 Street Typology & Accommodated Modes from the General Plan Mobility Element: School Streets

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	SUBJECT TO MMLOS STANDARD (Y/N)	STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES
School Streets		
	N	• Primary purpose is to connect people to schools from nearby residential neighborhoods. • Designed to safely move all modes of travel with an emphasis on providing safe pedestrian and bicycle access for students traveling to and from nearby schools. • Vehicle speeds shall be managed to support school uses (typically 25 MPH) • Enhanced bicycle and pedestrian crossings should be provided, including: – High visibility crosswalks – Enhanced pedestrian notifications (e.g. responsive push-button devices) – Enhanced bicycle detection – Bicycle lanes shall be provided and can be further enhanced or complemented by other facilities or off-street pathways • Pedestrian facilities should be a minimum of six feet and shall strive for eight feet in width and shall conform to ADA requirements • Pedestrian crossing distances should be minimized • Opportunities for mid-block pedestrian crossings should be investigated • Traffic calming devices that improve service levels and safety for pedestrians and bicyclists should be considered
	Y	
	Y	
	N	

Source: City of Carlsbad General Plan Mobility Element (2015)

Table 1-8 Street Typology & Accommodated Modes from the General Plan Mobility Element: Bicycle/Pedestrian Pathway and Streets within ½ Mile of Transit

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	SUBJECT TO MMLOS STANDARD (Y/N)	STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES
Bicycle/Pedestrian Pathway		
	Y	• Primary purpose is to provide safe bicycle and pedestrian access throughout the community by connecting people to residences, businesses and recreation uses. • For bicycles and pedestrians only – no vehicular access is permitted • Serves commuters and recreational users
	Y	
Streets within ½ Mile of a Transit Center		
	N	• Primary purpose is to connect people to/from the city's transit centers. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists and efficiently moving vehicles and buses to/from transit centers. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Provides access to the Breeze/COASTER system via enhanced bicycle/pedestrian connectivity or via shuttle service from the stations to the ultimate destination • Could include enhanced transit systems, such as signal priority for transit, dedicated ROW for transit, or queue bypass lanes. • Mid-block pedestrian crossings and traffic calming devices should be considered in these areas • Parking should be provided and managed using innovative parking techniques
	Y	
	Y	
	Y	

Source: City of Carlsbad General Plan Mobility Element (2015)

The Livable Streets Vision and Strategies section also discusses Multi-Modal Level of Service (MMLOS). This section explains that historically, transportation systems have been designed to achieve a level of service to accommodate car drivers. However, in 2010 the Transportation Research Board developed national guidelines to establish levels of service for all modes. Furthermore, this mobility element establishes a multi-modal level of service methodology for the City of Carlsbad. A detailed description of how the level of service for each mode – vehicular, pedestrian, bicycle, transit – will be evaluated, follows.

The Future Operations and Street Improvements section acknowledges that the envisioned street system in the City is built out, except for a defined list of remaining planned improvements. This section also discusses the City's current effort of implementing a citywide traffic signal system upgrade. And in the Future Traffic Operations subsection, recognizes that four arterials would need to widened beyond their current six-lane cross-section to operate at a level of LOS of D or better. However, the plan's intention is to implement Transportation Demand Management strategies, Transportation System Management and livable streets techniques to address and correct the problem.

The Bicycling, Walking, and Transit section reviews the bicycle facility classification system, the proposed bikeway system, the pedestrian facilities, the proposed pedestrian system, and the proposed transit system. The Mobility Element refers to the adopted Bicycle Master Plan, adopted Pedestrian Master Plan and transit improvements which are part of SANDAGs regional planning efforts.

Additional connectivity for bicycle and pedestrian facilities on Cannon Road, Marron Road, at Interstate-5 and the railroad are discussed in the Connectivity to Support Mobility section. It is also noted that improved accessibility to the lagoons and to the coast are envisioned to improve connectivity to those areas.

The Parking section addresses the need to find the correct balance in the parking supply. In order to promote efficient parking supply, the City will develop flexible parking standards which may include the following techniques: shared parking, collective parking, unbundled parking, park once strategy, in-lieu parking fees, parking management strategies, public-private partnerships, parking locator signs, parking way-finding signs, reduced parking standards, biking equals business program, transit equals business program, and bicycle corrals in-lieu of vehicle parking.

The commitment to, and support of, Transportation Demand Management and Traffic Signal Management is affirmed in the subsection entitled, Transportation Demand Management and Traffic Signal Management.

The Goals and Policies section lays out the overarching goals and implementing policies. The goals are as follows:

3-G.1 Keep Carlsbad moving with livable streets that provide a safe, balanced, cost-effective, multi-modal transportation system (vehicles, pedestrians, bikes, transit), accommodating the mobility needs of all community members, including children, the elderly and the disabled.

3-G.2 Improve connectivity for residents, visitors and businesses.

3-G.3 Provide inviting streetscapes that encourage walking and promote livable streets.

3-G.4 Manage parking to support all modes of transportation and ensure efficient use of land.

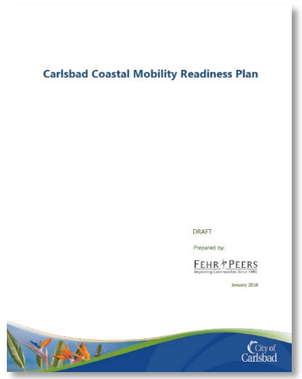
3-G.5 Implement transportation demand and traffic signal management techniques to improve mobility.

3-G.6 Protect and enhance the visual, environmental and historical characteristics of Carlsbad through sensitive planning and design of scenic transportation corridors.

3-G.7 Provide for the safe and efficient movement of goods throughout the city.

The implementing policies, are divided into policies for Street Typology and Multimodal Level of Service, Street Design and Connectivity, Pedestrian and Bicycle Movement, Transit, and Parking and Demand Management, Rail and Truck Movement, as well as Air Movement.

Carlsbad Coastal Mobility Readiness Plan (Draft 2016)



The *Carlsbad Coastal Mobility Readiness Plan* was developed to help stakeholders and constituents envision a coastal transportation system that connects people, creates a sense of belonging, and closely links quality of life issues to economic growth. The report was designed as a blueprint for building the infrastructure to meet the mobility needs of the community, encourage healthy lifestyles, and support a vibrant downtown setting. Collaborative partnerships with the community will bring the following vision to life and is intended to guide Carlsbad's mobility and access decisions along the coast: *To create an innovative transportation future in which advanced information, new technologies and sustainable fuels support a vibrant community with seamless mobility options.*

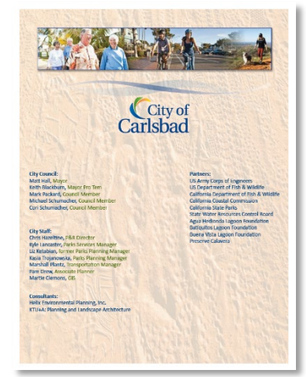
To attain this goal, the plan establishes the importance of improving existing transportation options while increasing viable mobility choices that provide many of the same advantages as personal vehicles. Implementations and recommendations are designed to facilitate and encourage the use of integrated transportation systems that build upon the "Park Once" strategies developed in the Village and Barrio Master Plan.

As indicated, the Plan utilizes previously existing report and policies to help guide and inform the development of a diverse transportation system. The plan draws from the *Carlsbad Active Transportation Strategy (2015), The City of Carlsbad General Plan Update (2015), Bicycle Master Plan (2007), Pedestrian Master Plan (2008), Climate Action Plan (2015), and Village and Barrio Master Plan to* work in tandem with networks that already exist. These plans will support the programs and policies identified in the Coastal Mobility Readiness Plan in hopes of strengthening it for the future.

The transportation system along the coast is intended to become a vital part of the experience and allow residents and visitors to access more services and activities than would otherwise be available. It is intended to help solve last mile solutions connecting the city's two coastal Coaster Stations with work places and with residents both along the coast and inland. Traveling along the coastline should link people of all ages, abilities, and backgrounds. The coastal corridor will showcase this innovative transportation future.

The Plan works to identify specific actions the city can take to implement recommended technologies of the *Carlsbad Coastal Mobility Readiness Plan* to facilitate appropriate policies and strategies. By clearly highlighting the infrastructure requirements, regulatory barriers, staff responsibilities, implications for the City, and actions that will encourage adoption, suggestions for improvement aid to create tangible mobility options for residents and visitors of Carlsbad.

Draft Trails Master Plan (2016)



The City of Carlsbad has a citywide Trails Program with a mission statement of "…***striv[ing] to meet the leisure and recreational needs of Carlsbad residents while protecting and preserving open spaces and coastal resources in accordance with the City of Carlsbad General Plan.***"

The Trails Master Plan (TMP) builds on the previous efforts of the trails program. In 1990 the City adopted the Open Space and Conservation Resource Management Plan (OSCRMP). Since then, up until this TMP there has been no unified set of policies or planning effort to implement trails. The TMP is intended to provide a comprehensive planning document for developing and maintaining the city's trail system.

The Carlsbad Active Transportation Strategy (CATS) was developed in coordination with the trails system so that the facilities located within the roadway right-of-way will work in concert with existing and future trails. Together, the CATS & TMP aim to maximize opportunities for active healthy lifestyles. Collaborative implementation of these two Plans is meant to facilitate safer and more efficient roadways for people who walk and bike in Carlsbad and ultimately increase access to trails and open space. The CATS and TMP work in synergy to:

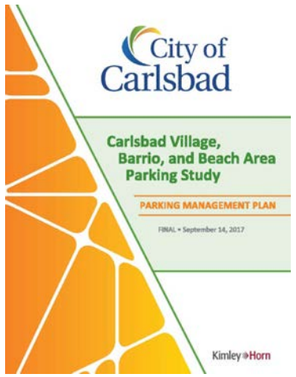
- Better Citywide Connections
- Form Active Transportation Connections
- Improved Walking & Biking Access to Open Space Trailheads
- Increased Tourism & Citizen Enjoyment
- Reduced Greenhouse Gas Emissions

The focus of the Carlsbad TMP is to recommend additional trail links that will help to complete the trail network that has been steadily increasing in mileage and functionality. It identifies important east/west connections around the city's major lagoons out to the Pacific Coast. Additionally, it refines the original trails alignments contained in the OSCRMP. A program vision and supporting goals are included in the TMP to provide guidance for decisions related to trail development in Carlsbad. The goals are a set of overarching principles that are used to guide decision making, and together with specific objectives help to achieve the vision for the future of the Carlsbad trails system.
Four goals are identified within the Carlsbad TMP. These Include:

- Goal 1: Create a Connected and Complete Trails System
- Goal 2: Accommodate a Variety of Trail Users in a Safe and Environmentally Sensitive Manner
- Goal 3: Identify Existing & Future Trail Development
- Goal 4: Integrate Transportation Related Facilities as Part of the Trails System

The TMP is meant to facilitate identifying and selecting future trail projects that have the greatest potential for closing gaps in the citywide trail network, with minimal developmental impact and long-term maintenance. Future segments will close gaps in the current trail system, creating loops and connecting different subareas in Carlsbad with each other, including the three lagoons, open space, and beach areas.

Carlsbad Parking Management Plan (2017)



In support of the proposed Village and Barrio Master Plans, the city conducted a comprehensive parking study and developed a Parking Management Plan for the Carlsbad Village, Barrio, and adjacent beach area. The adjacent beach area has been included to provide the full picture of parking along the coast and its potential impact on Carlsbad Village.

City council adopted the Parking Management Plan in 2017. The Parking Management Plan provides implementable short-term (by year 2020), medium-term (by year 2025), and long-term (by year 2035) strategies to improve the efficiency and effectiveness of the parking system. These strategies focus on the Village and Barrio and, in turn, the proposed Village and Barrio Master Plan.

The goals of the parking management plan are:

- Make parking more convenient for community members, employees and visitors
- Promote more efficient use of existing parking
- Support future parking needs and mobility options
- Explore options to make the project area more inviting for pedestrians, bicyclists, and people who use public transportation
- Support the vision outlined in the Draft Village and Barrio Master Plan (April 2016)

The Parking Management Plan began with a comprehensive study capturing the existing parking conditions in the study area. Parking occupancy and parking duration data were collected, and the inventory of on- and off-street parking spaces was updated. The analysis included public outreach, peer city review, and scenario planning.
Future parking conditions and needs were evaluated based on the anticipated development of the study area as defined in the various city documents, including the General Plan Environmental Impact Report, and as determined by staff. *Park+*, a parking demand scenario planning tool, was used to evaluate future parking demand based on the full buildout of the study area by the year 2035. There are three Technical Memorandums that include the comprehensive methodology and results of the data collection, as well as the analysis, peer city reviews and best practices, and the Park+ scenarios.

The study produced an inventory of all available public and private (privately-owned and dedicated to a specific property) parking spaces in the study area which totaled 11,657 parking spaces, excluding parking associated with single-family homes and properties with controlled access.

Additionally, the study analyzed the availability and use of the parking system during the peak and off-peak seasons. The demand for parking peaked at 7 p.m. on a weekend in July 2016.

There are pockets of high demand where parking occupancy has reached effective capacity, leading to difficulty finding parking in those areas. High-demand areas include on-street facilities west of the railroad tracks, Village Faire parking lot, and on-street facilities in the Village center on Grand Avenue, Carlsbad Village Drive, and State Street. However, the study did reveal that the current and future parking supply is adequate to meet demand if the parking system, as part of the larger transportation system, is actively managed.

Given the adequate supply of parking within the parking system to meet current and future projected parking demand, it is not recommended that the city invest in construction of additional parking supply at this time. Rather, to address the observed parking demand imbalance and maximize the efficient use of the parking system, the draft Parking Management Plan recommends that the city implement a comprehensive Parking Management Program that consists of the strategies summarized in Table E-1 and discussed in greater detail in the full report.
The strategies include:

- On-Street Parking Reconfiguration and Curb Lane Management
- Parking Time Limits
- Enforcement
- Shared and Leased Parking
- In-Lieu Fees
- Reduced Parking Requirements
- Residential Parking Program (RPP)
- Paid Parking
- Parking Wayfinding
- Curb Cafes

Village & Barrio Master Plan (2018)

The master plan focuses on enhancing neighborhood character, public spaces, and ways to get around the Village and Barrio, based on ideas gathered from the community starting in September 2014.

The city released the first draft of the Village and Barrio Master Plan in November 2015. The plan was then revised based on input, and a second draft was released in April 2016. Additional community input received in July and October 2016 has helped to guide the latest, third draft which was released for comment in early January 2018. The plan was approved by City Council July 10. 2018.

Along with establishing a vision, the proposed plan refines, the current development standards under which development Village and Barrio is presently occurring. Following are some of the highlights of the January 2018 draft:

- Keeping the maximum building height in Carlsbad Village at its current 45-foot limit, but imposing limits on roof protrusions and the enclosed area of fourth stories.
- Revising existing Carlsbad Village standards and design guidelines so they are easier to understand and have more “teeth” so city staff and decision-makers can ensure proposed projects are consistent with the community’s character.
- Providing an implementation plan for public improvements, parking management, and other actions that generally identifies, phasing, time frames and funding sources.
- Incorporating findings from the city’s final Carlsbad Village, Barrio and Beach Area Parking Management Plan that was accepted by City Council in September 2017. Specifically, it incorporates the main parking recommendations of managing streets and parking lots to improve parking availability, overall mobility and establish context sensitive parking requirements.

In July 2018, the City Council approved the Village and Barrio Master Plan. The plan implementation will proceed as follows:

- For portions of the Barrio and Carlsbad Village in the Coastal Zone, the master plan will require approval by the California Coastal Commission before it is effective in the Coastal Zone. The Coastal Commission’s review would occur after and separate from the city review process and will take approximately 6-12 months to complete.
- For portions of the master plan not in the Coastal Zone, Coastal Commission approval is not required, and plan provisions will take effect following their approval by the City Council.
- The Village and Barrio Master Plan will replace the Carlsbad Carlsbad Village Master Plan and Design Manual, which was approved in 1995 and has been revised periodically since, most recently in 2017.

2.0 Community Profile

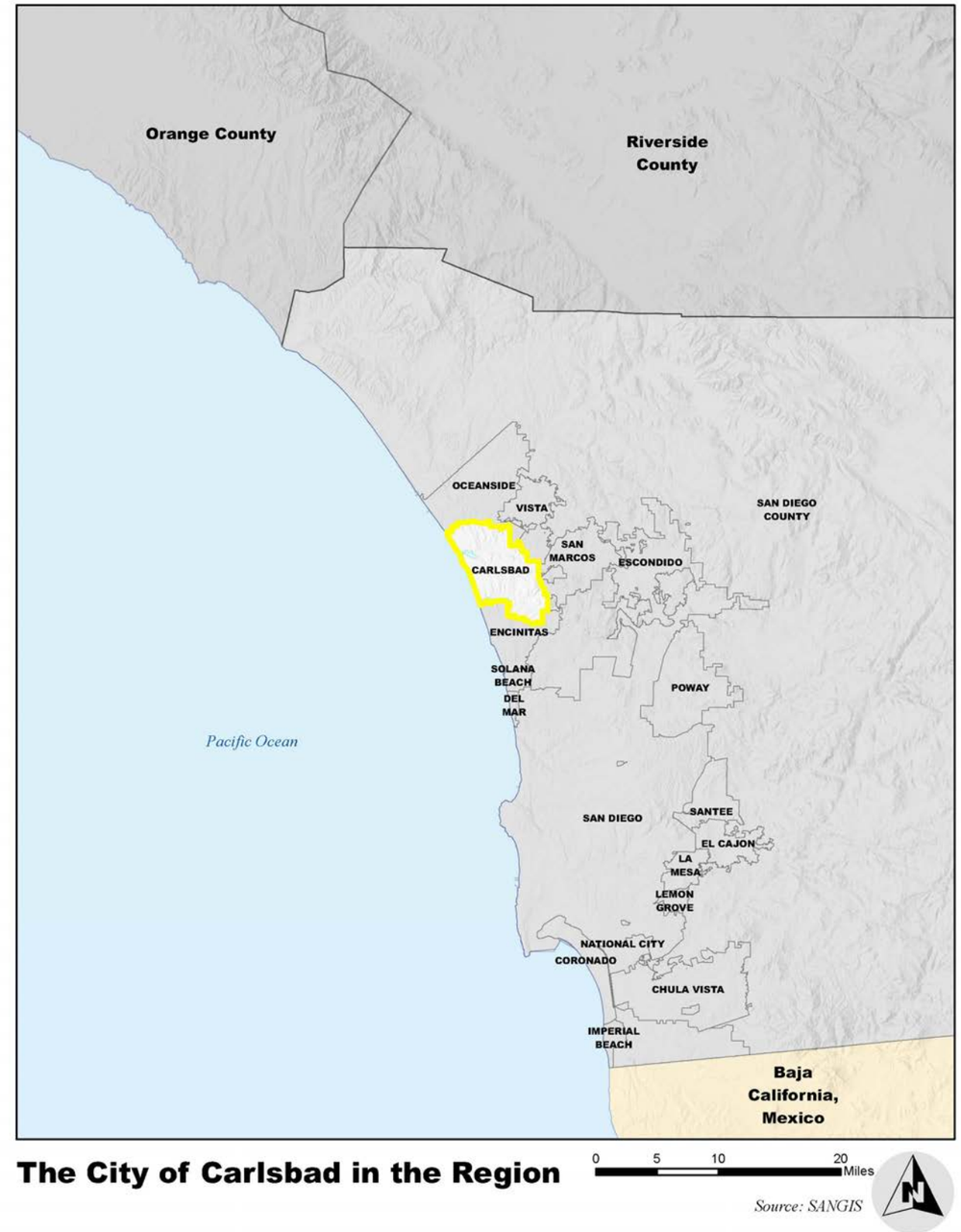
2.1 Overview

The City of Carlsbad is located in northern San Diego County in Southern California, approximately 35 miles north of San Diego and approximately 90 miles south of Los Angeles. Carlsbad is bordered by the cities of Oceanside and Vista to the north, the City of San Marcos and Unincorporated San Diego County to the east, the City of Encinitas to the South, and the Pacific Ocean to the west. Interstate 5 traverses the city in a north-south direction, providing the primary north-south freeway access to Carlsbad, while California State Route 78 connects the northern portion of Carlsbad with communities to the east.

Along the coast, the terrain of the City of Carlsbad is relatively flat. However, as the city spreads east, the terrain becomes more and more hilly.

The City of Carlsbad has several qualities contributing to the potential for an ideal walking and cycling environment, including a temperate Southern California climate, an active population, region-drawing recreation, and wide, new streets in many parts of the city that can, or already do, accommodate active transportation infrastructure. Figure 2-1 displays the City of Carlsbad's location within the context of the San Diego region.

Figure 2-1 Carlsbad within the Region



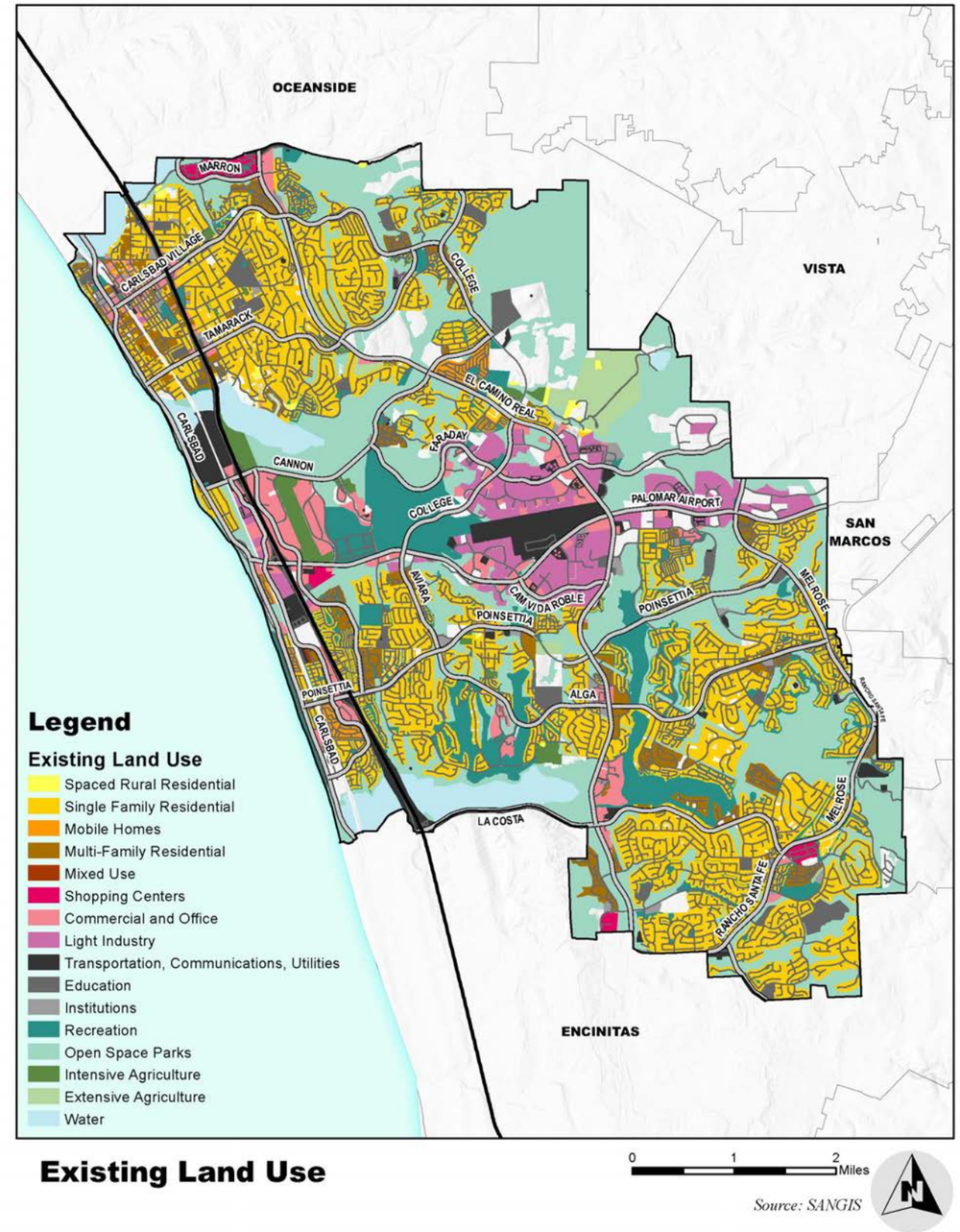
Existing Land Use

The City of Carlsbad began as a small coastal town, and its settlement pattern is typical of most coastal Southern California cities. The original downtown, known today as Carlsbad Village, is characterized by a mix of commercial and residential land uses, narrow tree-lined streets arranged in a grid pattern, and has been served by rail service for over 100 years.

Beginning in the postwar years of the late 1940s, development accelerated, bringing greater numbers of employees and residents. Despite this development, significant amounts of nearby land remained as undeveloped open space. Throughout the second half of the 20th Century, housing frequently took the shape of master-planned developments adjacent to major vehicular arterials. Employment centers were also developed as standalone sites, separate from housing and commercial land uses. Currently, employment area is predominately located between Cannon Road to the north and Palomar Airport Road to the south.

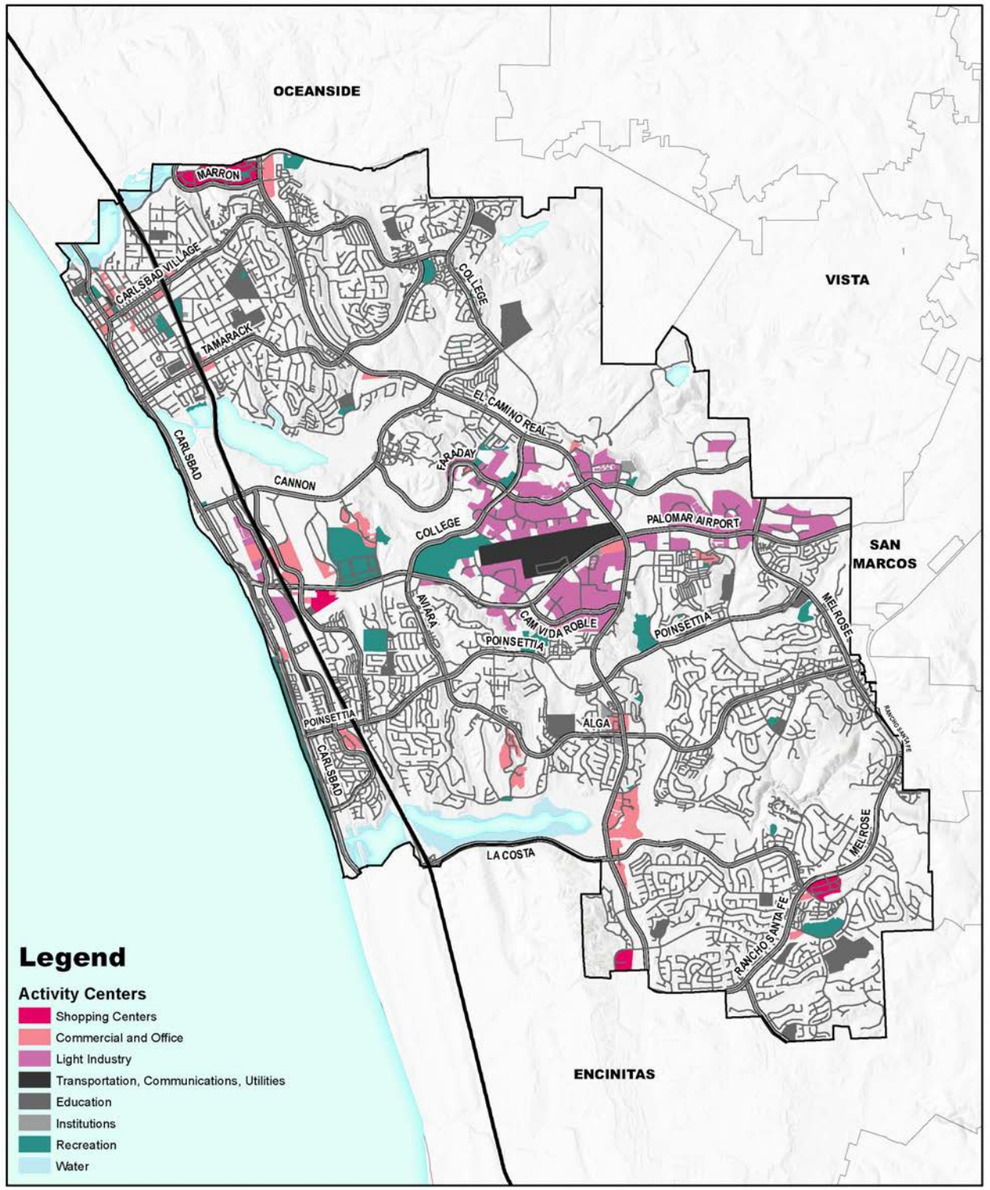
Figure 2-2 shows the existing land use of the City of Carlsbad.

Figure 2-2 Existing Land Uses



Existing Land Use

Figure 2-3 Activity Centers



Activity Centers

Source: City of Carlsbad

Key Destinations & Major Activity Centers

With more than six miles of coastline, a theme park, the Flower Fields and a historic downtown, the City of Carlsbad acts as both a regional and statewide draw.

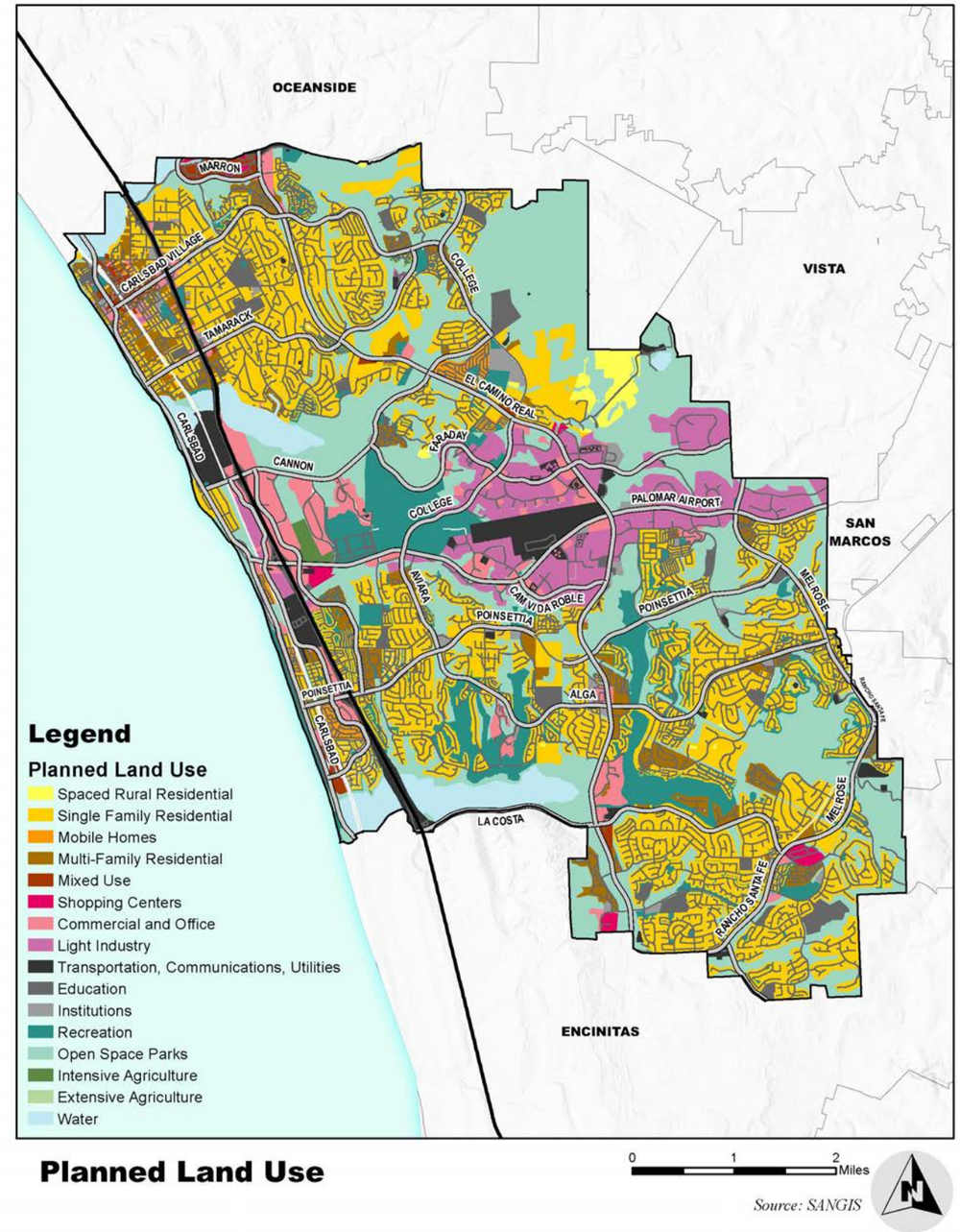
Carlsbad Village, the area located west of the Interstate-5 and clustered north and south of Carlsbad Village Drive, as seen in Figure 2-3, is within walking distance to the beach, hosts an Amtrak station and has 132 shops, 77 dining establishments and 16 art and entertainment businesses.

In addition to Carlsbad Village, the City of Carlsbad also has a few large malls, reflected in fuchsia in **Figure 2-3**, as well as five community centers, four large recreational parks in addition to several smaller parks all reflected in green on the Activity Centers map.

Planned Land Uses

The notable differences between the City of Carlsbad's existing land use and the planned land uses, depicted in **Figure 2-4**, is an increase in single family residential northeast of El Camino Real and College Boulevard, and an increase in light industrial in the area north of Faraday Avenue, directly west of the intersection of Faraday Avenue and S. Melrose Drive. The planned land uses also include an increase in mixed commercial directly south of the intersection of Avenida Encinas and Carlsbad Boulevard on the most southern end of the city.

Figure 2-4 Planned Land Uses

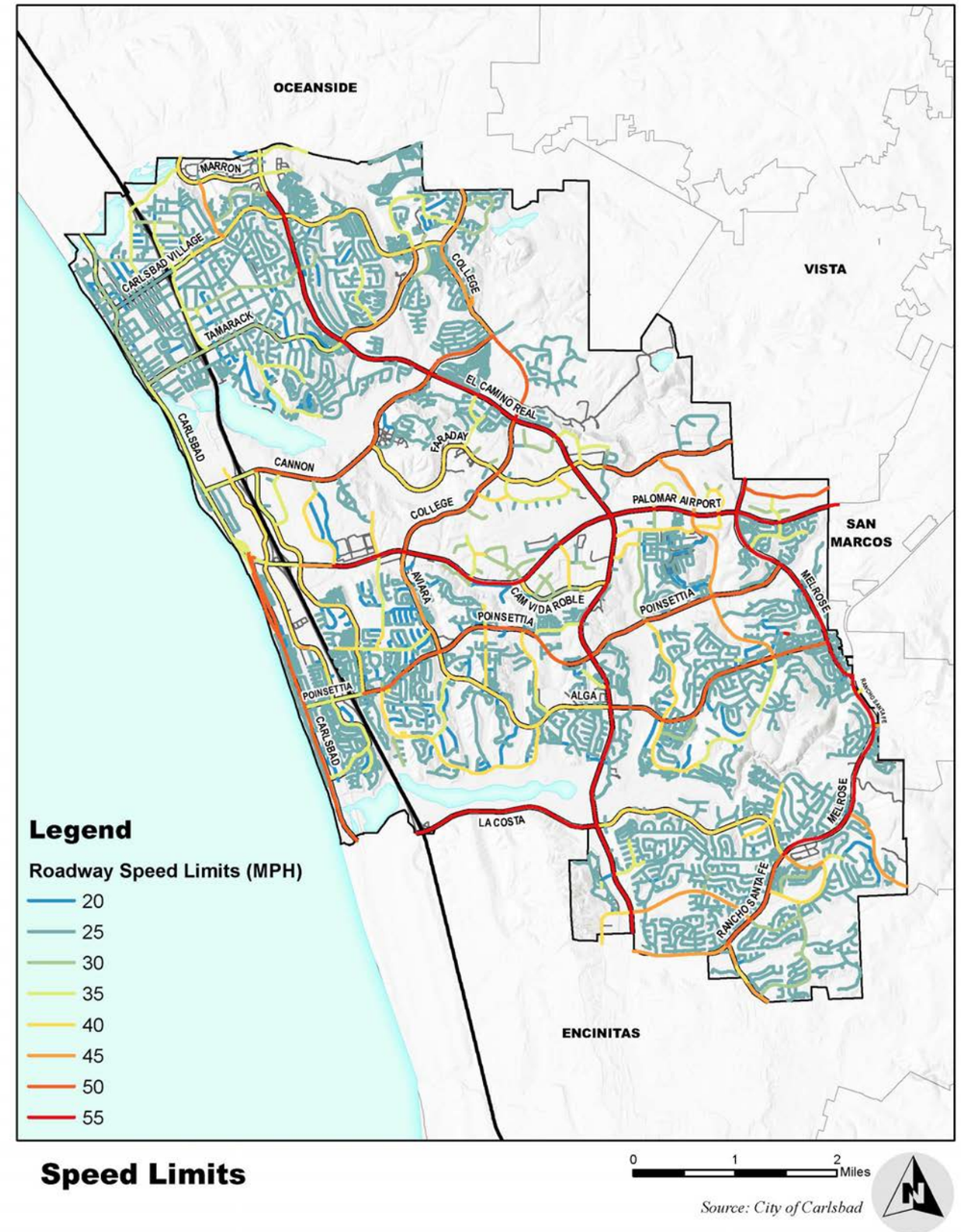


Planned Land Use

Posted Speed Limits

Figure 2-5 identifies the posted speed limits. The vast majority of the City of Carlsbad's residential streets have a speed limit of 20 to 25 miles per hour which create a pedestrian- and bicycle-friendly environment along those streets. Many other roadways have a speed limit of between 35 and 40 miles per hour. However, as can be seen in the figure below, the roadways which connect neighborhoods to each other are posted at higher speed limits of 45 to 55 miles.

Figure 2-5 Posted Speed Limits



Speed Limits

Source: City of Carlsbad

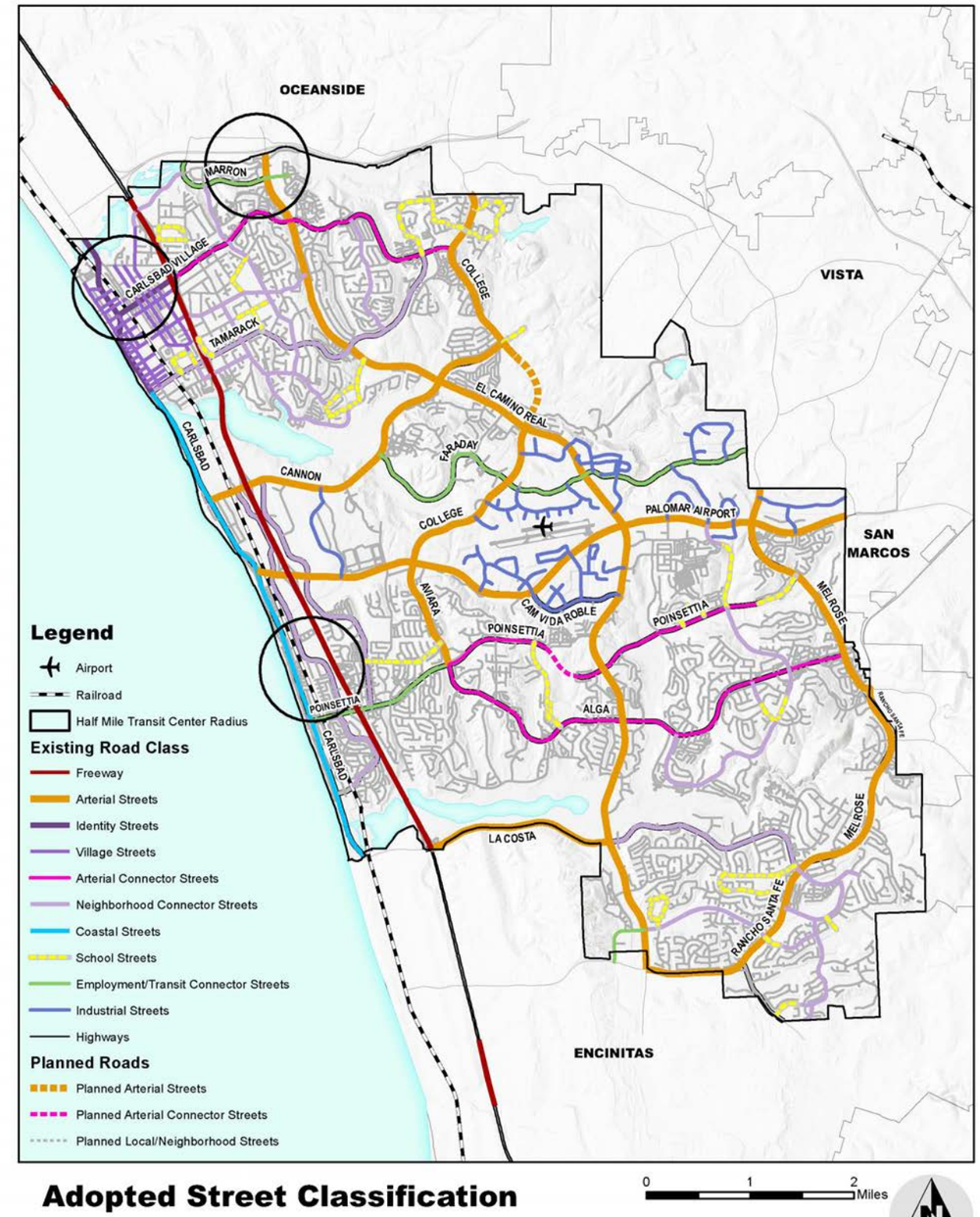
Adopted Street Network

As part of the City of Carlsbad's General Plan Mobility Element, all of the city's streets were categorized by type based on the context of the street, its geographic setting, and adjacent land uses. Once the streets had been categorized into different typologies using the above listed factors, the type of travel mode (pedestrian, bicycle, vehicles, etc.) which should be accommodated on that street were assessed.

The categories support the City of Carlsbad's vision contained in the Mobility Element, which includes, "better pedestrian and bicycle connections between neighborhoods, destinations, and different parts of the community, and a balanced transportation system rather than a singular focus on automobile movement."

The street classification can be seen in **Figure 2-6**.

Figure 2-6 Adopted Street Classification



Adopted Street Classification

Source: City of Carlsbad Mobility Element

2.2 Demographic Summary

Demographic information is used to better understand the people who live in Carlsbad today. Demographic information was obtained from the US Census 2012 – 2016 American Community Survey 5-Year Estimates, which represent the most recent available data.

As can be seen in Figure 2-7, the areas with the highest population density are in The Village and Barrio on the northwestern end of the City of Carlsbad and the areas directly adjacent, as well as the area immediately north of Poinsettia Lane between Paseo del Norte and Aviara Parkway. The area in the geographic center of the City of Carlsbad has the lowest population density, but it is also the area with the highest recreational, light industrial, commercial and office uses.

Figure 2-7 Population Density by Census Block Group

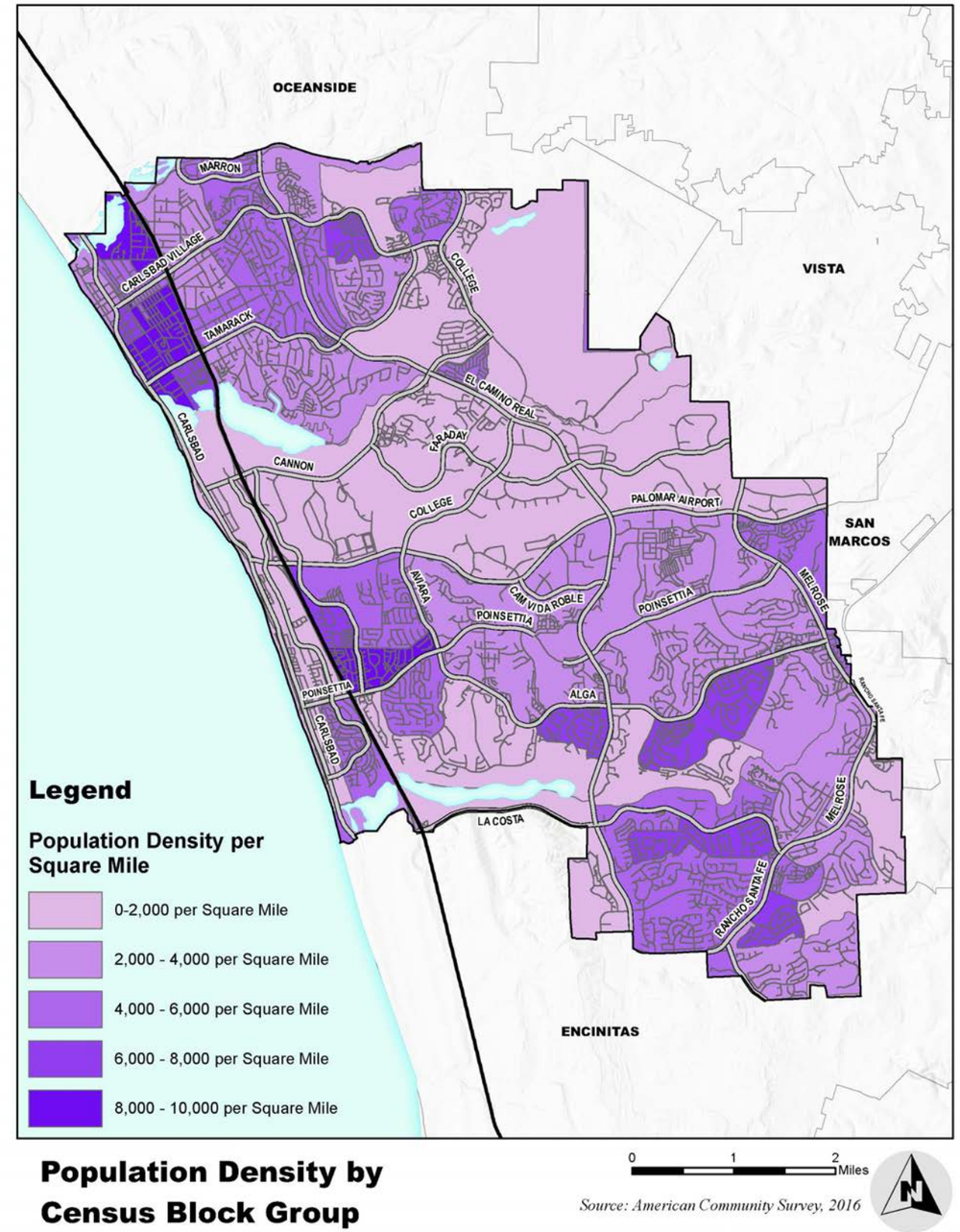
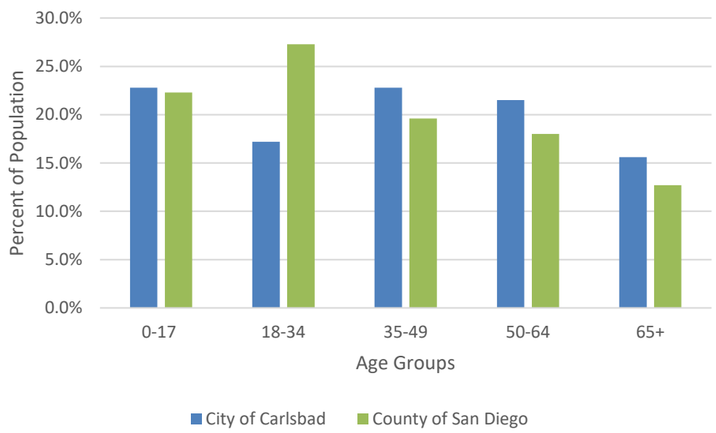


Figure 2-8 illustrates the population by age group for the City of Carlsbad and County of San Diego. As shown, the City of Carlsbad's population distribution by age is relatively similar to San Diego County's age distribution on the whole, though the City of Carlsbad has somewhat fewer people in the 18 – 34 years old category, and slightly more residents in the 35 – 49, 50 – 64 and 65 plus age groups.

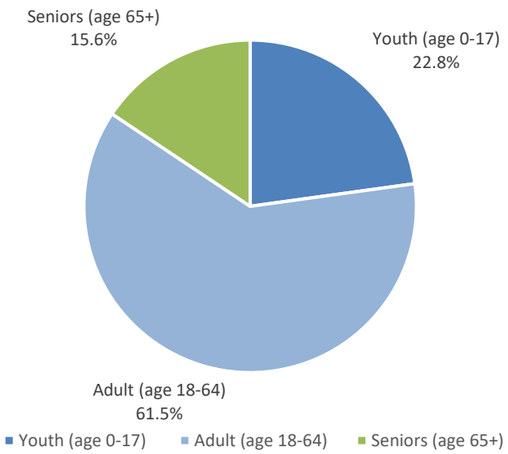
Figure 2-8 Percent of Population by Age Group City of Carlsbad compared to San Diego County



Source: US Census, 2012 – 2016 American Community Survey 5-Year Estimates (2018)

As can be seen in Figure 2-8, the age groups in the City of Carlsbad are almost equally divided, with the age group of 18 – 34-year-olds containing a slightly lower percentage of the population, 17.2 percent of the population, as compared to the rest of the age groups within the city.

Figure 2-9 City of Carlsbad Youth and Senior Populations



Source: US Census, 2012 – 2016 American Community Survey 5-Year Estimates (2018)

Figure 2-9 shows the percent of the City of Carlsbad's senior (age 65 and older) and youth (age 17 and younger) populations. Youth and senior populations have more limited mobility options than the general adult population, making them more vulnerable and reliant on alternative transportation modes and infrastructure, and therefore requiring additional considerations when planning transportation networks. Taken together, 39 percent of residents within the City of Carlsbad fall into this vulnerable population category.

In order to better address the needs of seniors and youth in the City of Carlsbad, the Sustainable Mobility Plan will incorporate the 8-to-80 principles discussed in **Section 2.3**.

Figure 2-10 Distribution of Senior Citizen Population within the City of Carlsbad

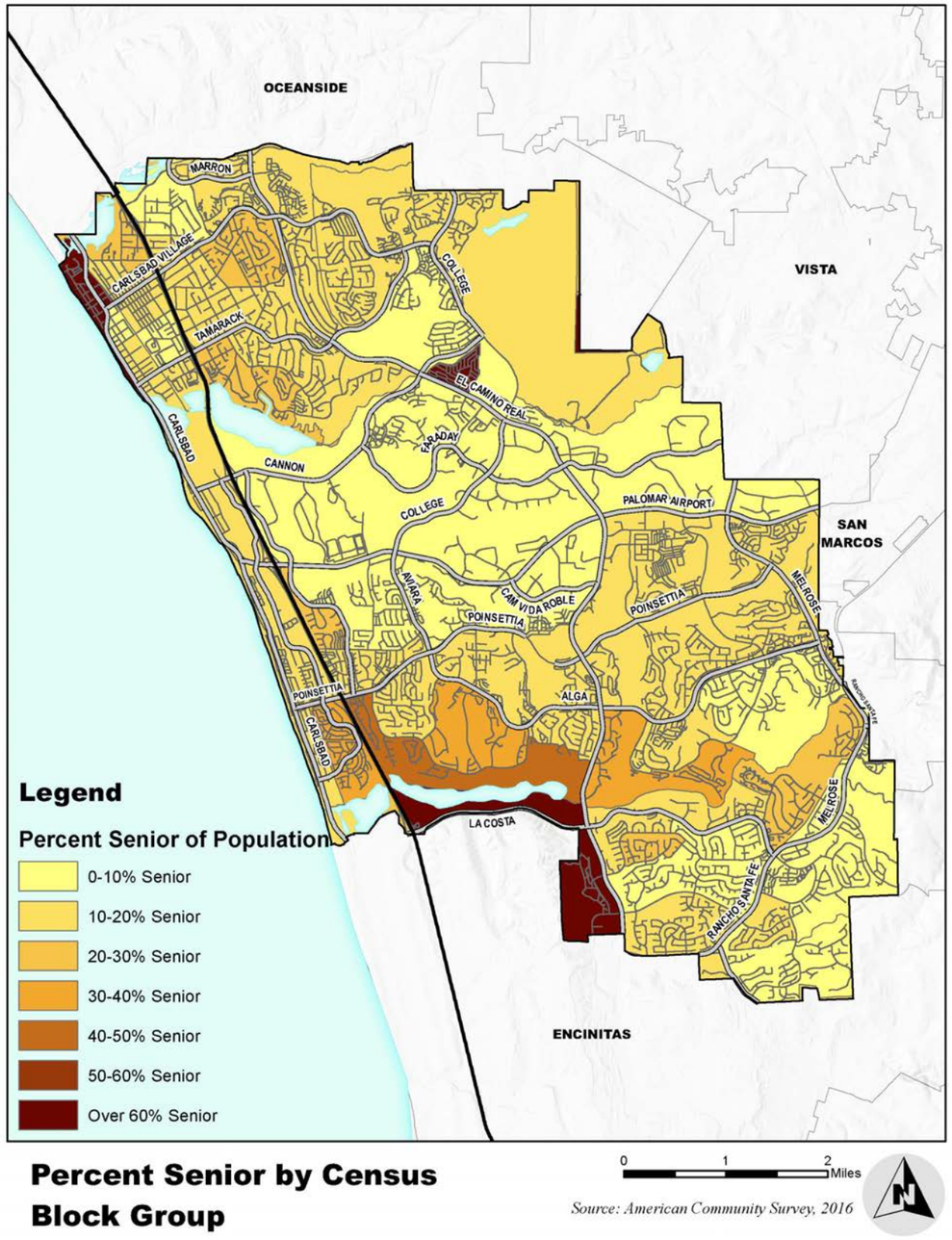
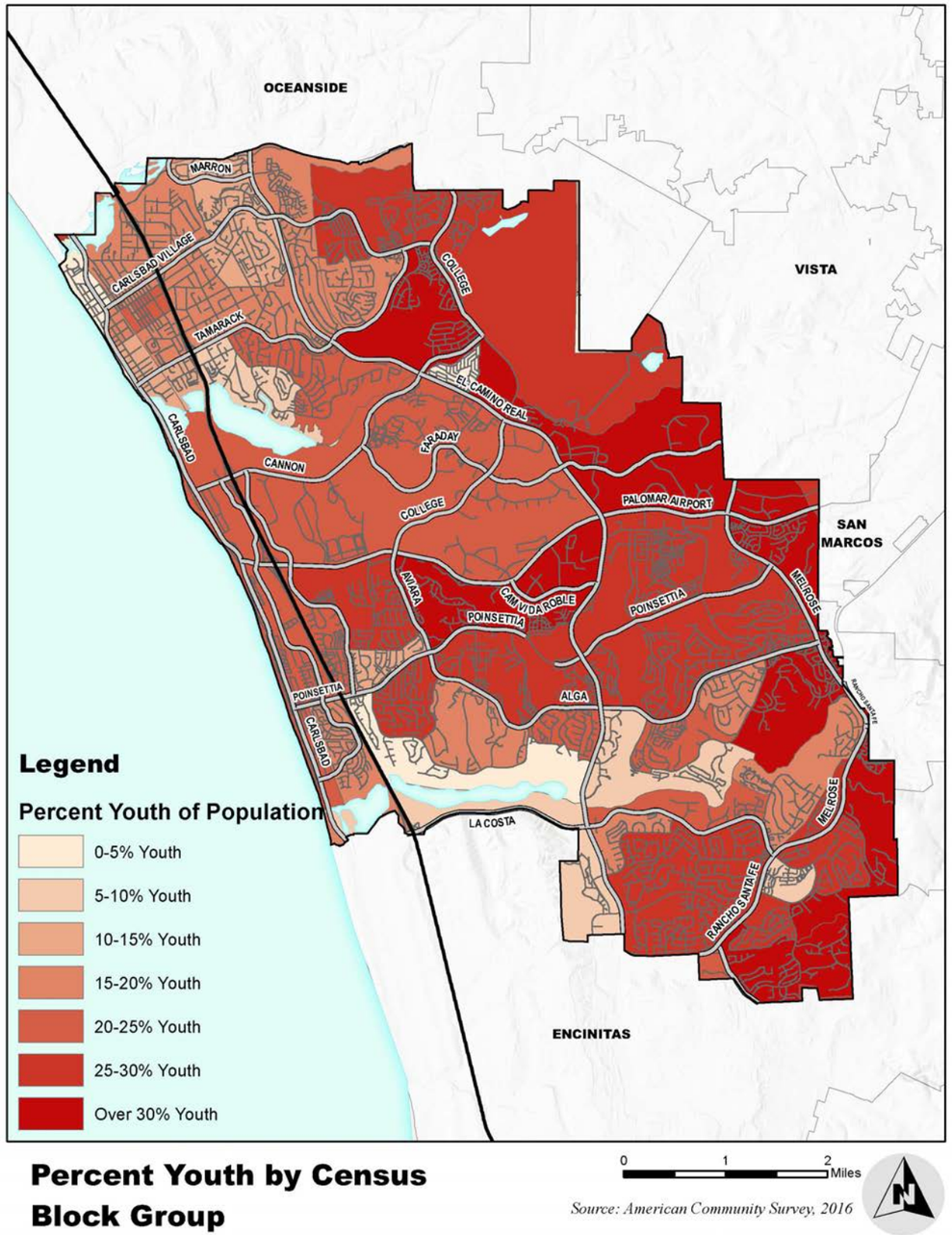


Figure 2-10 shows the distribution of the senior citizen population within the City of Carlsbad. As can been seen the senior populations are clustered in three specific locations, along the coast west of Carlsbad Village, east of the intersection of Cannon Road and El Camino Real, and surrounding Batiquitos Lagoon State Marine Conservation Area.

Figure 2-11 shows the distribution of the youth population within the City of Carlsbad. As can been seen, youth live more dispersed throughout the city; though there are areas of slightly higher concentrations the youth population does not have the same distinct population clusters as the senior population.

Figure 2-11 Distribution of Youth within the City of Carlsbad



Percent Youth by Census Block Group

Source: American Community Survey, 2016

2.3 8 to 80 Summary

The idea behind an "8 to 80" city is that if planners take an eight-year-old and an 80-year-old into consideration while planning, they plan a city that functions properly for everyone. This concept acknowledges that for the past fifty years, most cities in North America have been planning around the car. This car-centric planning has resulted in engineering physical activity out of daily life and creating a physical environment that does not facilitate interaction among people.

Instead, if the planning process shifted the focus back to people, with a goal to plan for people rather than vehicle movement, the result is healthier and happier cities due to the creation of safe, accessible, and enjoyable places to walk, bike and be active. This is particularly true for children (who can get around on their own earlier), and seniors (who can be independent longer).

The City of Carlsbad has begun this process by re-categorizing the street types in the city's General Plan Mobility Element (as discussed in Section 1.2 Document Review) to acknowledge that there are certain roadways which should be prioritized for non-motorized travel.

2.4 Equity Analysis

Vehicle availability for Carlsbad households is displayed in Table 2-1. Approximately 97 percent of households have access to at least one vehicle, while 68 percent of households have access to more than one vehicle.

Table 2-1 Zero Vehicle Households by Census Block Group

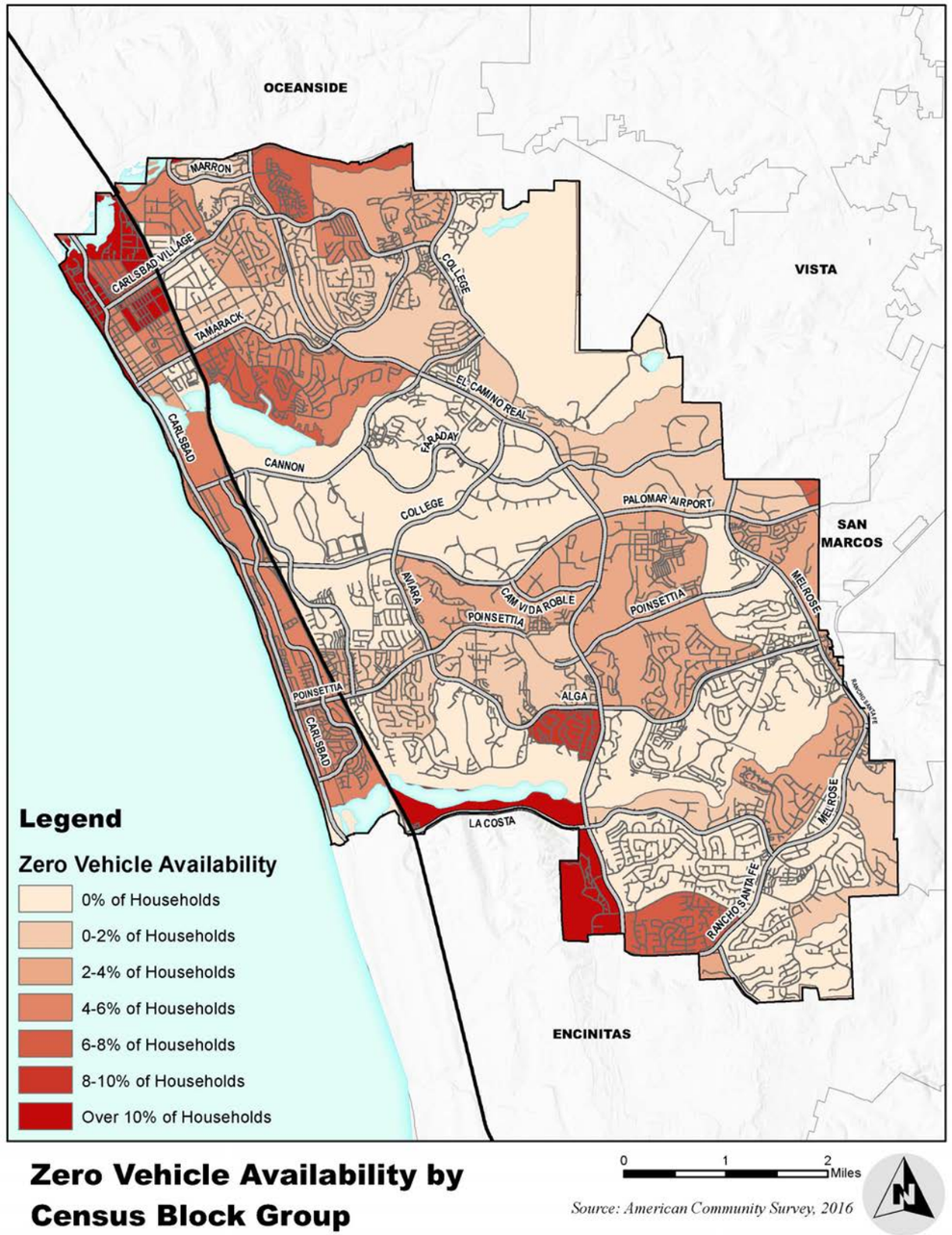
Mode of Transportation	Households	Percent of Total
3 or More Vehicles Available	9,487	**22.1%**
2 Vehicles Available	19,703	**45.9%**
1 Vehicle Available	12,363	**28.8%**
No Vehicles Available	1,373	**3.2%**
Total Occupied Household Units	**42,926**	**100.0%**

Source: US Census, 2012 – 2016 American Community Survey 5-Year Estimates (2018)

The distribution of households without vehicles can be seen in Figure 2-12 Zero Vehicle Availability by Census Block Group.

Figure 2-13 displays the median household income for the City of Carlsbad by census block group. As can be seen, there is not a strong correlation between the census block groups which have a lower median household income and the areas which have a higher percentage of zero household vehicles, however, there is a correlation between the areas identified to have high senior citizen populations (Figure 2-6) and area with a higher percentage of zero vehicle ownership.

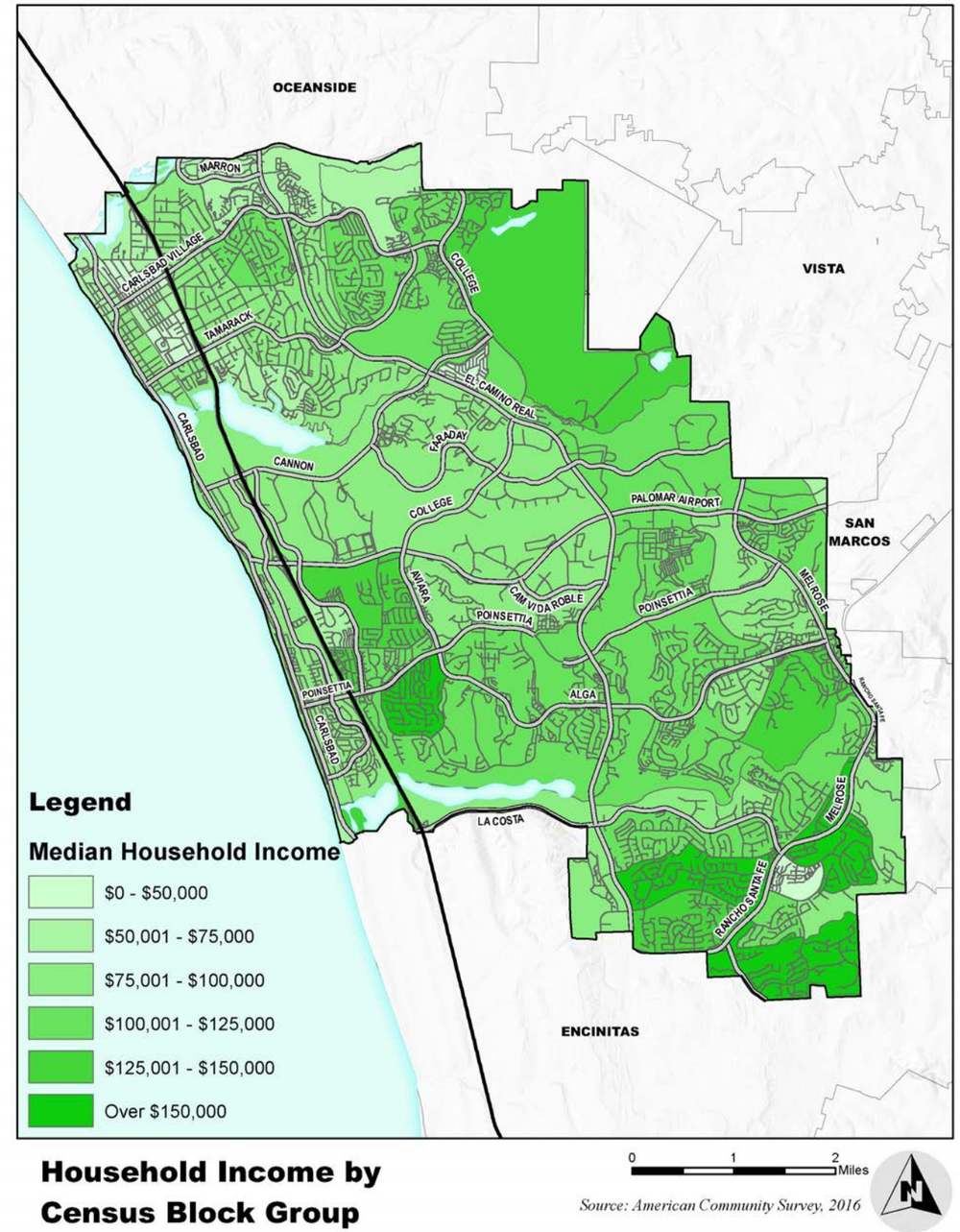
Figure 2-12 Zero Vehicle Availability by Census Block Group



Zero Vehicle Availability by Census Block Group

Source: American Community Survey, 2016

Figure 2-13 Median Household Income for the City of Carlsbad by Census Block Group



Household Income by Census Block Group

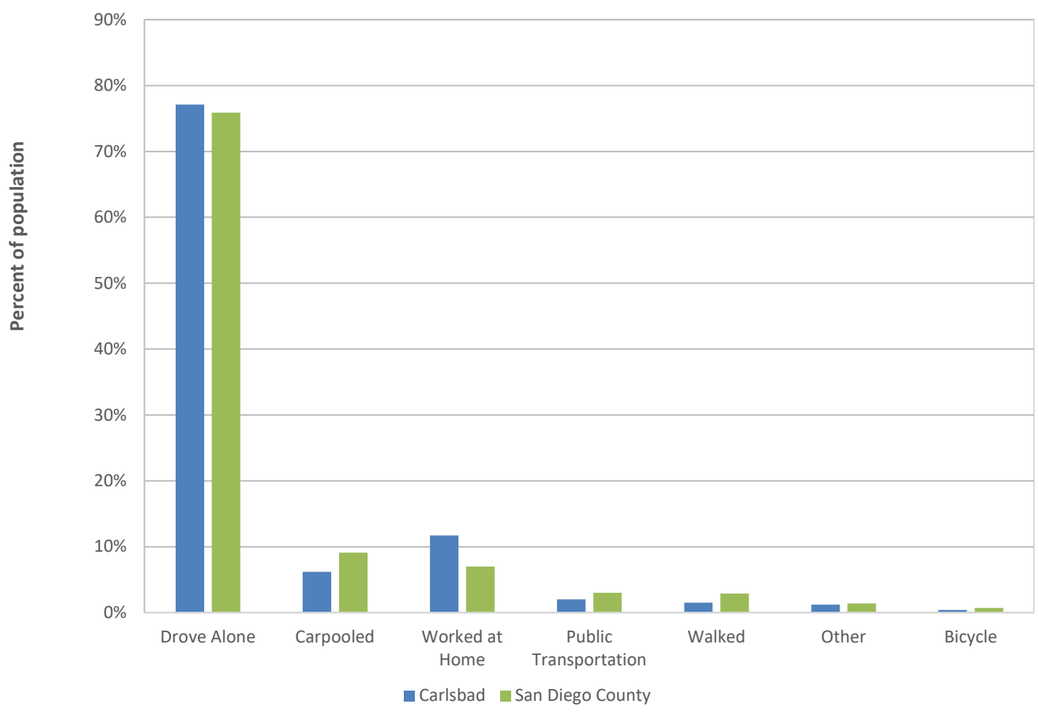
Source: American Community Survey, 2016

2.5 Commuter Profile

Examining the current commuter patterns of the residents of the City of Carlsbad, will provide a deeper understanding of how people are currently traveling, and in turn inform the outcome of the final Sustainable Mobility Plan.

Figure 2-14 displays a comparison of means of transportation to work for the City of Carlsbad and San Diego County. As shown below, the City of Carlsbad has similar but slightly higher rates of commuters driving alone to work than San Diego County as a whole, as well as a slightly higher rate of residents working at home. Also noteworthy is a lower percentage of the City of Carlsbad residents that carpool, take public transportation, walk to work, ride a bicycle, or commute via some other means, as compared to San Diego County as a whole. These findings indicated that there is a lot of potential for change.

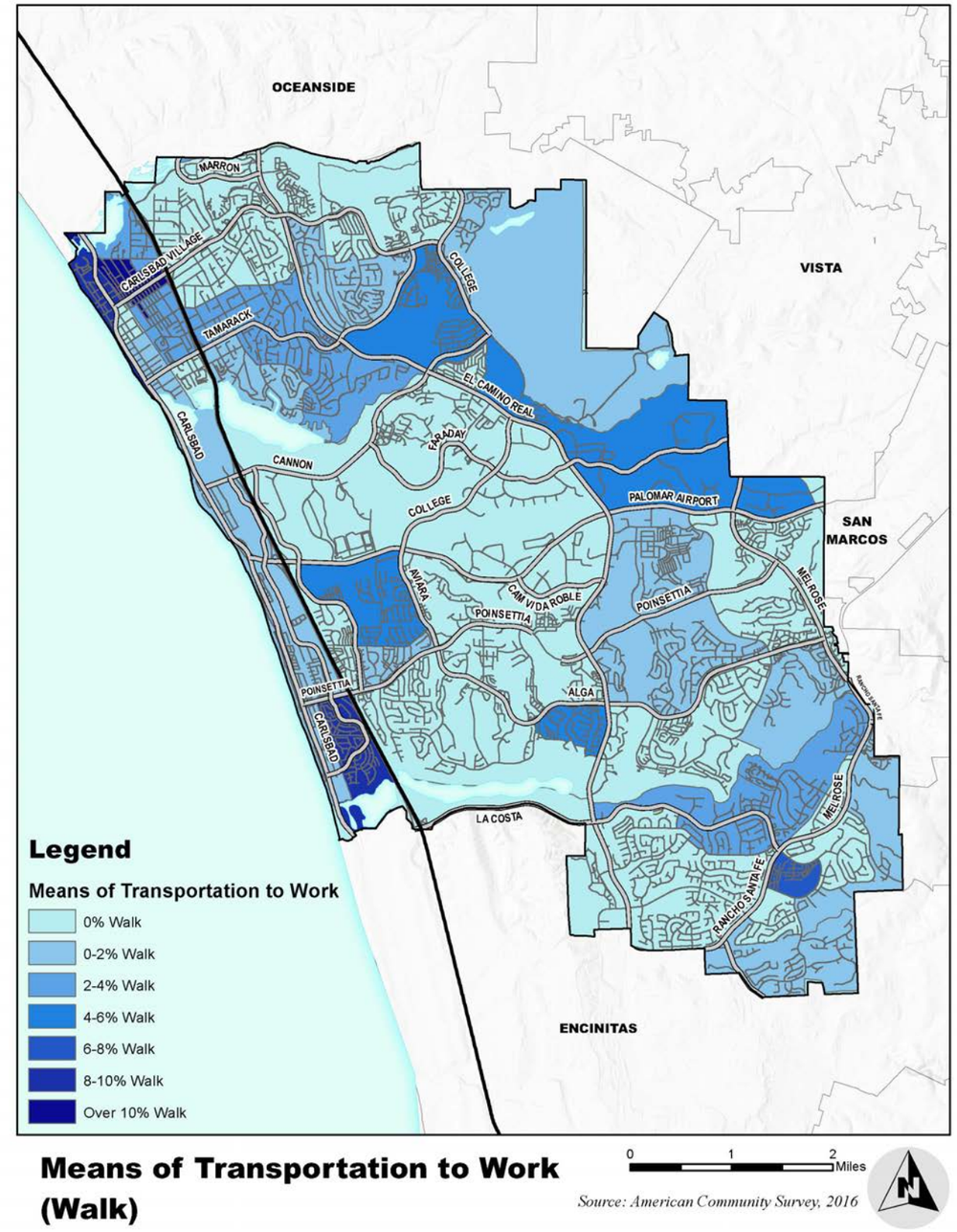
Figure 2-14 Means of Transportation to Work



Source: US Census, 2012 – 2016 American Community Survey 5-Year Estimates (2018)

Figure 2-15 displays the percentage of commuters who walk to work citywide, while Figure 2-16 displays commuters who ride a bicycle to work. The level of pedestrian commuting is higher in several areas throughout the community where residential density is generally higher, and where there is nearer proximity to jobs. Bicycle commuting is

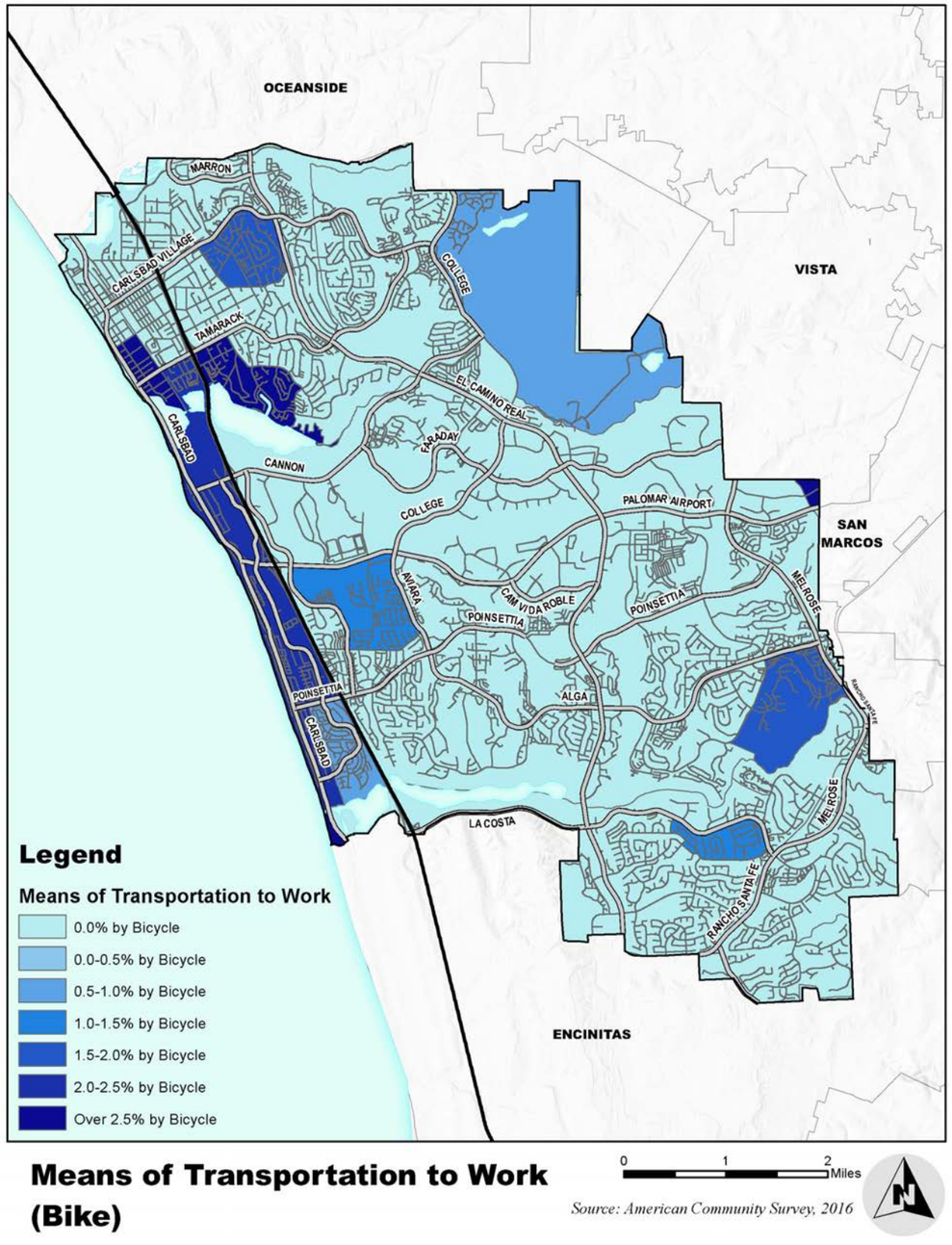
Figure 2-15 Percent of Commuters Who Walk to Work



Means of Transportation to Work (Walk)

Source: American Community Survey, 2016

Figure 2-16 Percent of Commuters Who Bicycle to Work



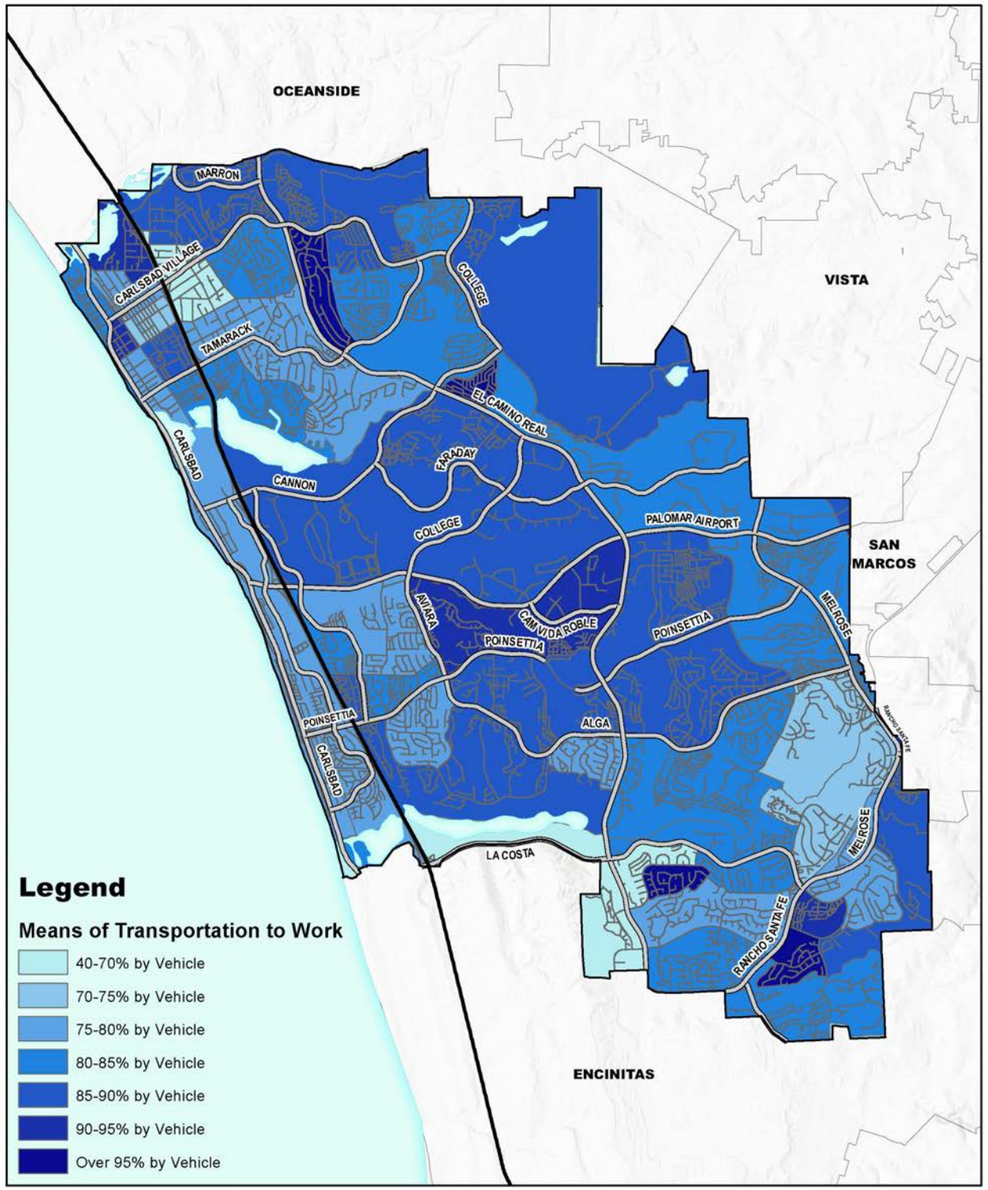
Means of Transportation to Work (Bike)

Source: American Community Survey, 2016

generally higher in the areas that have access to existing bicycle facilities.

Figures 2-17and Figure 2-18 show the distribution of commuters who take transit to work and those use a vehicle to commute to work within the City of Carlsbad. The percent of commuters who take a vehicle to work includes those who drive alone, as well as those who carpool.

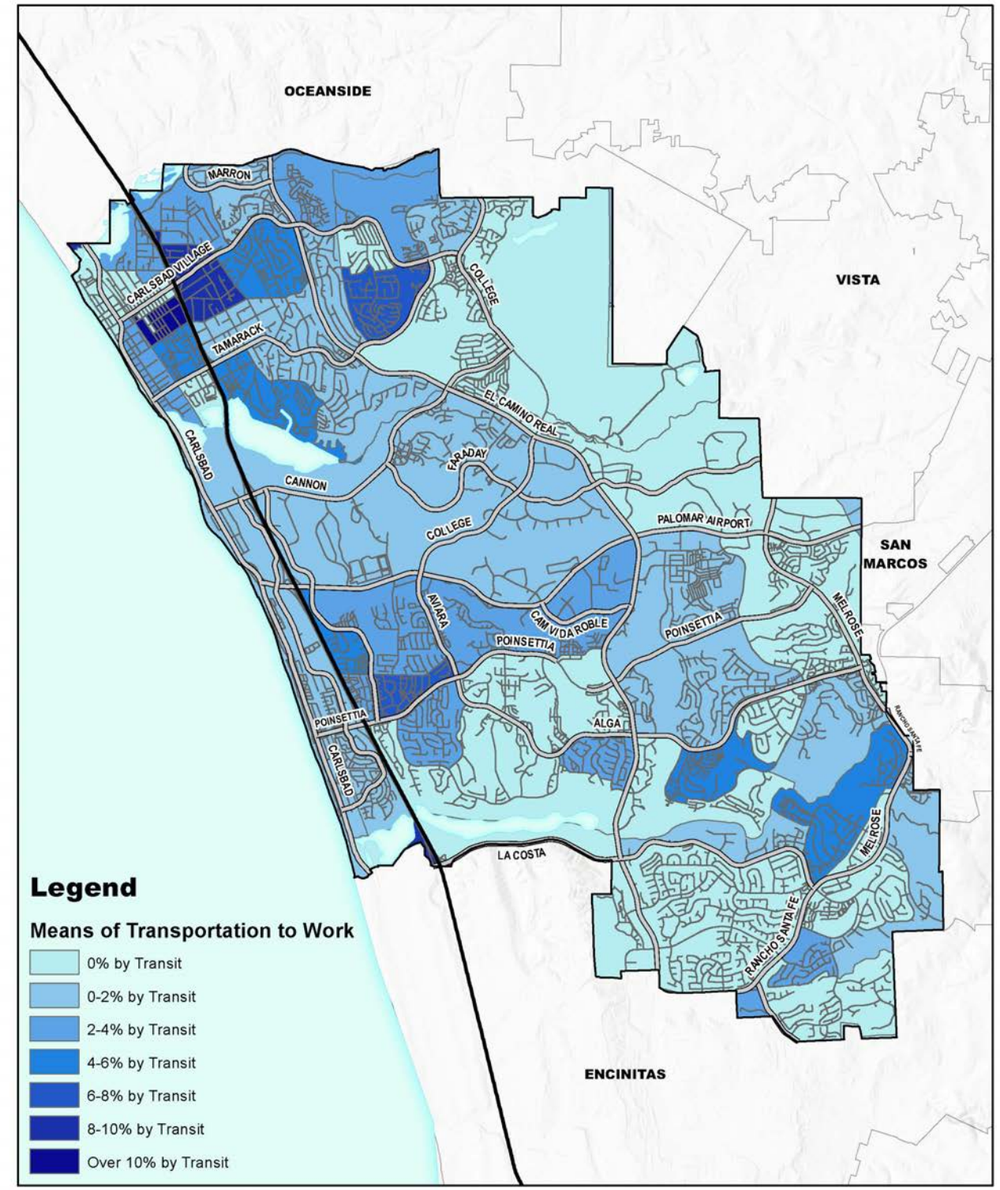
Figure 2-17 Percent of Commuters Who Drive to Work



Means of Transportation to Work (Vehicle)

Source: American Community Survey, 2016

Figure 2-18 Percent of Commuters Who Take Transit to Work

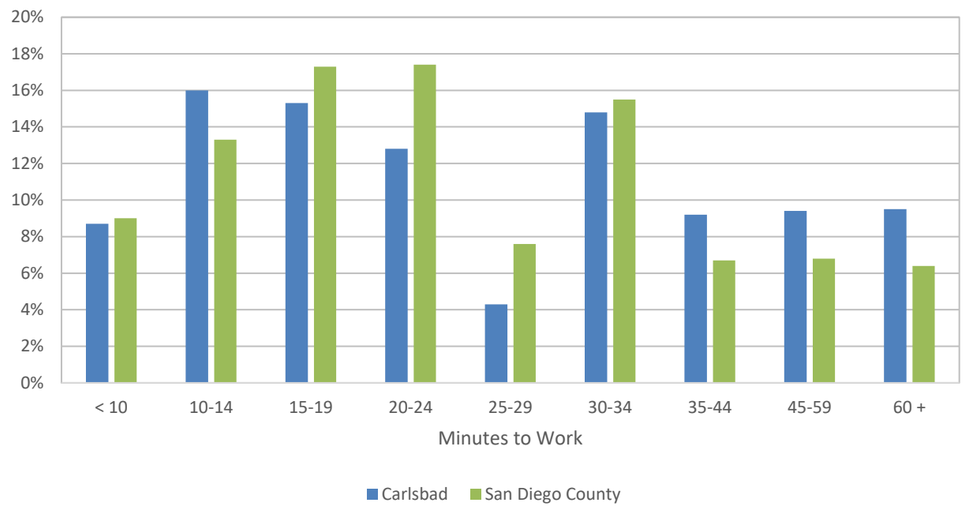


Means of Transportation to Work (Transit)

Source: American Community Survey, 2016

Figure 2-19 displays the mean (average) travel time to work for residents of Carlsbad, relative to San Diego County as a whole. The mean travel time for working residents of the City of Carlsbad is 28.6 minutes, whereas the mean travel time to work in San Diego County as a whole is marginally shorter, at 25.3 minutes.

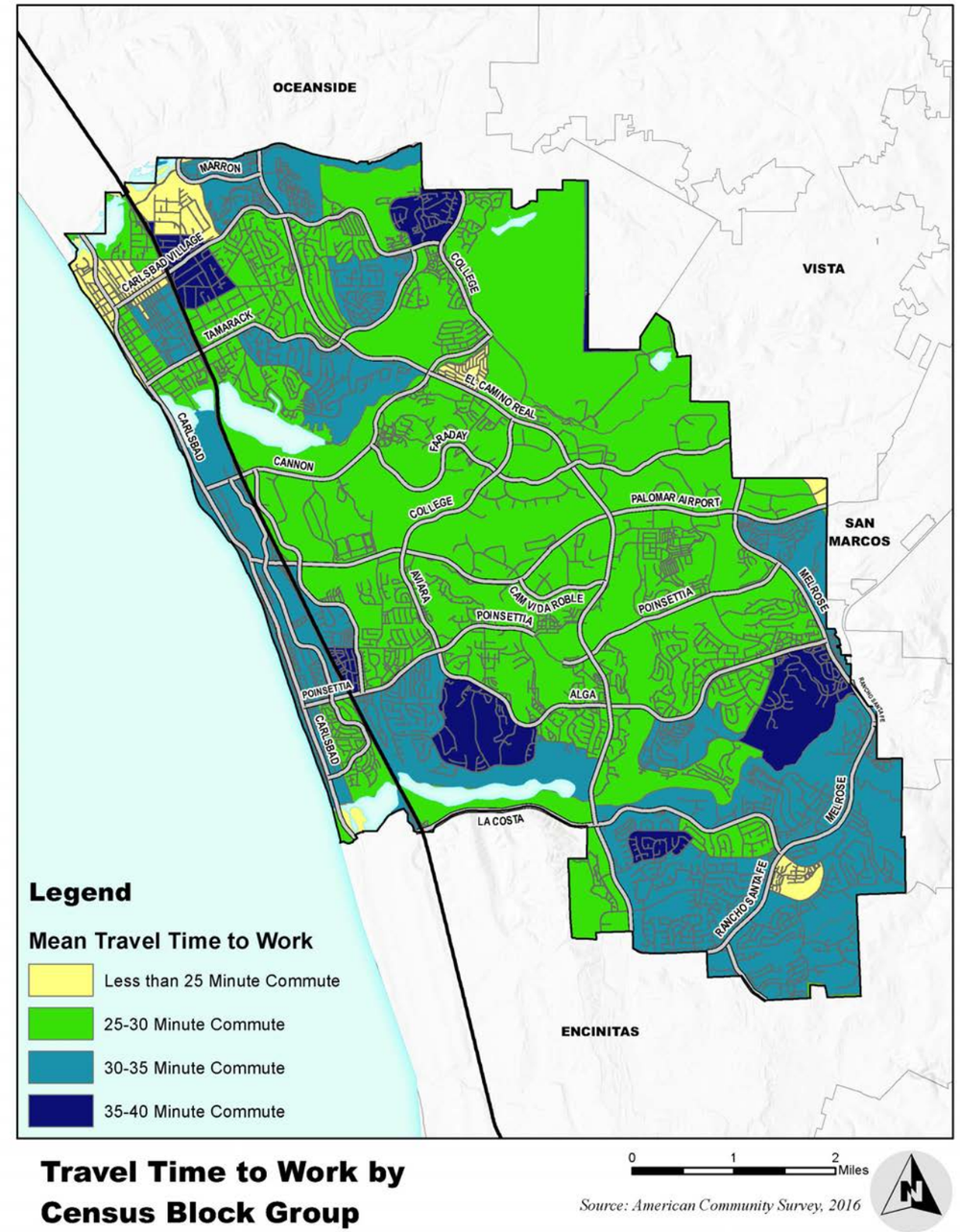
Figure 2-19 Mean Travel Time to Work



Source: US Census, 2012 – 2016 American Community Survey 5-Year Estimates (2018)

Figure 2-20 displays travel time to work by census block group. As can be seen, most census block groups have an average commute lasting between 25 – 30 minutes. Very few census block groups have an average commute time of less than 25 minutes.

Figure 2-20 Travel Time to Work by Census Block Group

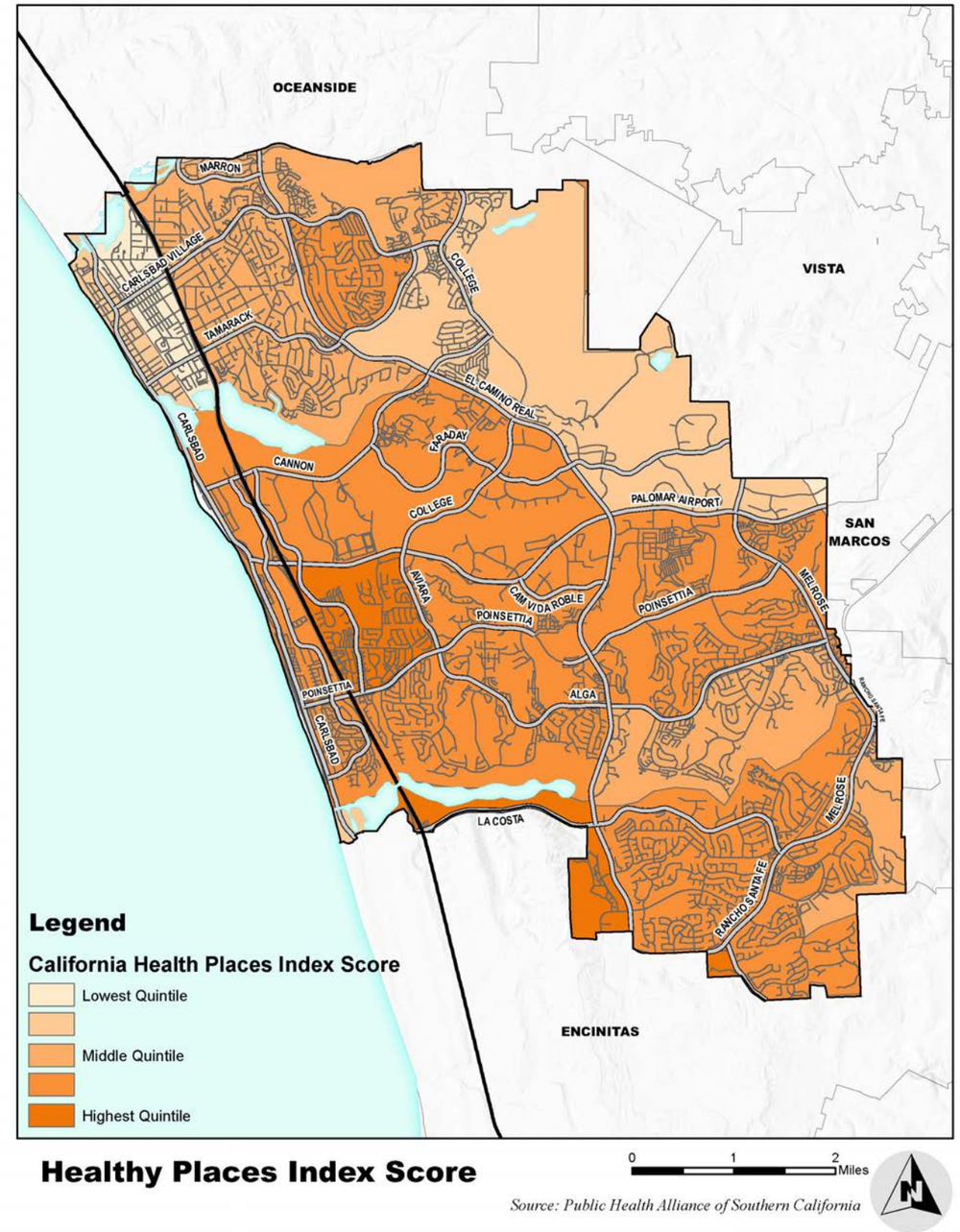


2.6 Health Index

There are a number of community conditions including housing, education, economics, and social factors which, when grouped together, can be used to assess a community's life expectancy. These social determinants of health have been grouped and analyzed to get a general picture of the City of Carlsbad health. The economic category analyzes the areas poverty levels, employment rates and median household income. The education category includes the number of bachelor's degrees or higher in the area, the high school graduation rates, as well as the preschool enrollment rates. The housing category includes the homeownership rates, the burden of owning or renting, the percent of uncrowded housing, as well as the percent of housing stock which is habitable. The health care access category includes the percent of insured adults in the community. The neighborhood category includes retail density, supermarket access, as well as park access and tree canopy, in addition to the number of people who live within a quarter-mile of a store which sells alcohol. The clean environment category examines the availability of safe drinking water, as well as clean air in three different metrics, particulate matter, diesel particulate matter, and ozone. The transportation category includes automobile access and active commuting. The final category of social factors examines, the percentage of two parent households and the percentage of registered voters.

Figure 2-21 shows the California Healthy Places Index Score, the areas which are lighter in color are less healthy when all eight factors are taken into consideration, in comparison to the areas which are darker in color.

Figure 2-21 Healthy Places Index Score



Healthy Places Index Score

Source: Public Health Alliance of Southern California

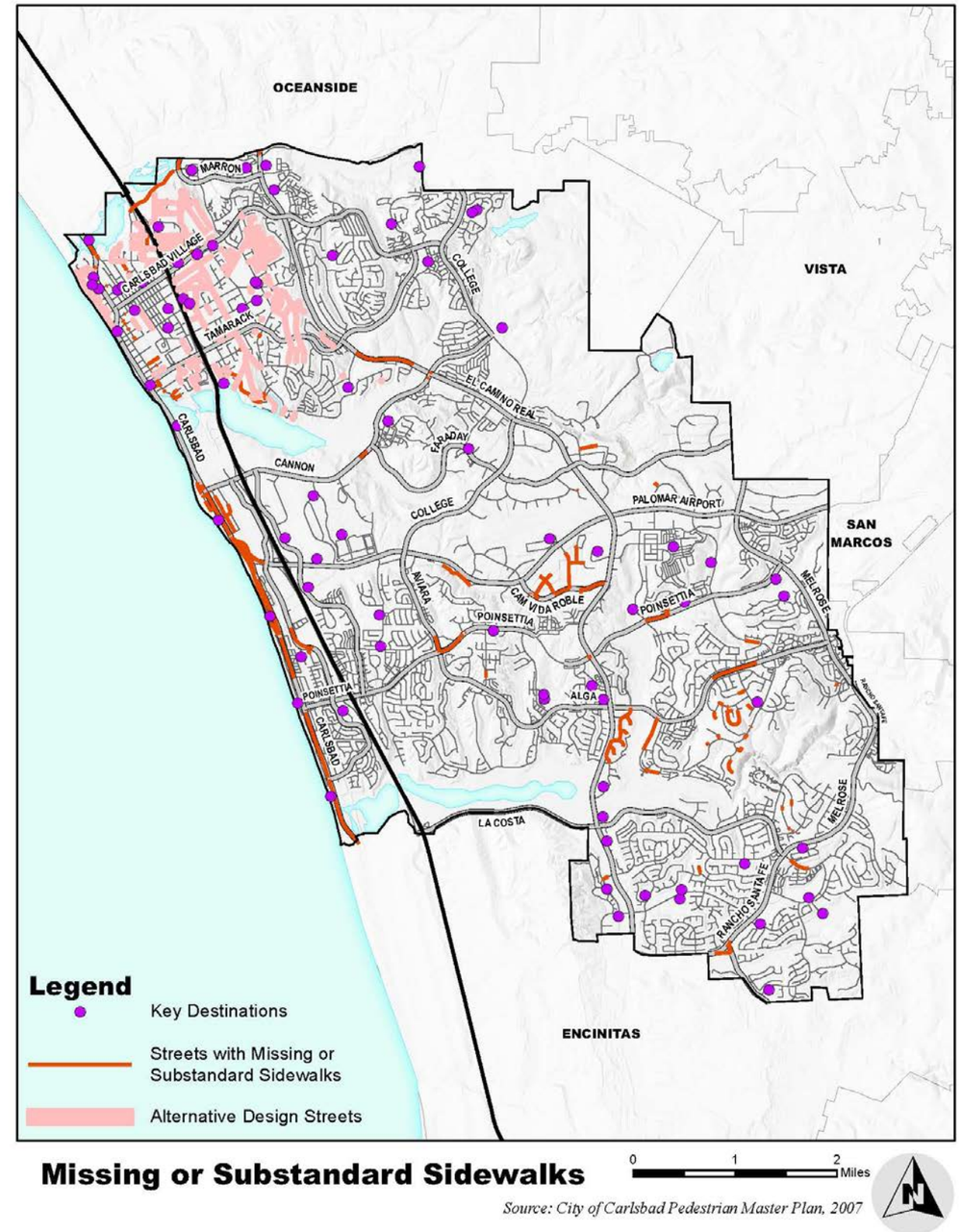
3.0 People on Foot

3.1 Network Summary

The current pedestrian network includes not only the city's sidewalk network, but also the trails, paths and connectors identified in the Trails Master Plan. Figure 3-1 shows the missing or substandard sidewalks in the City of Carlsbad. In total, of 30 miles of roadway are without sidewalks or with substandard sidewalks, although several of these locations are considered "Alternative Design Streets," and are not intended to be constructed or retrofitted with sidewalks.

Figure 3-2 shows the extensive network of existing and planned trails in the City of Carlsbad.

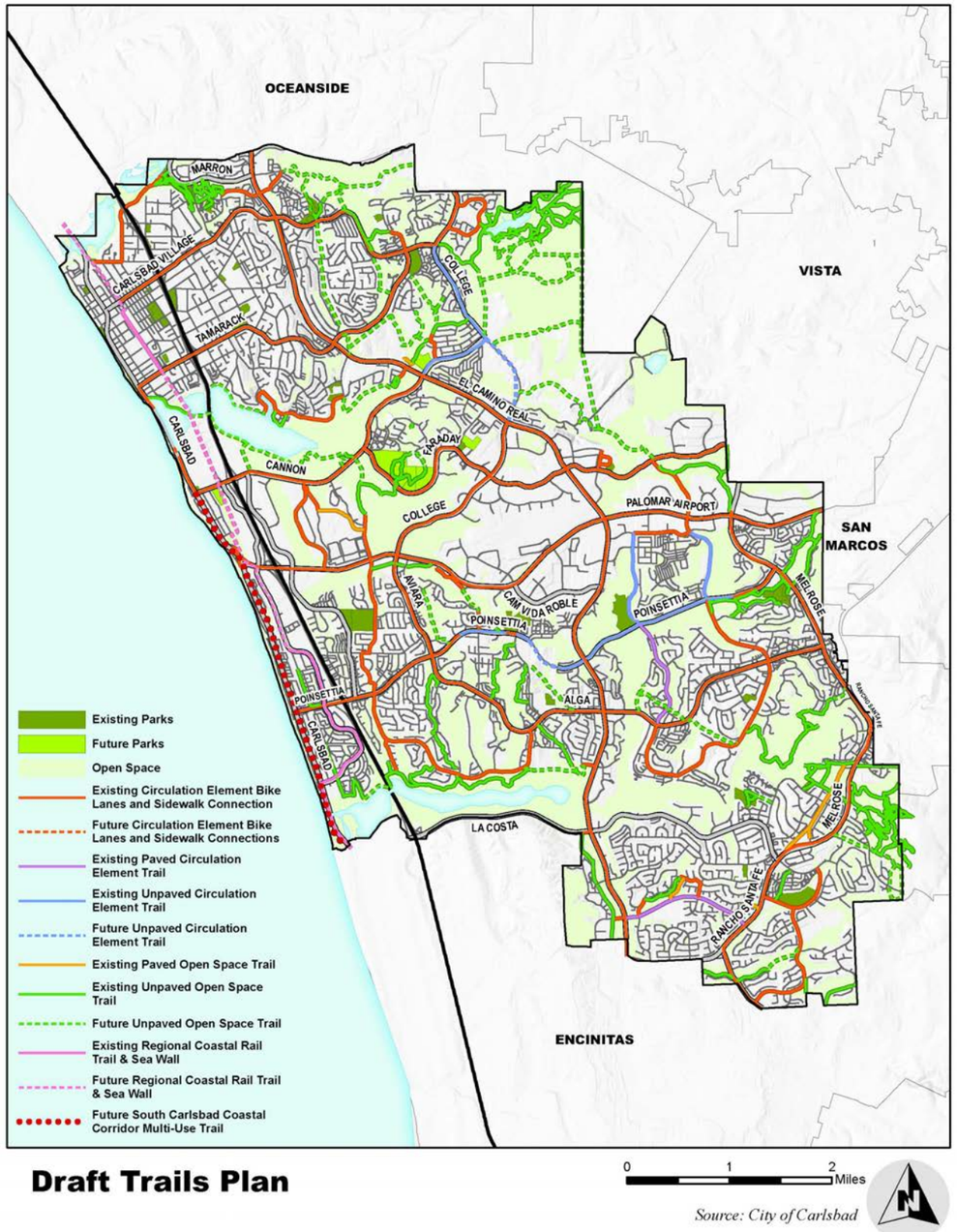
Figure 3-1 Missing or Substandard Sidewalks



Missing or Substandard Sidewalks

Source: City of Carlsbad Pedestrian Master Plan, 2007

Figure 3-2 Draft Trails Plan



3.2 Collision Analysis

3.2.1 Collision History

Collision data can be used to identify potential deficiencies related to pedestrian travel. The collision review draws from five years of data (January 2013 – December 2017) obtained from the California Statewide Integrated Traffic Records System (SWITRS). The analysis was used to identify trends and patterns related to collision locations, causes, time, party-at-fault and victim age.

3.2.2 Collision Locations

A total of 130 pedestrian-involved collisions were reported in the City of Carlsbad during the five-year analysis period. Pedestrian-involved collisions means that there was a pedestrian and an automobile involved. Figure 3-3 displays the location of the pedestrian collisions across the City of Carlsbad. As can be seen, there is a high density of pedestrian collisions along Carlsbad Boulevard, as well as in Carlsbad Village. Additionally, as shown in Figure 3-1 there's a significant number of pedestrian collisions along the major through fares, including Carlsbad Boulevard and Carlsbad Village Drive, as well as El Camino Real and Palomar Airport Road.

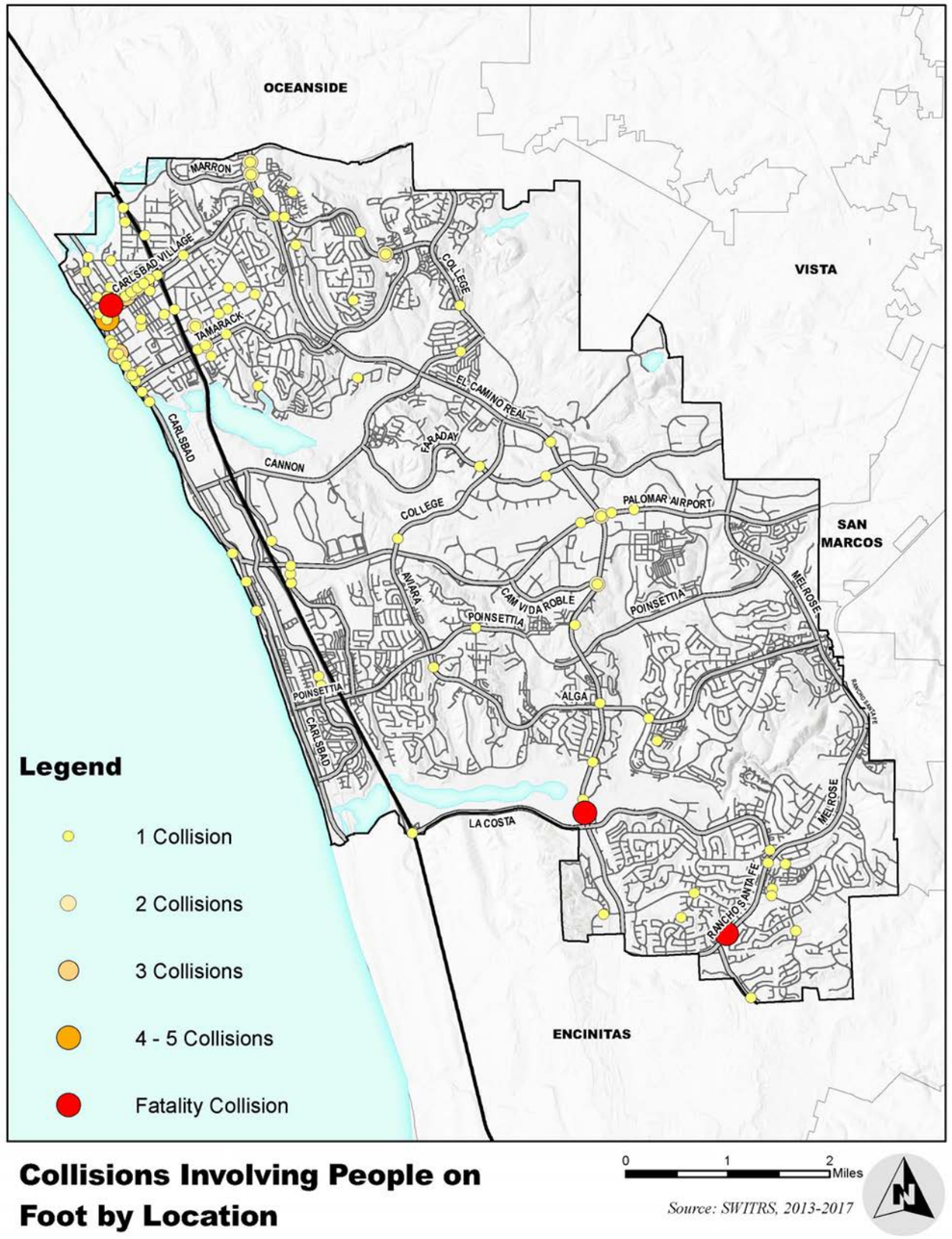
Table 3-1 identifies the locations where multiple pedestrian-involved collisions were reported.

Table 3-1 Multiple Pedestrian Collision Locations (Pedestrian): January 2013 – December 2017

Rank	Intersection	Collisions
1	Carlsbad Boulevard & Oak Avenue	5
2	Carlsbad Boulevard & Maple Avenue	3
	State Street & Carlsbad Village Drive	3
	Roosevelt Street & Carlsbad Village Drive	3
	Harding Street & Carlsbad Village Drive	3
3	Washington Street & Carlsbad Village Drive	2
	Madison Street & Carlsbad Village Drive	2
	Carlsbad Boulevard & Hemlock Avenue	2
	Jefferson Street & Carlsbad Village Drive	2
	Magnolia Avenue & Adams Street	2
	Adams Street & Tamarack Avenue	2
	El Camino Real & Plaza Drive	2
	El Camino Real & Marron Road	2
	Chatham Road & Carlsbad Village Drive	2
	El Camino Real & Camino Vida Roble	2
	El Camino Real & Palomar Airport Road	2

Source: SWITRS (2018)

Figure 3-3 Pedestrian Collisions (January 2013 – December 2017)



Collisions Involving People on Foot by Location

Table 3-2 reports pedestrian collisions by roadway location, differentiating between intersection and midblock locations. As shown, a little less than a third (about 25 percent) of the pedestrian-involved collisions occurred at intersections and the majority (about 74 percent) occurred at midblock locations; for two collisions the location was not denoted.

Table 3-2 Pedestrian Collisions by Roadway Location (January 2013 – December 2017)

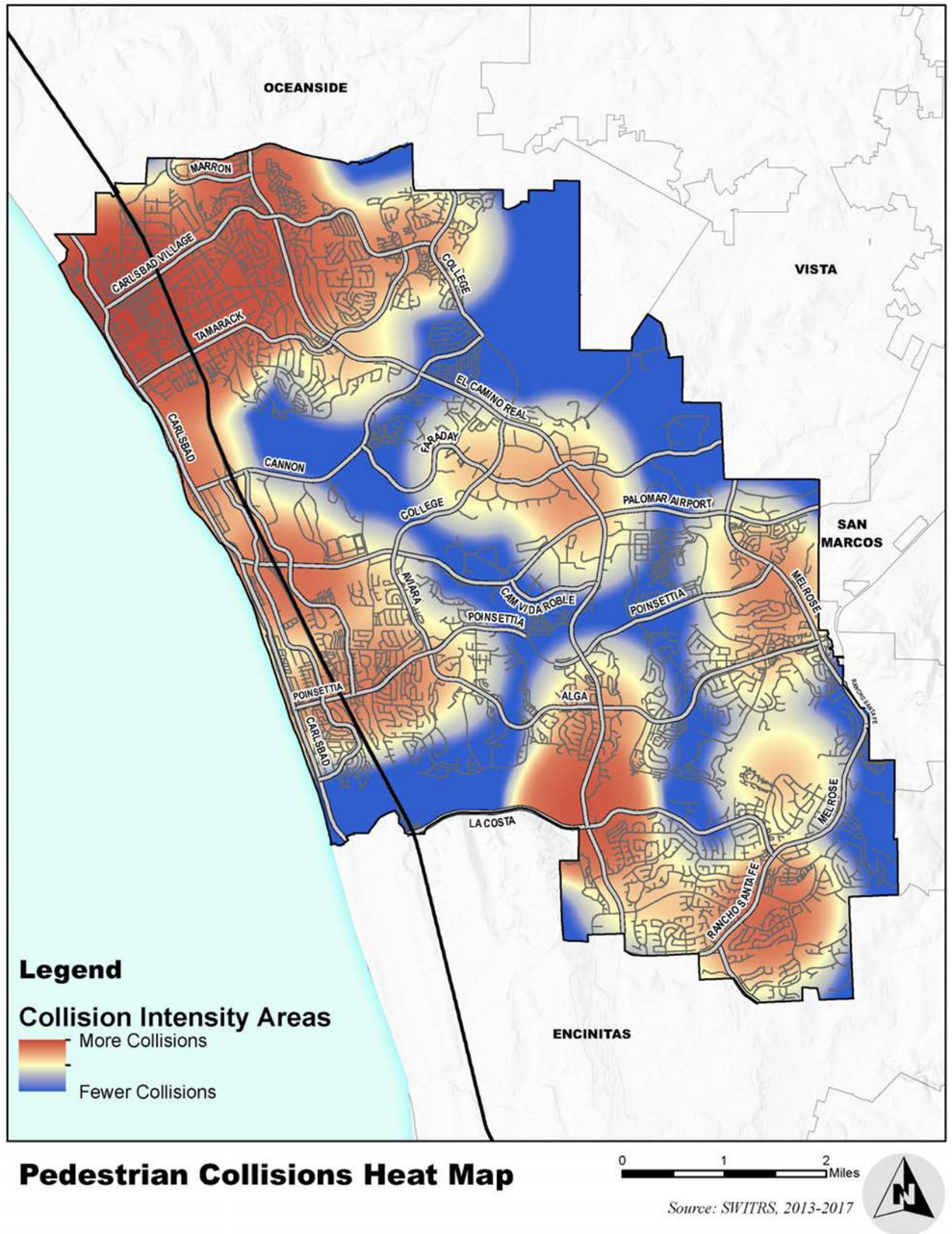
Collision Location	Collisions	Percent of Total
Intersection	32	**24.6%**
Midblock	96	**73.8%**
Total	**128***	**98.4%***

*Two pedestrian-involved collisions did not contain a notation regarding the location.

Source: SWITRS (2018)

Figure 3-4 presents the collision analysis by the density of collisions. The higher the density of collisions the darker brown.

Figure 3-4 Pedestrian Collision Heat Map



The primary collision factors for pedestrian-involved collisions are reported in Table 3-3. As shown, the second leading cause was due to vehicles violating the pedestrian right-of-way – meaning the pedestrian had the legal right to be in the roadway at the time of the collision – accounting for 33.1 percent of collisions.

Table 3-3 Primary Pedestrian Collision Factor (January 2013 – December 2017)

Collision Cause	Collisions	Percent of Total
Pedestrian Violation	45	**34.6%**
Pedestrian Right-of-Way	43	**33.1%**
Unsafe Speed	9	**6.9%**
Unknown	8	**6.2%**
Improper Turning	8	**6.2%**
Traffic Signals and Signs	5	**3.9%**
Driving Under the Influence	3	**2.3%**
Automobile Right-of-Way	2	**1.5%**
Other Improper Driving	2	**1.5%**
Unsafe Starting or Backing	1	**0.77%**
Improper Passing	1	**0.77%**
Other Hazardous Violation	1	**0.77%**
Impeding Traffic	1	**0.77%**
Other Equipment	1	**0.77%**
Total	**130**	**100.0%**

Source: SWITRS (2018)

Figure 3-5 shows the location of these 43 collisions involving the driver violating the pedestrian right-of-way, most of these occurred in the northwest corner of the city, in and around Carlsbad Village area. Figure 3-6 shows the location of the 43 pedestrian involved collisions, with the collisions noted in red where the pedestrian is considered at fault.

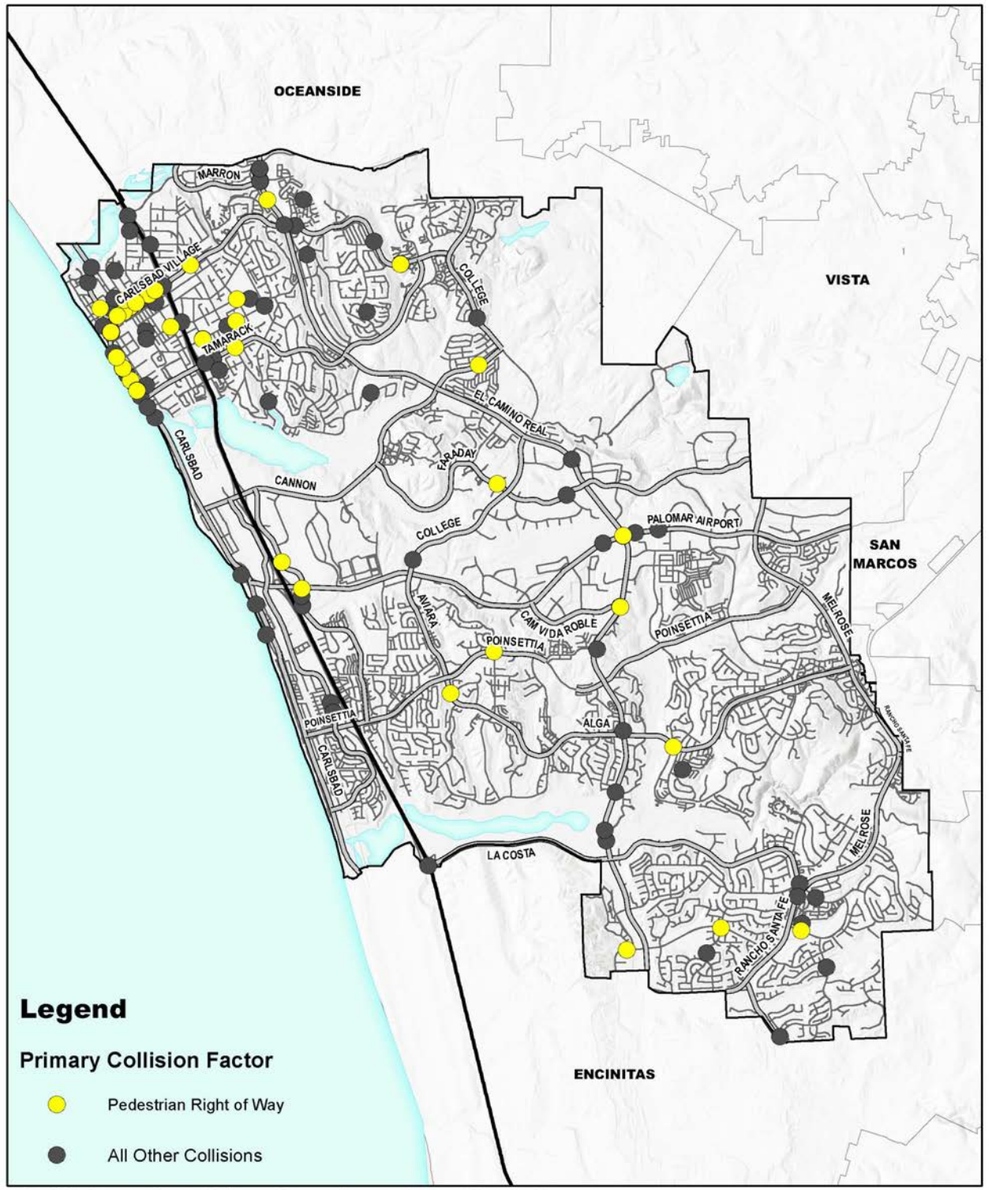
Table 3-4 reports the pedestrian action during the collisions. The pedestrian was reported as crossing in the crosswalk at an intersection for less than half the collisions (39.2 percent). The second leading cause was due to crossing not in the crosswalk, at 25.4 percent.

Table 3-4 Pedestrian Action During Collision (January 2012 – December 2017)

Pedestrian Action	Collisions	Percent of Total
Crossing in Crosswalk at Intersection	51	39.2%
Crossing Not in Crosswalk	33	25.4%
In Road, Including Shoulder	32	24.6%
Crossing in Crosswalk Not at Intersection	7	5.4%
Not in Road	6	4.6%
Not Stated	1	0.77%
Total	**130**	**100.0%**

Source: SWITRS (2018)

Figure 3-5 Collisions Involving People on Foot – Violation by Driver

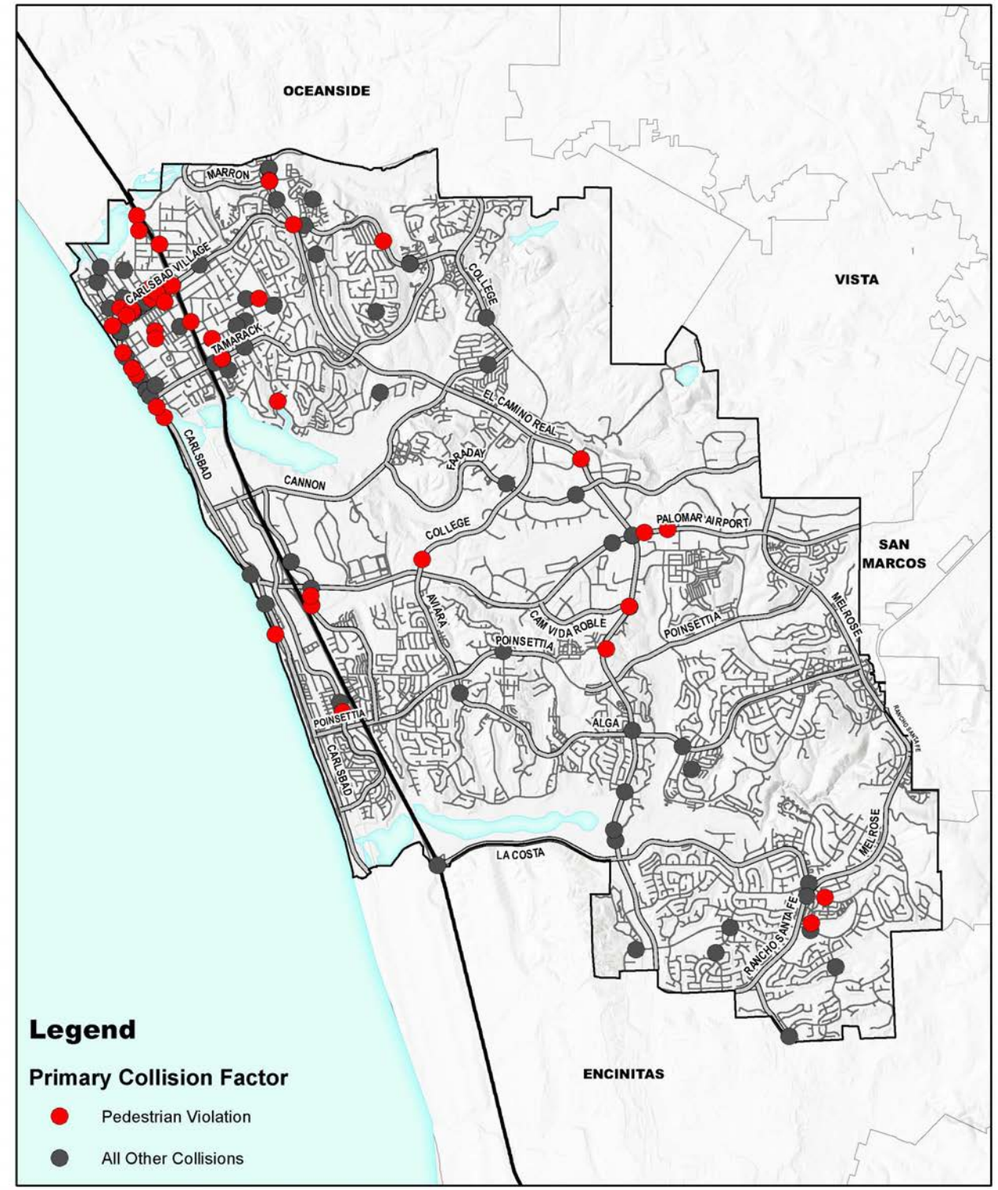


Collisions Involving People on Foot by Primary Collision Factor - Pedestrian Right-of-Way Violation by Driver

0 1 2 Miles

Source: SWITRS, 2013-2017

Figure 3-6 Collisions Involving People on Foot – Pedestrian Violation



Collisions Involving People on Foot by Primary Collision Factor - Pedestrian Violation

0 1 2 Miles

Source: SWITRS, 2013-2017

The party at-fault is reported for pedestrian-involved collisions in **Table 3-5.** The driver was reported as at-fault for the majority of pedestrian-involved collisions, approximately 65.4 percent.

Table 3-5 Pedestrian Collisions by Party At-Fault (January 2013 – December 2017)

Collision Location	Collisions	Percent of Total
Pedestrian	45	**34.6%**
Driver	85	**65.4%**
Total	**130**	**100.0%**

Source: SWITRS (2018)

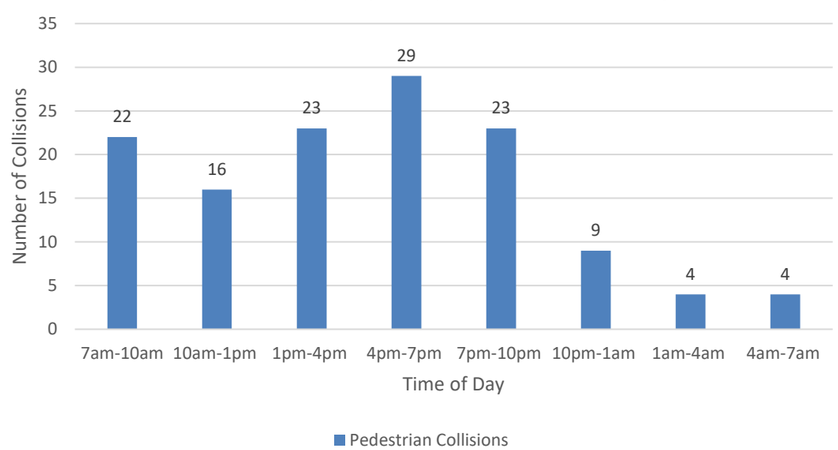
3.2.3 Temporal Collision Assessment & Victim Ages

The temporal assessment reports collisions by time of day, day of week, and month of year. This information may be used to help identify potential factors contributing to collisions, such as lack of lighting (collisions occurring in the evening), or patterns, such as collisions occurring during peak commute hours (7:00 – 9:00 a.m. & 4:00 – 6:00 p.m.). Victim age is also examined in this section. The age group analysis will help determine whether any age group is experiencing a disproportionate amount of collisions.

The Sustainable Mobility Plan will identify locations and/or infrastructure which will improve roadway safety and work to protect the most vulnerable roadway users. This can include improved lighting, installing high visibility crosswalks, leading pedestrian interval signals, bicycle signals and/or curb extensions.

Pedestrian collisions are reported by hour in **Figure 3-7**. As shown the highest occurrence of pedestrian collisions (29 collisions) occur between the hours of 4 to 7 p.m., this is followed by the time slot of 1 to 4 p.m. and 7 to 10 p.m. (each with 23 collisions).

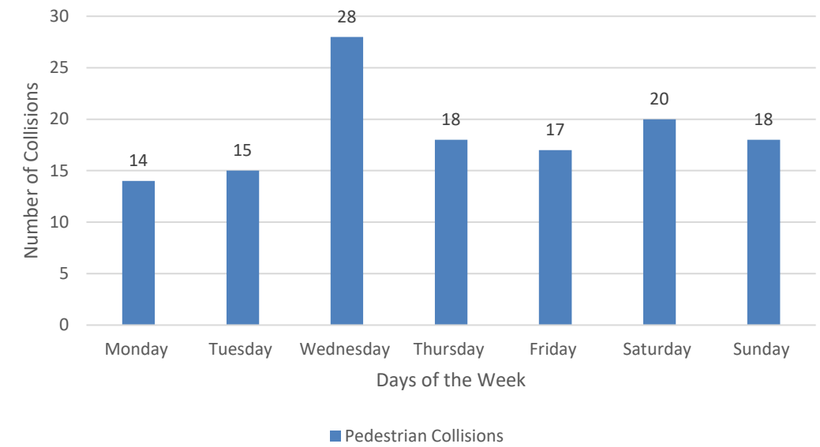
Figure 3-7 Pedestrian Collisions by Hour (January 2013 – December 2017)



Source: SWITRS (2018)

Pedestrian collisions by day of week are reported in **Figure 3-8**. Pedestrian collisions were highest on Wednesdays (28 collisions), followed by Saturdays (20 collisions). The rest of the week collisions are relatively evenly distributed

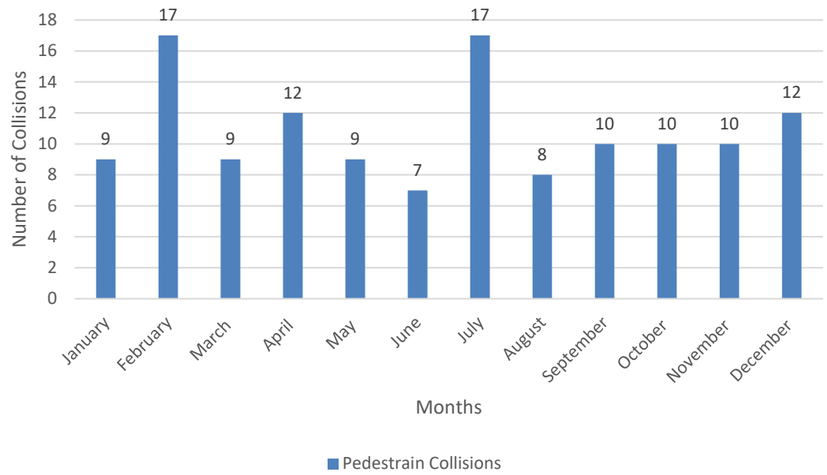
Figure 3-8 Pedestrian Collisions by Day of Week (January 2013 – December 2017)



Source: SWITRS (2018)

Figure 3-9 reports pedestrian- involved collisions by month. The greatest number of pedestrian collisions were reported as occurring in February and July, with April and December also experiencing relatively higher numbers of collisions. The month of August had the lowest number of pedestrian collisions.

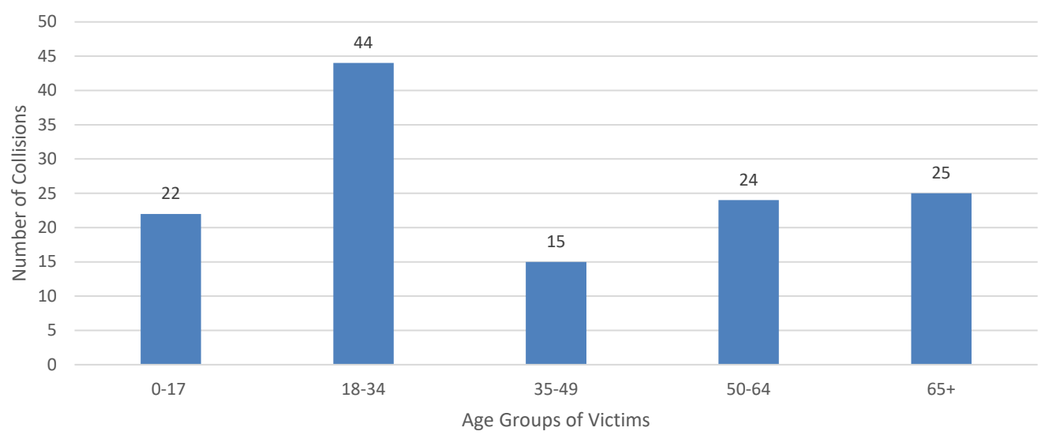
Figure 3-9 Pedestrian Collisions by Month (January 2013 – December 2017)



Source: SWITRS (2018)

As shown in Figure 3-10, pedestrian collisions are most prevalent in the 18 - 34 age group. There were no age groups which did not experience pedestrian collisions.

Figure 3-10 Pedestrian Collisions by Age Group (January 2013 – December 2017)



Source: SWITRS (2018)

3.3 Collision Severity

Pedestrian collisions are summarized by severity in Table 3-6. As shown, a majority of collisions resulted in "Other Visible Injury," meaning an injury that is visible but non-traumatic, at 50.0 percent of all collisions, followed by "Complaint of Pain," at 31.5 percent of all collisions. A total of eight pedestrian collisions, or 6.2 percent, were fatal.

Table 3-6 Pedestrian Collision Severity (January 2013 – December 2017)

Collision Severity	Collisions	Percent of Total
Other Visible Injury	65	**50.0%**
Complaint of Pain	41	**31.5%**
Severe Injury	13	**10.0%**
Fatality	8	**6.2%**
Property Damage Only	3	**2.3%**
Total	**130**	**100.0%**

Source: SWITRS (2018)

3.4 Collision Analysis

Additional analyses were undertaken to identify areas of relatively greater demand and deficiency, including the city's adopted Pedestrian Level of Service analysis and the Pedestrian Environment Quality Evaluation, to analyze roadway segments from the pedestrian's perspective.

Pedestrian Level of Service

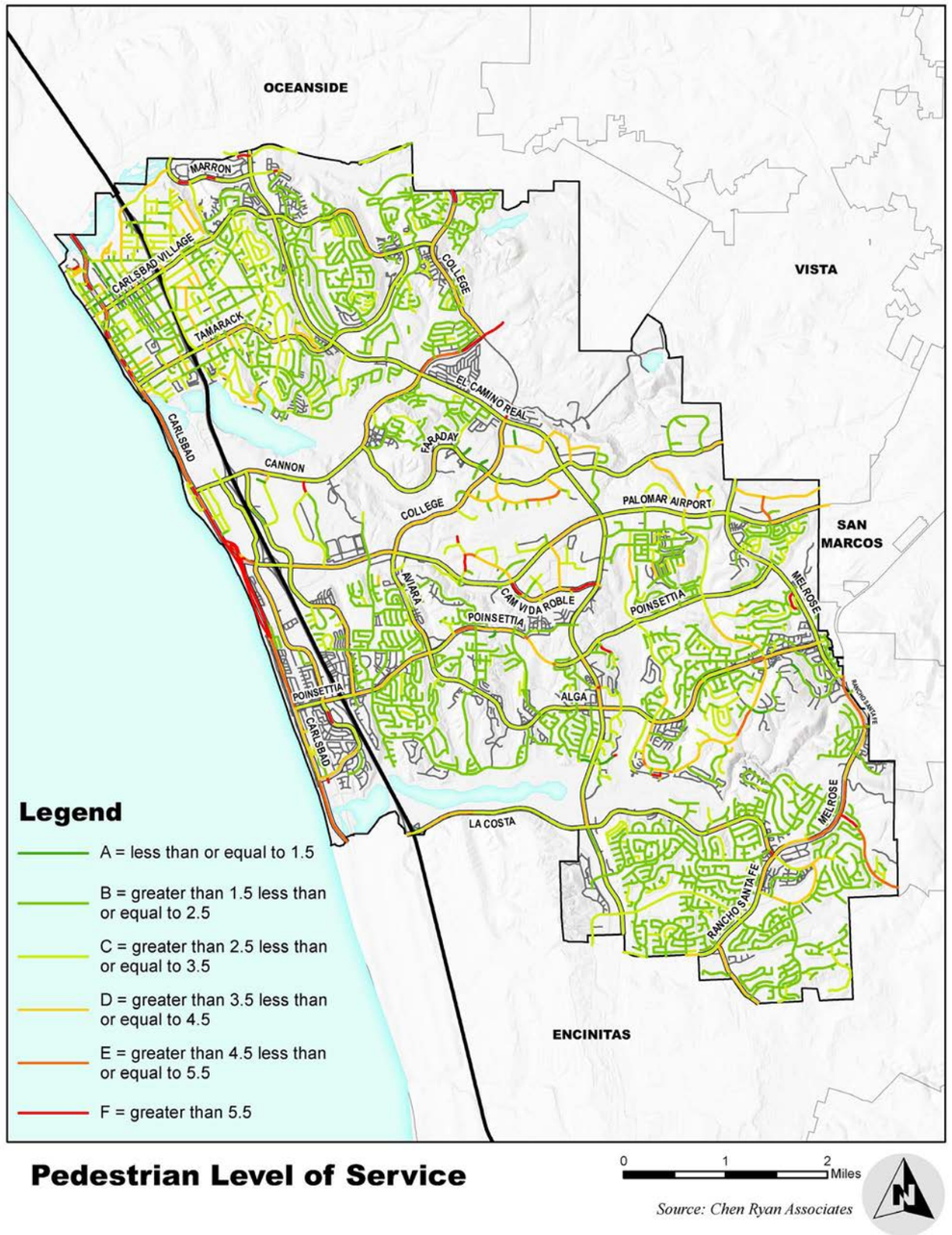
The City of Carlsbad collected a series of datasets in the Fall of 2017 to develop a comprehensive metric for evaluating Levels of Service for people walking consistent with the criteria established in the 2015 Mobility Element. Known as Pedestrian Level of Service, the effort establishes scores for walking on both sides of every street in the City of Carlsbad.

Scores are determined based on a composite score using the following criteria:

- Sidewalk Buffer Width
- Sidewalk Width
- Bike Lane Width
- Outside Lane Width
- Bike Lane Buffer Width
- Parking Lane Width
- Percent of Parking Occupied
- Missing Sidewalk
- Average Daily Traffic
- Estimated Percentage of Trucks
- Pavement Condition

For the purpose of the Citywide SMP, a street score was developed using the average of both directional scores (east+west scores or north+south scores) and is shown in **Figure 3-11** and **Figure 3-12** below. The Citywide PLOS scores can be seen in Figure 3-11. Figure 3-12 shows a subarea surrounding the Carlsbad Village Station. Subsequent subarea analyses will make use of the directional scores to help identify areas for improvement.

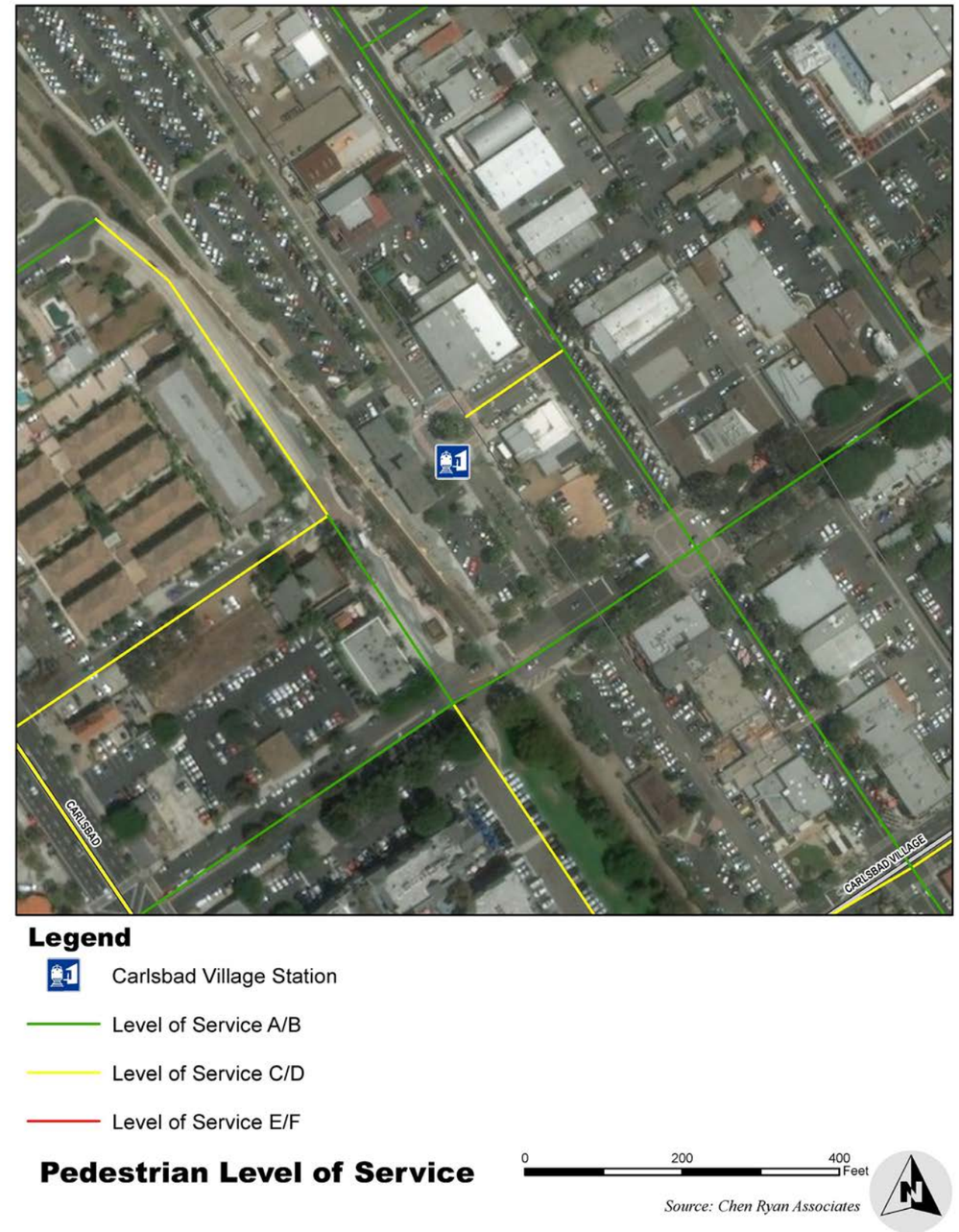
Figure 3-11 Pedestrian Level of Service



Pedestrian Level of Service

Source: Chen Ryan Associates

Figure 3-12 Pedestrian Level of Service Surrounding Carlsbad Village Station



Pedestrian Level of Service

Source: Chen Ryan Associates

Pedestrian Environment Quality Evaluation

All public roadways in the City of Carlsbad were also evaluated using the Pedestrian Environment Quality Evaluation (PEQE)[1]. PEQE is another way of looking at PLOS. Areas of need are reflective of those with relatively greater demand and greater deficiency, drawing from the infrastructure review and US Census information in the previous chapter. This needs summary is presented in an opportunities and constraints graphics, used to help formulate recommendations to improve the pedestrian network.

PEQE assigns a score to each side of a roadway segment based on four measures: horizontal buffer, lighting, clear pedestrian zone, and posted speed limit. The scores for each side of the roadway were averaged together in order to display a single segment score. Table 3-7 displays the attributes influencing the segment scores, scoring evaluation, and the three rating categories.

Table 3-7 Pedestrian Environment Quality Evaluation Rating

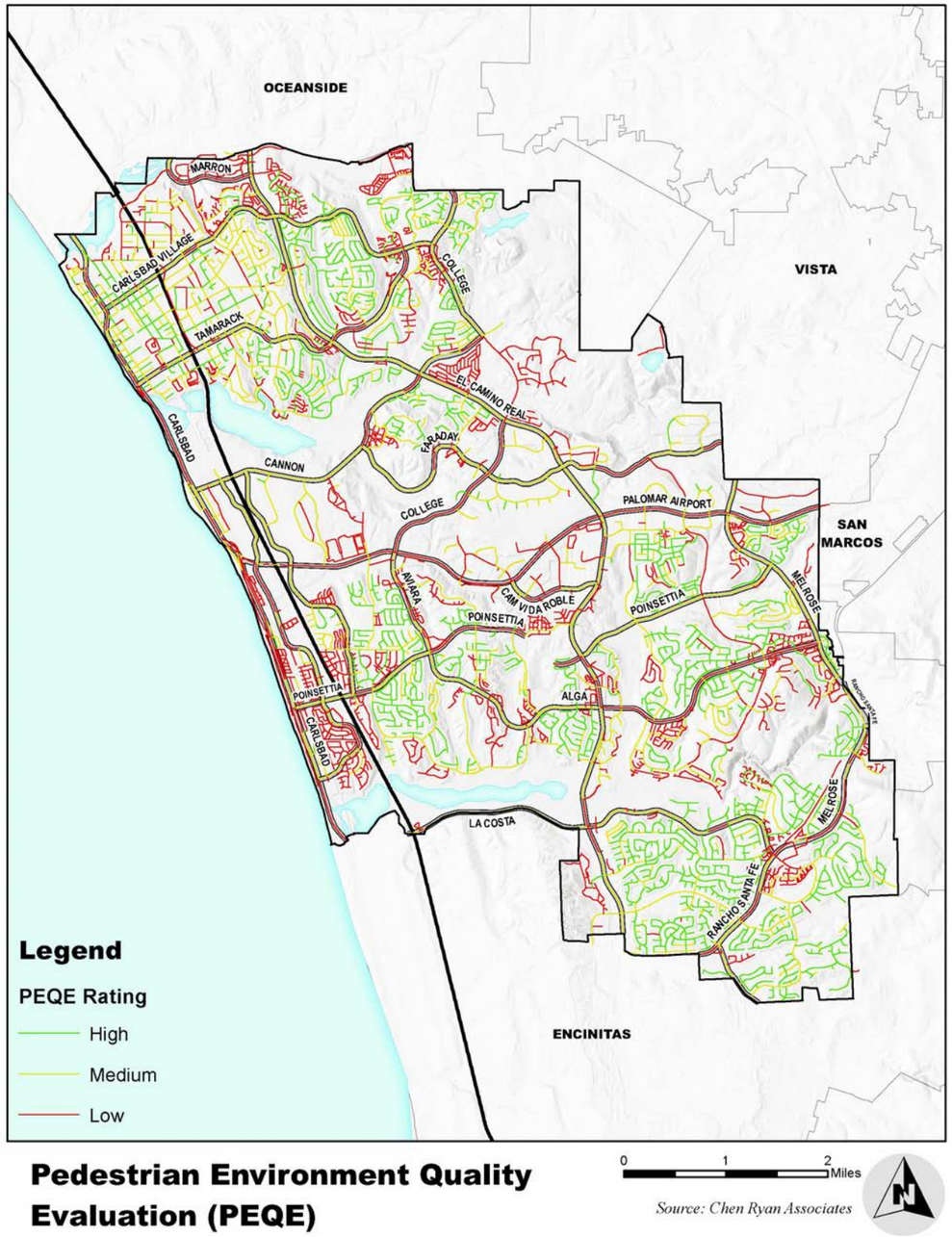
Measure	Description	Scoring
Horizontal Buffer	Between the edge of the auto travelway and the edge of the clear pedestrian zone. A vertical buffer of any width, such as a fence or on-street parking, is also awarded full points.	0 points: < 6 feet 1 point: 6 – 14 feet 2 points: > 14 feet (or vertical buffer)
Lighting	Standard lighting was considered one streetlight per segment.	0 points: below standard/requirement 1 point: meets standard/requirement 2 point: exceeds standard/requirement
Clear Pedestrian Zone	5' minimum	0 points: has obstructions 2 points: no obstructions
Posted Speed Limit	--	0 points > 40 mph 1 point: 30 – 40 mph 2 points: < 30 mph (or separated from roadway)
Maximum Points		**8 points**
Final PEQE Segment Scoring		
	Low:	≤ 3.5 points
	Medium:	4 – 5.5 points
	High:	≥ 6 points

Source: Chen Ryan Associates (2016)

Figure 3-13 displays the results of the PEQE roadway segment analysis. Citywide, approximately 45 percent (207 miles) of the roadways scored in Low range – 3.5 points or lower), 28 percent (131 miles) of roadway scored in the high range – 6 points or greater, 27 percent (123 miles) of roadway scored in the Medium range – between 4 and 5.5 points.

[1] The Pedestrian Environment Quality Evaluation (PEQE) is a modified version of the Pedestrian Environmental Quality Index (PEQI). PEQI is a qualitative observational tool that was originally developed in 2008 by the San Francisco Department of Public Health to assess the quality and safety of the physical pedestrian environment and to inform pedestrian planning. PEQE simplifies the inventorying of the pedestrian environment, but similarly scores roadway segments and intersections on a number of factors to assess the pedestrian environment and inform planning.

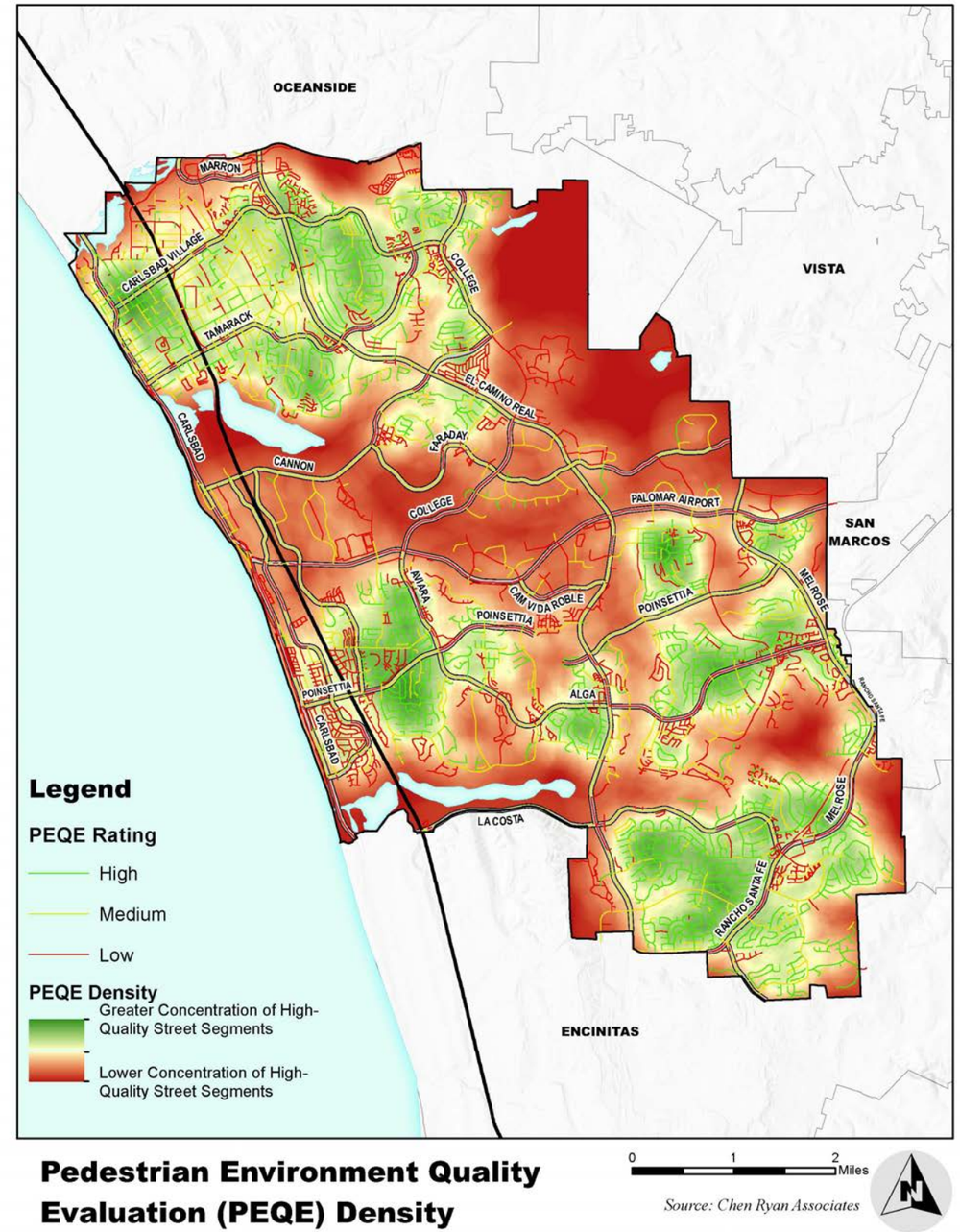
Figure 3-13 Pedestrian Environmental Quality Evaluation



Pedestrian Environment Quality Evaluation (PEQE)

Figure 3-14 displays the PEQE data in a heat map format. This shows the areas of the City of Carlsbad that have a low concentration of high-quality street segments

Figure 3-14 Pedestrian Environment Quality Evaluation Density



Pedestrian Environment Quality Evaluation (PEQE) Density

Source: Chen Ryan Associates

4.0 People on Bikes

4.1 Network Summary

Caltrans currently recognizes four classifications of bicycle facilities, including Class I multi-use paths, Class II bicycle lanes, Class III bicycle routes, and Class IV cycle tracks. A description and image of each of these facility types is provided in Table 4-1.

Figure 4-1 displays the location of existing bicycle facilities within the City of Carlsbad. As shown, the Carlsbad bicycle network is comprised of multi-use path (Class I), bike lane (Class II), bike route (Class III) facilities, as well as Cycle Track (Class IV). Bicycle lanes make up the bulk of the network. There are 5.8 miles of Multi-Use Paved Paths in the City of Carlsbad.

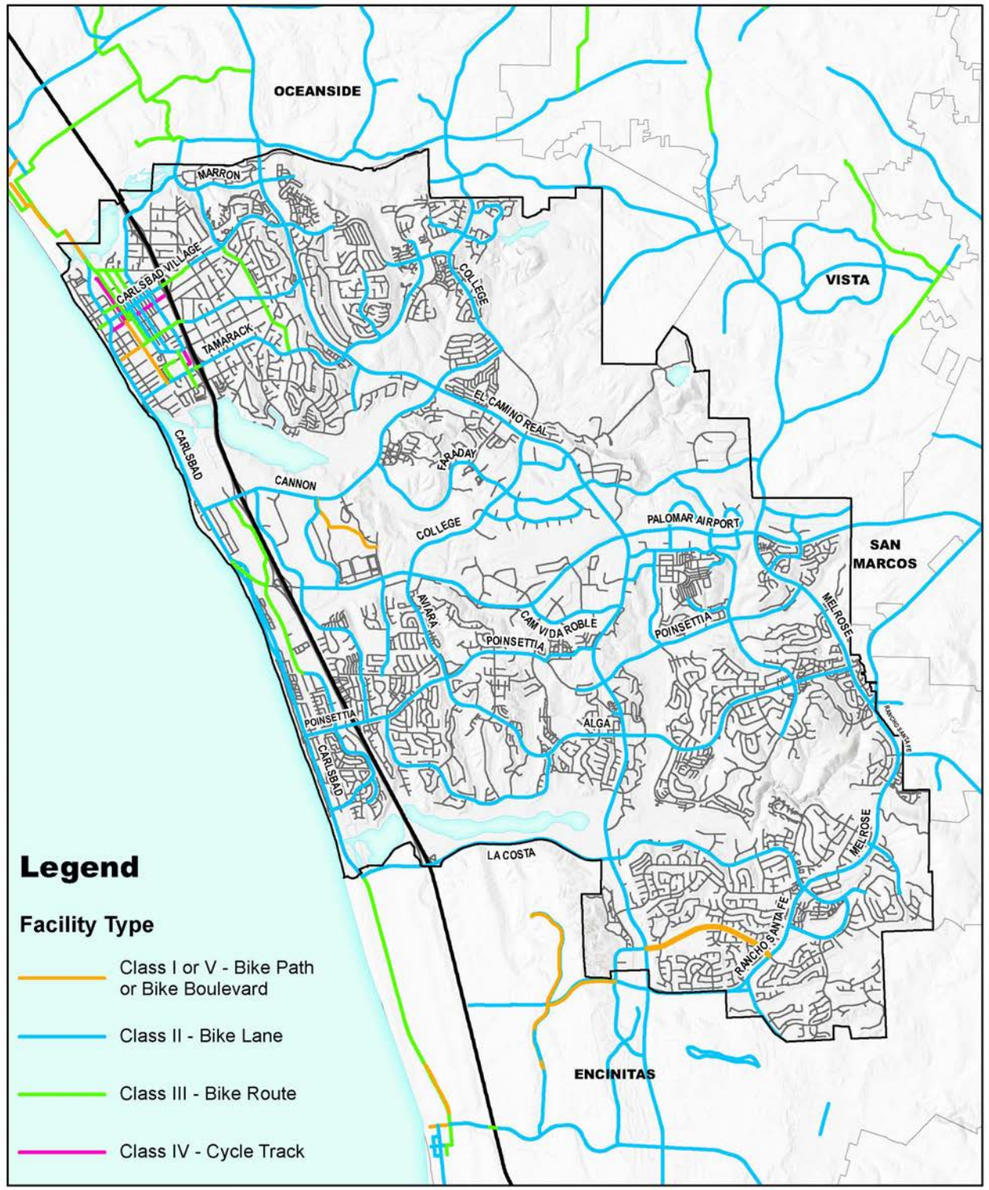
Figure 4-2 is a map of the Adopted Trails Plans, depicted in the trails map are existing bicycle lanes, as well as future bicycle lanes.

Table 4-1 Bicycle Facility Classifications and Existing Network Mileage

Class Description	Example
Class I Multi-Use Path – Also referred to as a bike paths or shared-use paths, Class I facilities provide a completely separated right-of-way designed for the exclusive use of bicycles and pedestrians with crossflows by motorists minimized. Multi-use paths can provide connections where roadways are non-existent or unable to support bicycle travel. The minimum paved width for a two-way multi-use path is considered to be eight-feet, with a two-foot wide graded area adjacent to the pavement.	
Class II Bike Lane – Provides a striped lane designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited. Bike lanes are one-way facilities located on either side of a roadway. Pedestrian and motorist crossflows are permitted. Additional enhancements such as painted buffers and signage may be applied. The minimum bike lane width is considered to be five-feet.	
Class III Bike Route – Provides shared use of traffic lanes with cyclists and motor vehicles, identified by signage and/or street markings such as “sharrows”. Bike routes are best suited for low-speed, low-volume roadways with an outside lane of 14 feet or greater. Bike routes provide network continuity or designate preferred routes through corridors with high demand.	
Class IV Cycle Track – Also referred to as separated or protected bikeways, cycle tracks provide a right-of-way designated exclusively for bicycle travel within the roadway and physically protected from vehicular traffic. Cycle tracks can provide for one-way or two-way travel. Types of separation include, but are not limited to, grade separation, flexible posts, or on-street parking.	

Source: Chen Ryan Associates (2018)

Figure 4-1 Adopted Bicycle Network

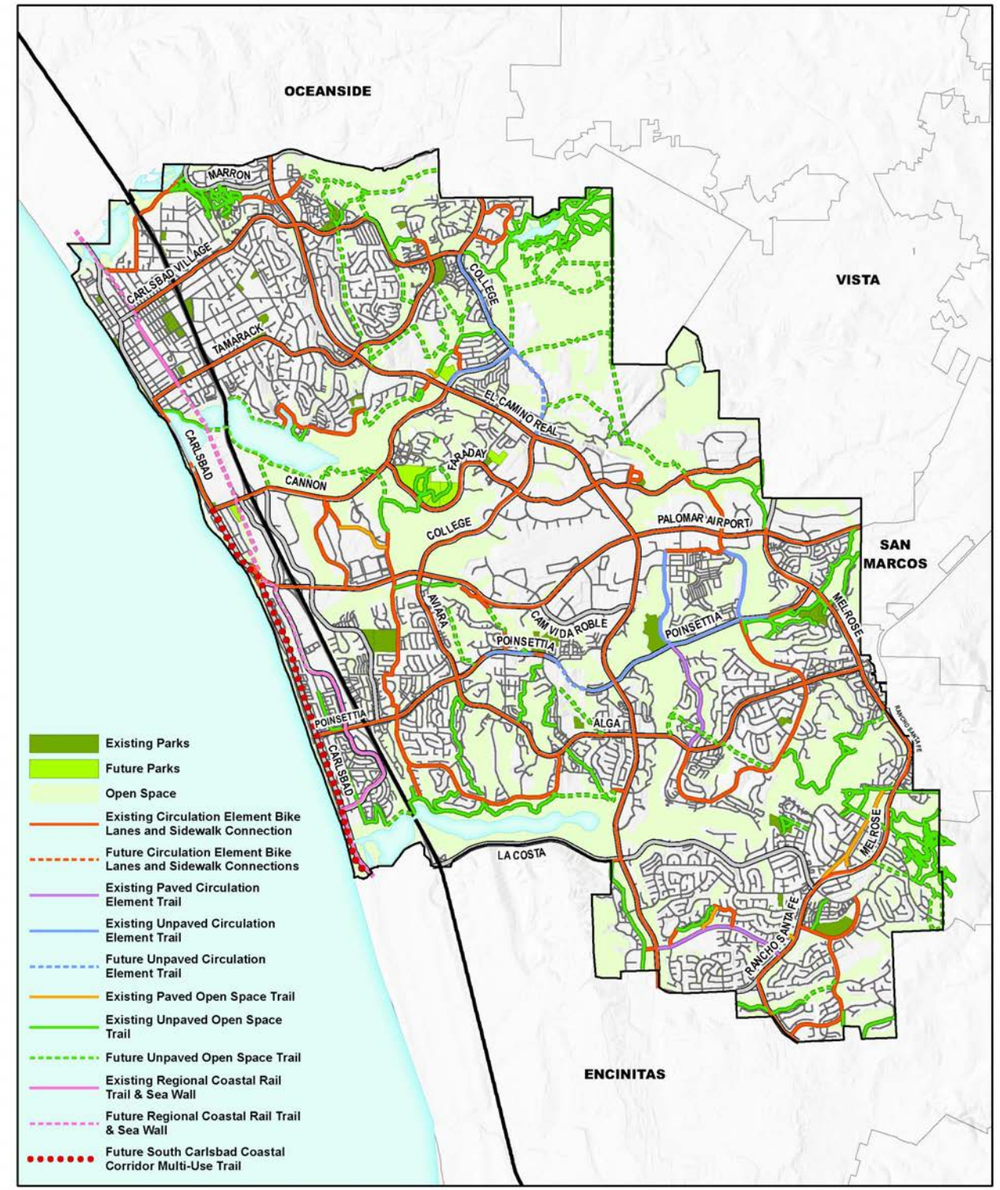


Adopted Bike Network

0 1 2 Miles

Source: City of Carlsbad

Figure 4-2 Draft Trails Plan



Draft Trails Plan

0 1 2 Miles

Source: City of Carlsbad

The bicycle network not only consists of roadway facilities but also of end of trip facilities such as bicycle parking. The 2007 Bicycle Master Plan identified the importance of bicycle parking. The Bicycle Master Plan also identified the ten largest employers in the City of Carlsbad and the bicycle facilities present. It is assumed that over the last 11 years an increasing number of destinations have supplied bicycle parking, as well as bicycle lockers and/or showers. The list below, seen below in **Table 4-2,** is from the 2007 Bicycle Master Plan.

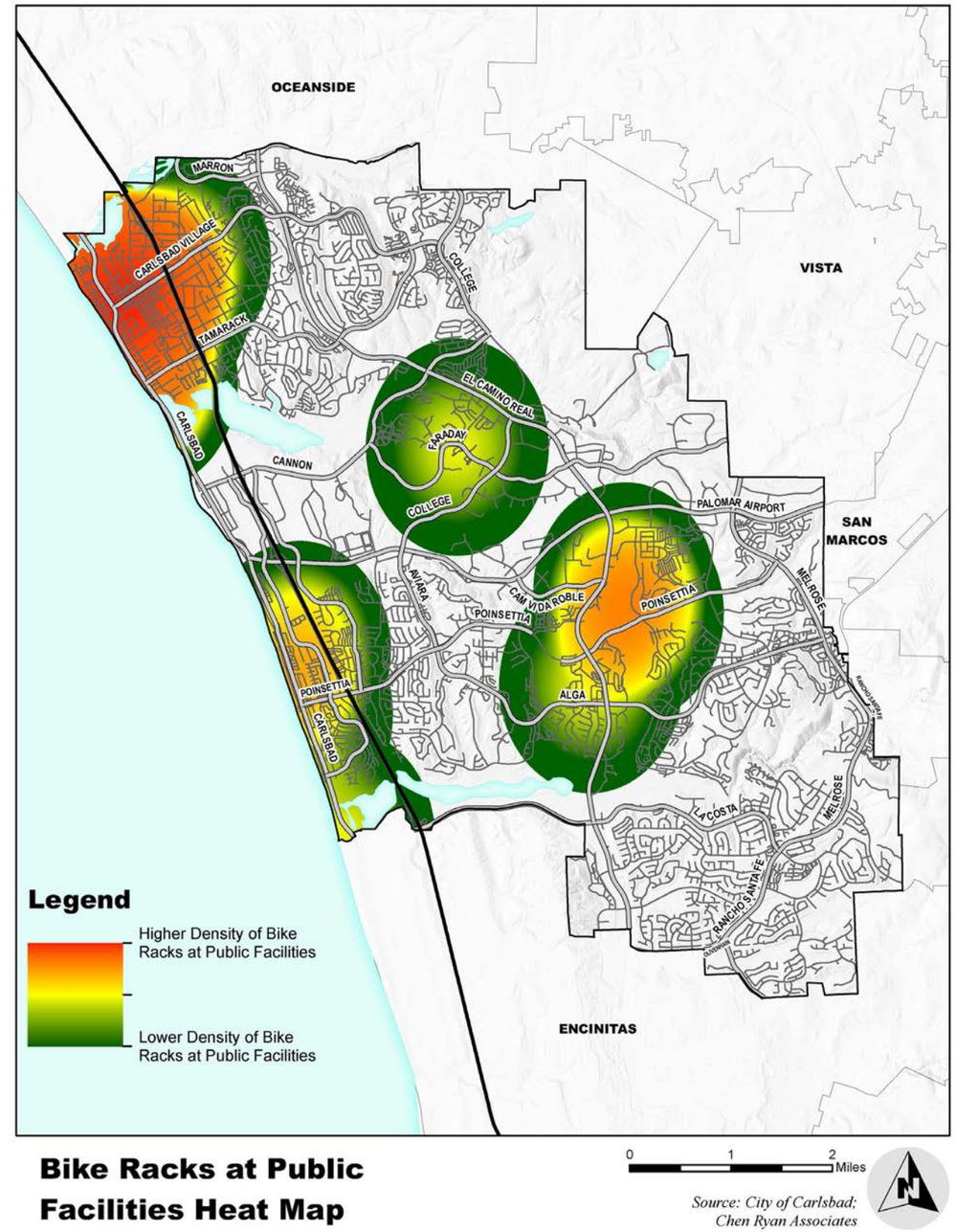
Table 4-2 Bicycle Racks and Support Facilities at the Ten Largest Employers in Carlsbad in 2007

No.	Location	Bicycle Racks	Bicycle Lockers	Showers
1	Callaway Golf	No	No	Yes
2	Carlsbad Unified School District	No	No	No
3	Four Seasons Resort Aviara	Yes	No	Yes
4	Invitrogen	Yes	No	Yes
5	Taylor Made – Adidas Golf Co.	No	No	No
6	La Costa Resort and Spa	No	No	Yes
7	City of Carlsbad	Yes	Yes	Yes
8	Gemological Institute of America	Yes	Yes	Yes
9	Acushnet Golf	No	No	Yes
10	Isis Pharmaceuticals	No	Yes	Yes

Source: Carlsbad Bikeway Master Plan (2007)

Figure 4-3 shows the concentration or density of bicycle racks in public places as of 2016. As can be seen in Figure 4-3, there is a significant concentration of bicycle racks in Carlsbad Village, with two other "hot spots" of higher concentrations of bicycle racks throughout the city.

Figure 4-3 Bicycle Racks at Public Facilities within the City of Carlsbad (2016)



4.2 Bicycle Collision Analysis

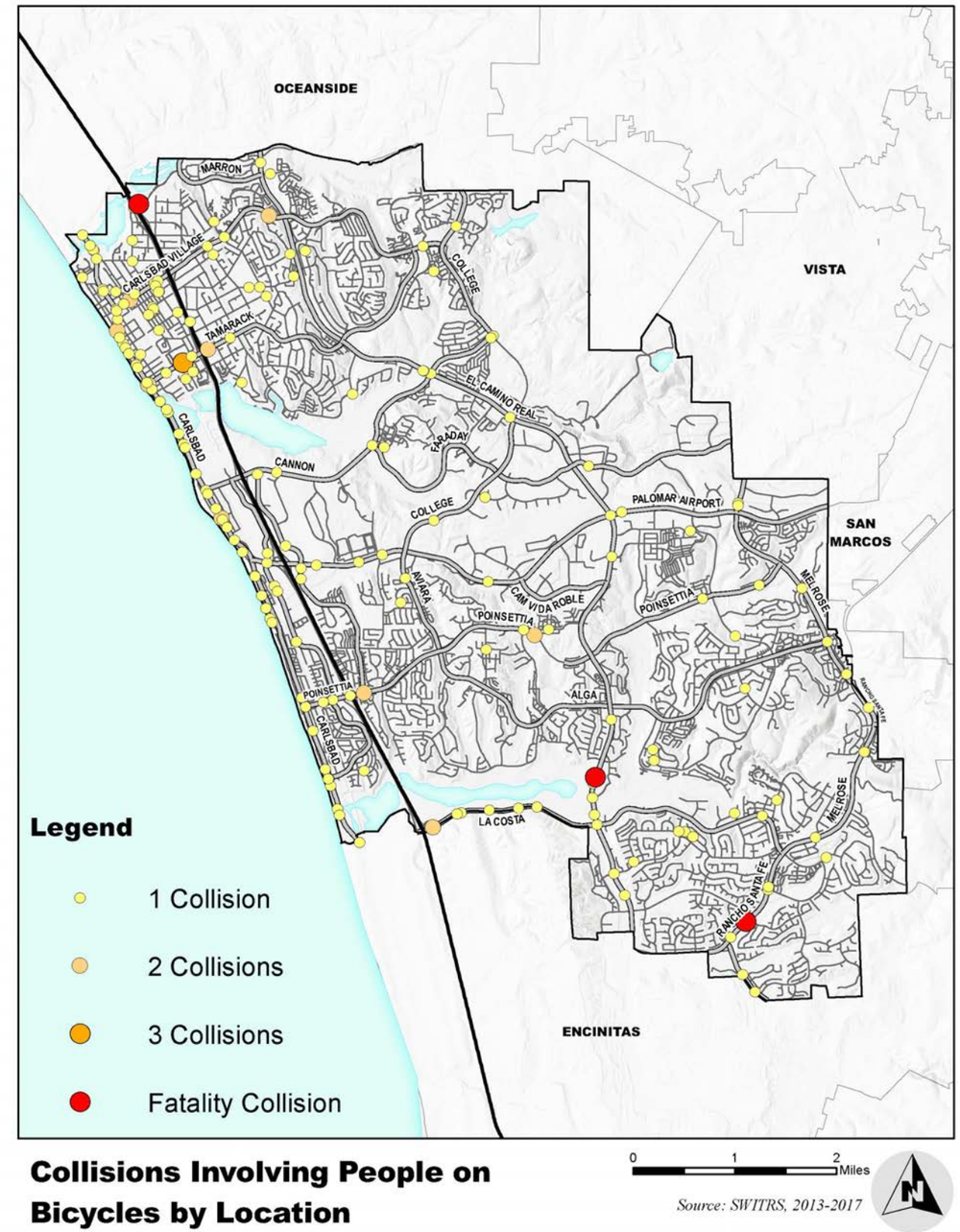
Collision data can be used to identify potential deficiencies related to bicycle travel. The collision review draws from five years of data (January 2013 – December 2017) obtained from the California Statewide Integrated Traffic Records System (SWITRS). The analysis was used to identify trends and patterns related to collision locations, causes, time, party-at-fault and victim age.

The bicycle collision assessment found 190 bicycle-car involved collisions reported during the five-year analysis period. The bicycle collision locations are displayed in Figure 4-4. There is a high concentration of bicycle collisions along Carlsbad Boulevard as well as in and around Carlsbad Village. There were three bicycle involved collisions which resulted in a fatality, these collisions took place on Carlsbad Boulevard, El Camino Real and Rancho Santa Fe Drive.

Figure 4-5 displays the collision data as a heat map, showing the areas with a greater concentration of collisions in darker colors.

Table 4-3 identifies the locations where multiple bicycle involved collisions were reported.

Figure 4-4 Bicycle Collisions (January 2013 – December 2017)



Collisions Involving People on Bicycles by Location

Figure 4-5 Bicycle Collision Heat Map

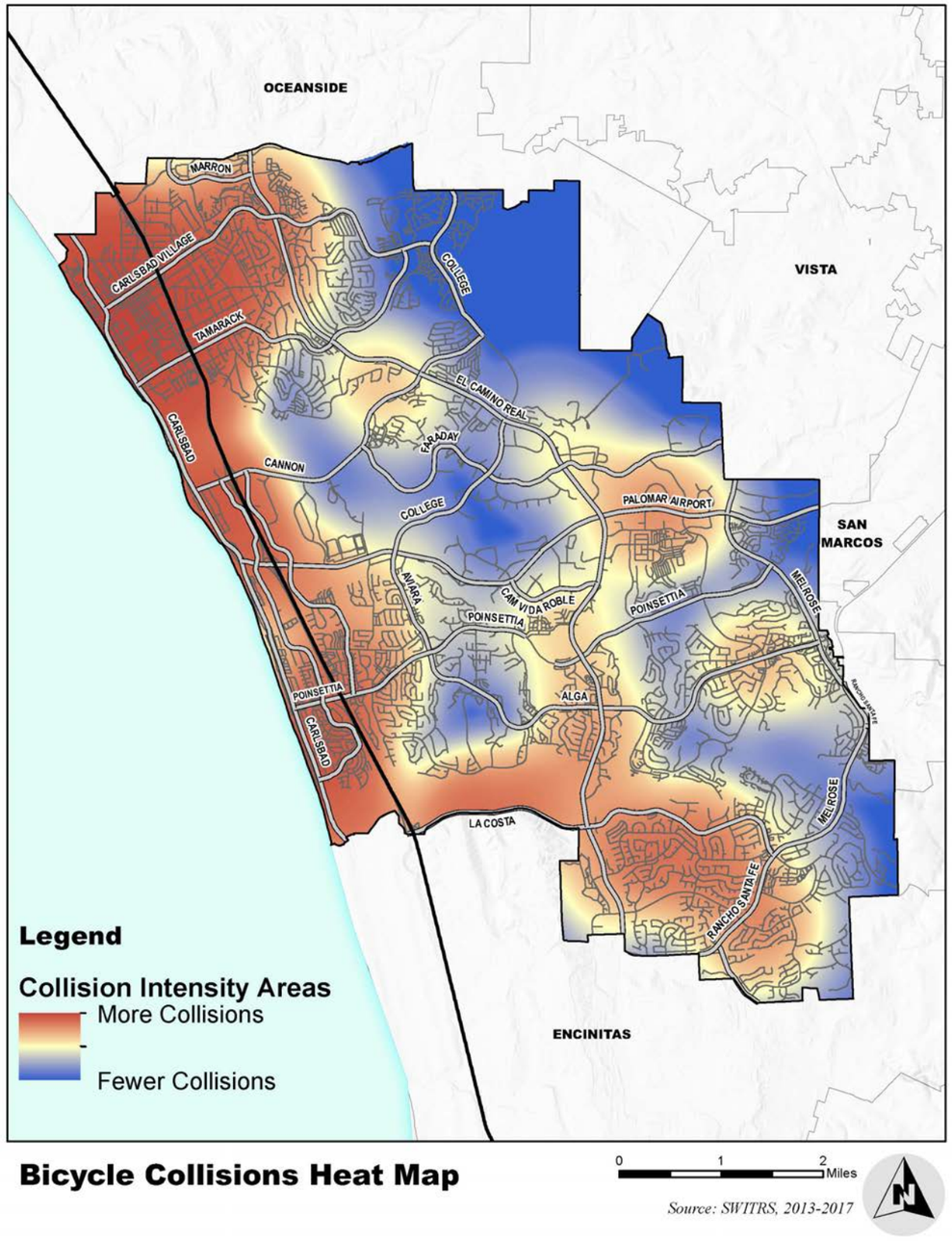


Table 4-3 Multiple Bicycle Collision Locations (January 2013 – December 2017)

Rank	Intersection	Collisions
1	Sheridan Place & Tamarack Avenue	3
2	Carlsbad Boulevard & Pine Avenue	2
	State Street & Carlsbad Village Drive	2
	Carlsbad Boulevard & Tamarack Avenue	2
	Pio Pico Drive & Tamarack Avenue	2
	Carlsbad Boulevard & Cerezo Drive	2
	Celinda Drive & Carlsbad Village Drive	2
	Paseo Del Norte & Poinsettia Lane	2
	Piraeus Street & La Costa Avenue	2
	Cassia Road & Poinsettia Lane	2

Source: SWITRS (2018)

Table 4-4 displays bicycle-involved collisions by roadway location. As shown, approximately one-fifth of all bicycle collisions occurred at intersections. It is important to note that while some collisions may occur at midblock locations, a portion of the midblock collisions are within the influence area of major intersections, which likely exerts an influence on some collision factors.

Table 4-4 Bicycle Collisions by Roadway Location (January 2013 – December 2017)

Collision Location	Collisions	Percent of Total
Intersection	33	**17.4%**
Midblock	157	**82.6%**
Total	**190**	**100.0%**

Source: SWITRS (2017)

4.2.1 Party At-Fault & Primary Collision Factors

The party at-fault for bicycle-involved collisions is reported in Table 4-5. The bicyclist was reported as the party at-fault for the majority of bicycle-involved collisions, approximately 52 percent of occurrences.

Table 4-5 Bicycle Collisions by Party At-Fault (January 2013 – December 2017)

Collision Location	Collisions	Percent of Total
Bicyclist	98	**51.6%**
Driver	92	**48.4%**
Total	**190**	**100.0%**

Source: SWITRS (2018)

The primary bicycle collision factors are reported in Table 4-6 and Figures 4-6 and 4-7. The leading cause was attributed to the bicyclist's improper turning, accounting for 24.7 percent of total bicycle involved collisions. Unsafe speed was also a common cause, accounting for 21.1 percent of bicycle involved collisions.

Table 4-6 Primary Bicycle Collision Factor Violation (January 2013 – December 2017)

Collision Cause	Collisions	Percent of Total
Improper Turning	47	**24.7%**
Unsafe Speed	40	**21.1%**
Automobile Right-of-Way	24	**12.6%**
Other Hazardous Violation	11	**5.8%**
Unknown	10	**5.3%**
Wrong Side of Road	10	**5.3%**
Traffic Signals and Signs	8	**4.2%**
Unsafe Lane Change	7	**3.7%**
Improper Passing	6	**3.2%**
Other Improper Driving	6	**3.2%**
Not Stated	5	**2.6%**
Driving or Bicycling Under the Influence	4	**2.1%**
Unsafe Starting or Backing	4	**2.1%**
Following Too Closely	3	**1.6%**
Pedestrian Right-of-Way	2	**1.1%**
Pedestrian Violation	1	**0.5%**
Other than Driver (or Pedestrian)	1	**0.5%**
Lights	1	**0.5%**
Total	**190**	**100.1%***

*Due to rounding; Source: SWITRS (2018)

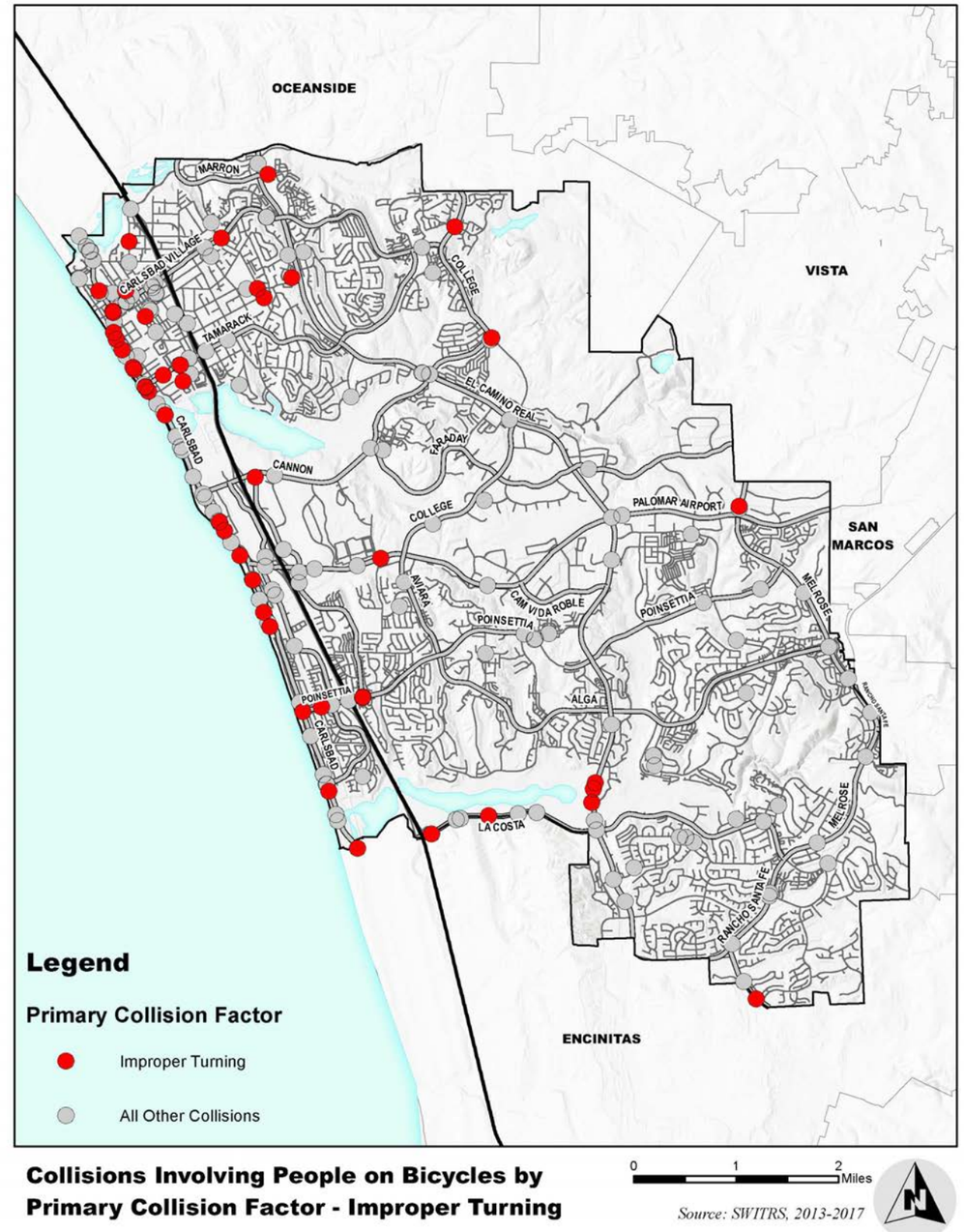
The bicycle collision type is reported in Table 4-7, with the leading category identified as broadside collisions. This result is somewhat incongruities with the findings in Table 3-11 which identified the leading bicycle collision roadway location type as midblock, and only 17.4 percent of bicycle collisions occurring in intersection locations.

Table 4-7 Bicycle Collision Type (January 2013 – December 2017)

Collision Type	Collisions	Percent of Total
Broadside	59	**31.1%**
Rear End	34	**17.9%**
Sideswipe	33	**17.4%**
Other	21	**11.1%**
Hit Object	16	**8.4%**
Overturned	14	**7.4%**
Not Stated	7	**3.7%**
Head-On	4	**2.1%**
Vehicle/Pedestrian	2	**1.1%**
Total	**190**	**100.0%**

Source: SWITRS (2018)

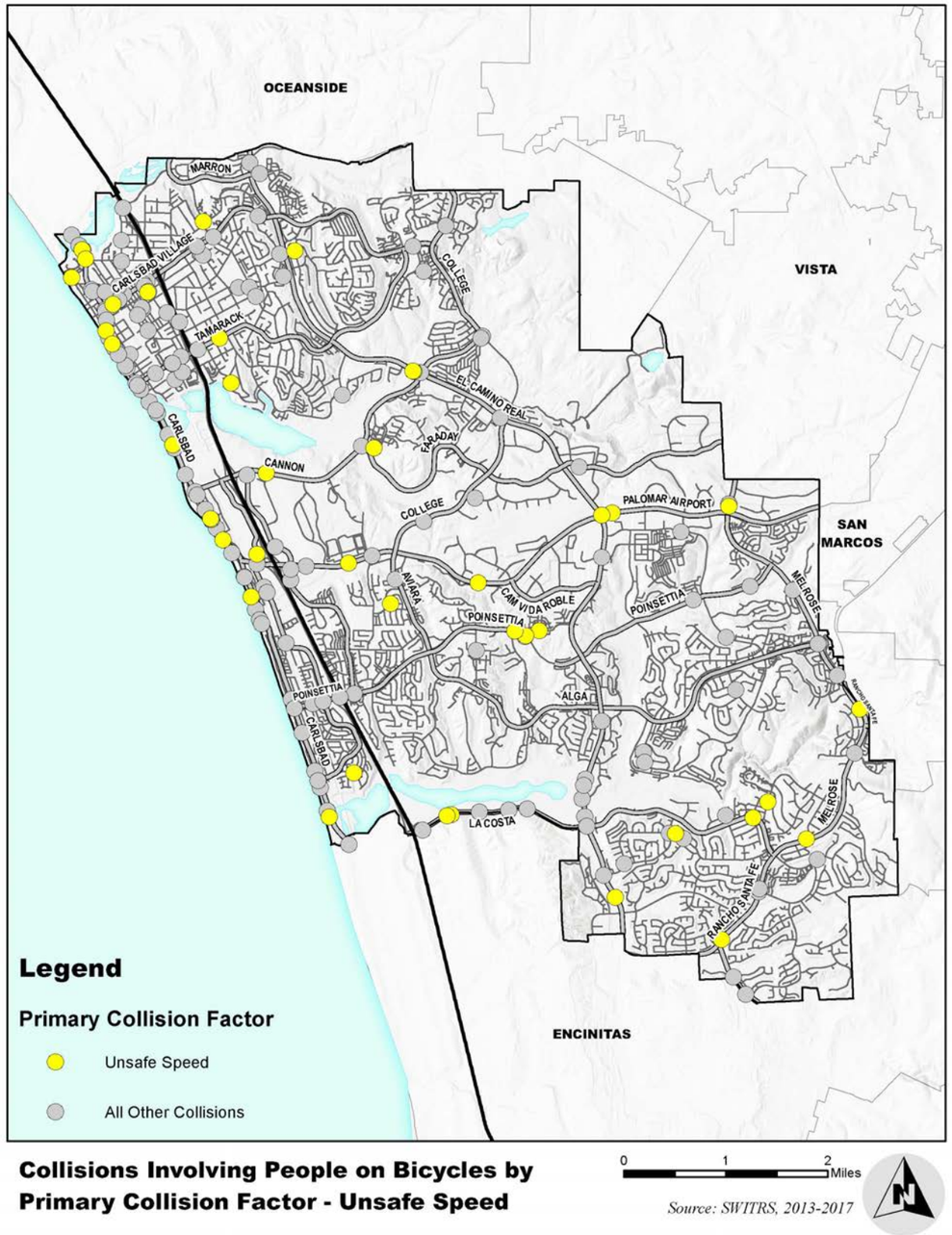
Figure 4-6 Collisions Involving People on Bicycles – Improper Turning



Collisions Involving People on Bicycles by Primary Collision Factor - Improper Turning

Source: SWITRS, 2013-2017

Figure 4-7 Collisions Involving People on Bicycles – Unsafe Speeds



Collisions Involving People on Bicycles by Primary Collision Factor - Unsafe Speed

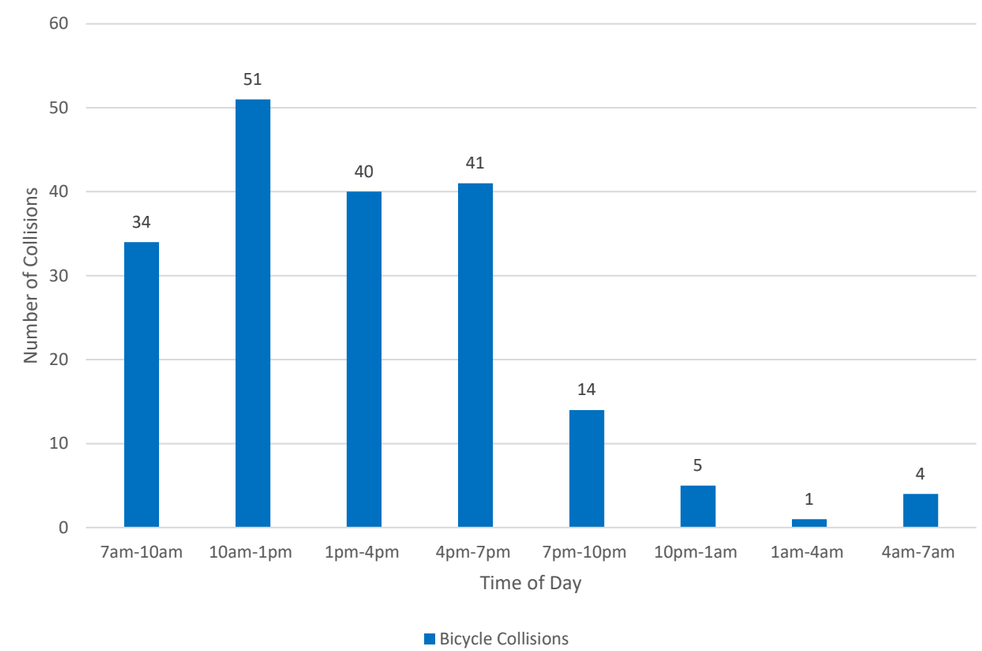
Source: SWITRS, 2013-2017

4.2.2 Temporal Collision Assessment & Victim Ages

The temporal assessment reports collisions by time of day, day of week, and month of year. This information may be used to help identify potential factors contributing to collisions, such as lack of lighting (collisions occurring in the evening), or patterns, such as collisions occurring during peak commute hours (7:00 – 9:00 a.m. & 4:00 – 6:00 p.m.). Victim age is also examined in this section. The age group analysis will help determine whether any age group is experiencing a disproportionate amount of collisions.

Bicycle collisions are reported by time of day in Figure 4-8. As shown, the highest number of collisions (51 collisions) are during the time period from 10 a.m. – 1 p.m., this is closely followed by the evening peak period 4 – 7 p.m. (41 collisions.

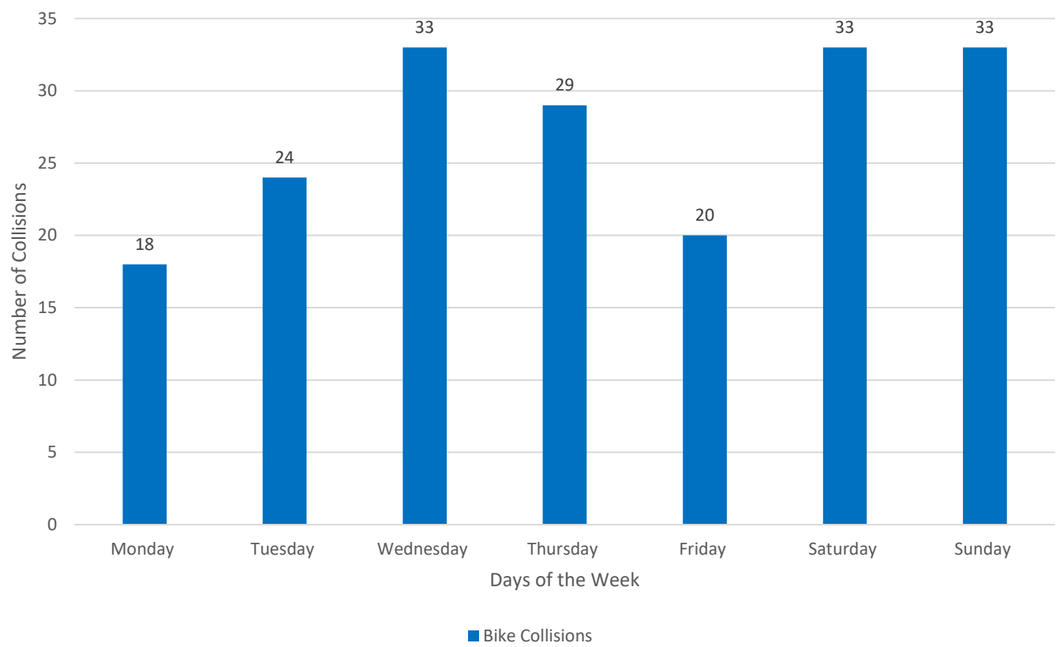
Figure 4-8 Pedestrian & Bicycle Collisions by Hour (January 2013 – December 2017)



Source: SWITRS (2018)

Bicycle collisions by day of week are reported in Figure 4-9. The same number of bicycle collisions occurred on Wednesday, Saturday and Sunday (33 collisions) closely followed by Thursday (29 collisions) and then by Tuesday (24 collisions).

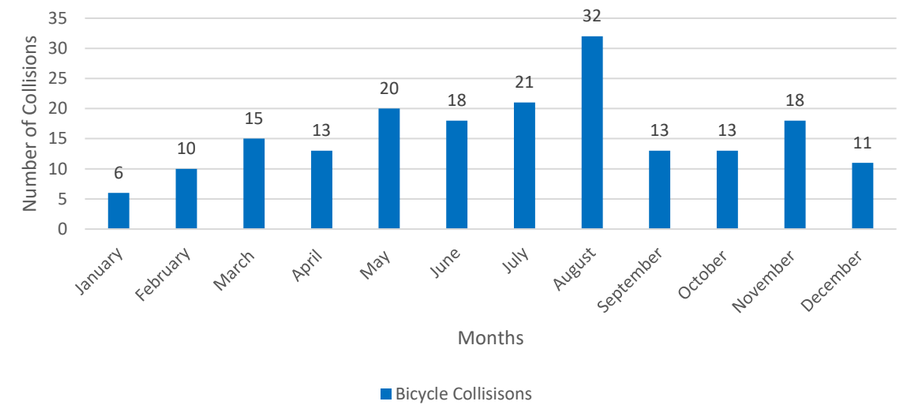
Figure 4-9 Bicycle Collisions by Day of Week (January 2013 – December 2017)



Source: SWITRS (2018)

Figure 4-10 reports bicycle-involved collisions by month. The greatest number of bicycle collisions were reported as occurring in August with July and May also experiencing relatively higher numbers of collisions. January was the month with the lowest number of bicycle collisions.

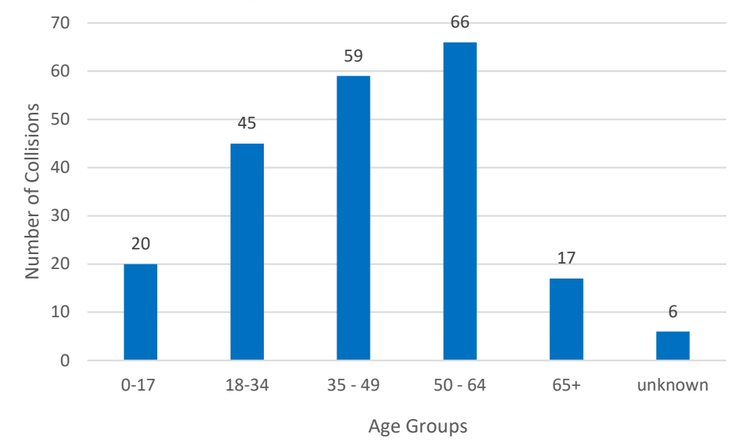
Figure 4-10 Bicycle Collisions by Month (January 2013 – December 2017)



Source: SWITRS (2018)

Bicycle Collisions are shown by age group below in **Figure 4-11**.

Figure 4-11 Bicycle Collisions by Age Group (January 2013 – December 2017)



Source: SWITRS (2018)

As shown in the figure, bicycle collisions are most prevalent in the 50-64 age group, with the 35-49 age group experiencing a high number of collisions as well.

4.3 Collision Severity

Bicycle collisions are summarized by severity in Table 4-8. As shown, a majority of collisions resulted in "Other Visible Injury," at 61.6 percent of all collisions, followed by "Complaint of Pain," at 25.3 percent of all collisions. Three bicycle collisions were fatal, or 1.6 percent of all collisions.

Table 4-8 Bicycle Collision Severity (January 2013 – December 2017)

Collision Severity	Collisions	Percent of Total
Other Visible Injury	117	**61.6%**
Complaint of Pain	48	**25.3%**
Severe Injury	13	**6.8%**
Property Damage Only	9	**4.7%**
Fatality	3	**1.6**
Total	**190**	**100.0%**

Source: SWITRS (2018)

4.4 Gap Analysis

Two types of gap analyses were undertaken and are presented in this chapter. Bicycle Level of Service and Bicycle Level of Traffic Stress were both analyzed. This chapter concludes with a summary of cycling needs in the City of Carlsbad. Areas of need are reflective of those with relatively greater demand and greater deficiency, drawing from the infrastructure review and US Census information in the previous chapter.

Bicycle Level of Service (BLOS)

The City of Carlsbad collected a series of datasets in the Fall of 2017 to develop a comprehensive metric for evaluating Levels of Service for people biking consistent with the criteria established in the 2015 Mobility Element. Known as Bicycle Level of Service, the effort establishes scores for biking on both sides of every street in the City of Carlsbad. Scores are determined based on a composite score using the following criteria:

- Bike Lane Width
- Outside Lane Width
- Bike Lane Buffer Width
- Parking Lane Width
- Percent of Parking Occupied
- Average Daily Traffic
- Estimated Percentage of Trucks
- Pavement Condition

For the purpose of the Citywide SMP, a street score was developed using the average of both directional scores (east+west scores or north+south scores) and is shown in Figure 4-12 and Figure 4-13 below. The Citywide BLOS scores can be seen in Figure 4-11. Figure 4-12 shows a subarea surrounding the Carlsbad Village Station as an example of how the material will be used in the development of the Sustainable Mobility Plan.

Figure 4-12 Bicycle Level of Service

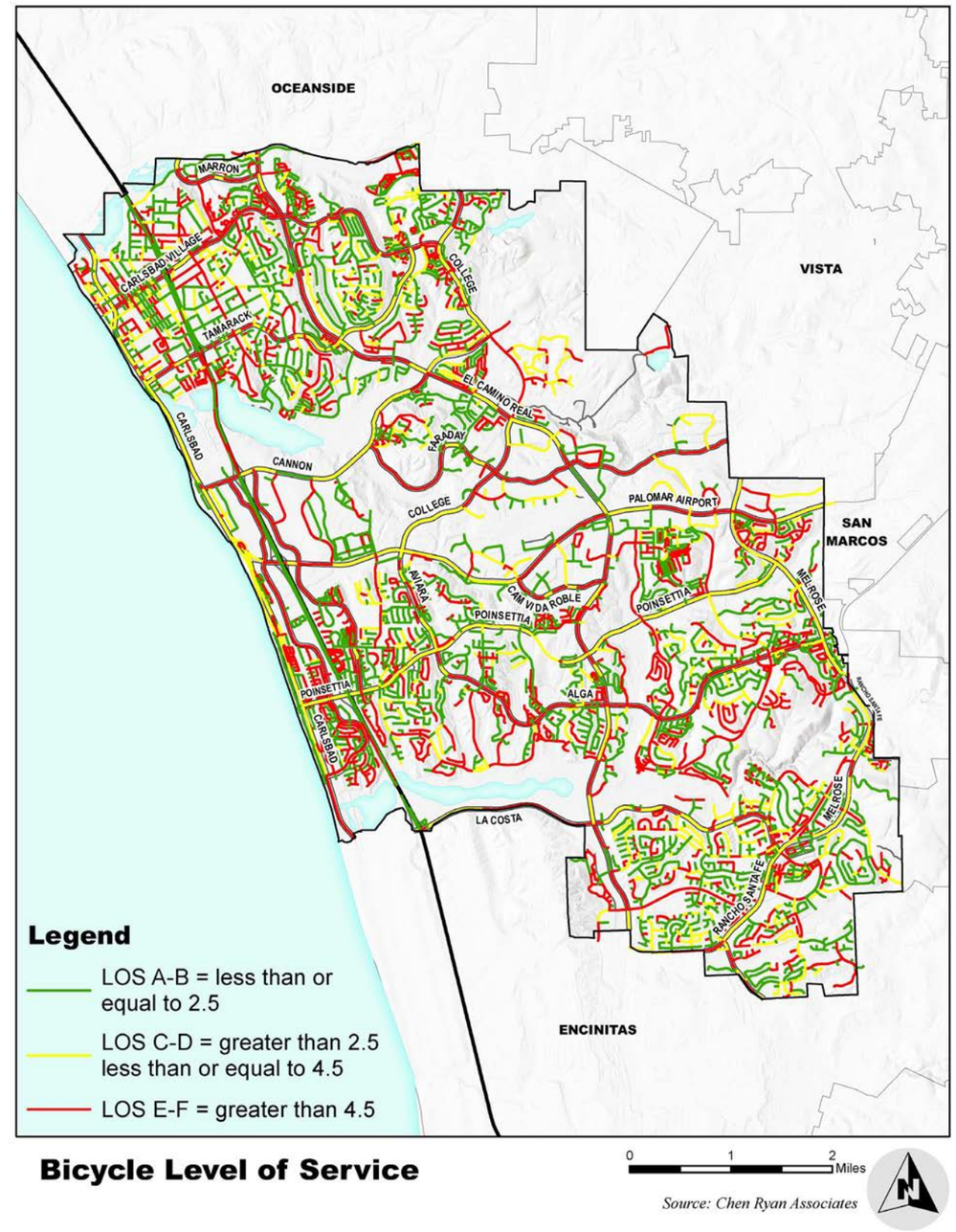
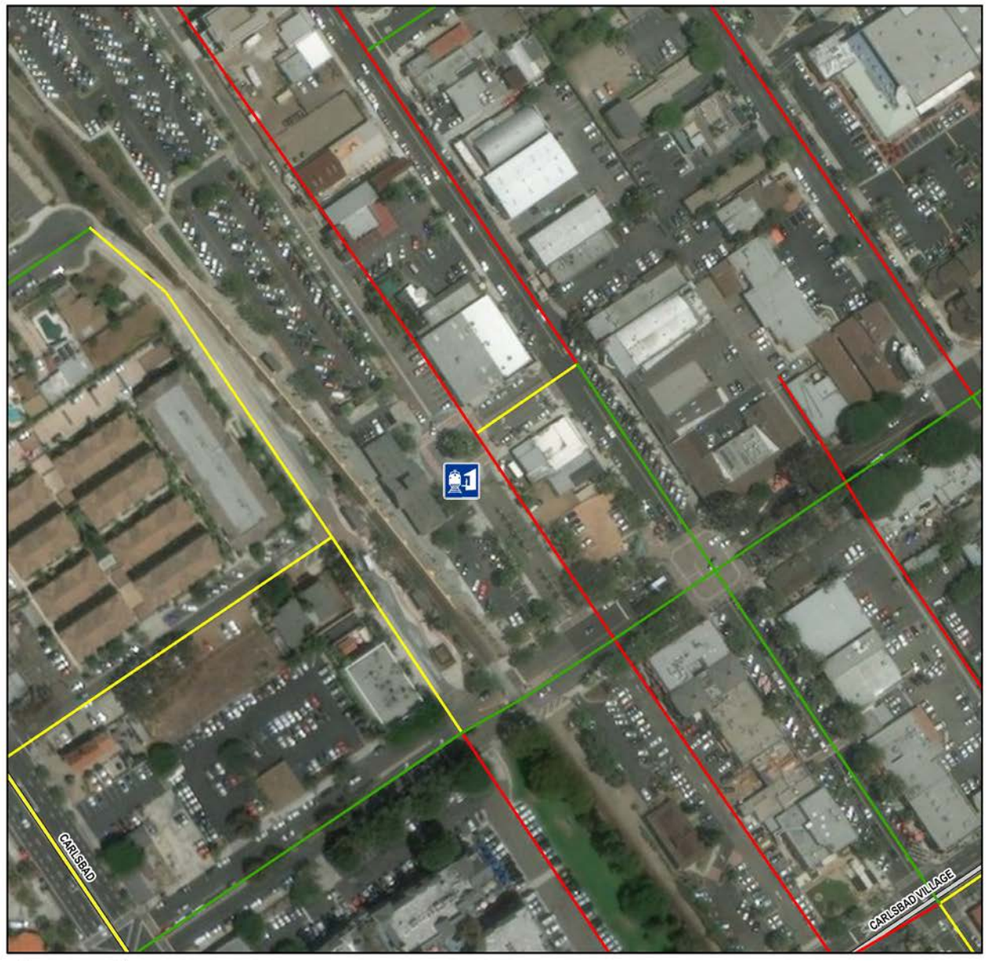


Figure 4-13 Bicycle Level of Service surrounding Carlsbad Village Station



Legend

- Carlsbad Village Station
- Level of Service A/B
- Level of Service C/D
- Level of Service E/F

Bicycle Level of Service

0 250 500 Feet

Source: Chen Ryan Associates

Bicycle Level of Traffic Stress (LTS)

The bicycle environment was assessed using the bicycle Level of Traffic Stress (LTS) methodology for characterizing cycling environments, as developed by Mekuria, et al. (2012) of the Mineta Transportation Institute and reported in *Low-Stress Bicycling and Network Connectivity*. LTS classifies the street network into categories according to the level of stress it causes cyclists, taking into consideration a cyclist's physical separation from vehicular traffic, vehicular traffic speeds along the roadway segment, number of travel lanes, and factors related to intersection approaches with dedicated right-turn lanes and unsignalized crossings.

Table 4-9 identifies the four LTS categories and provides a description of the traffic stress experienced by the cyclist and the environmental characteristics consistent with the category. LTS scores range from 1 (lowest stress) to 4 (highest stress) and correspond to roadways that different populations may find suitable for riding on, considering their stress tolerance. Each LTS classification is associated with a cyclist traffic tolerance category as identified by Portland Bicycle Coordinator Roger Geller and documented in a Portland Bureau of Transportation memo titled *Four Types of Cyclists*.

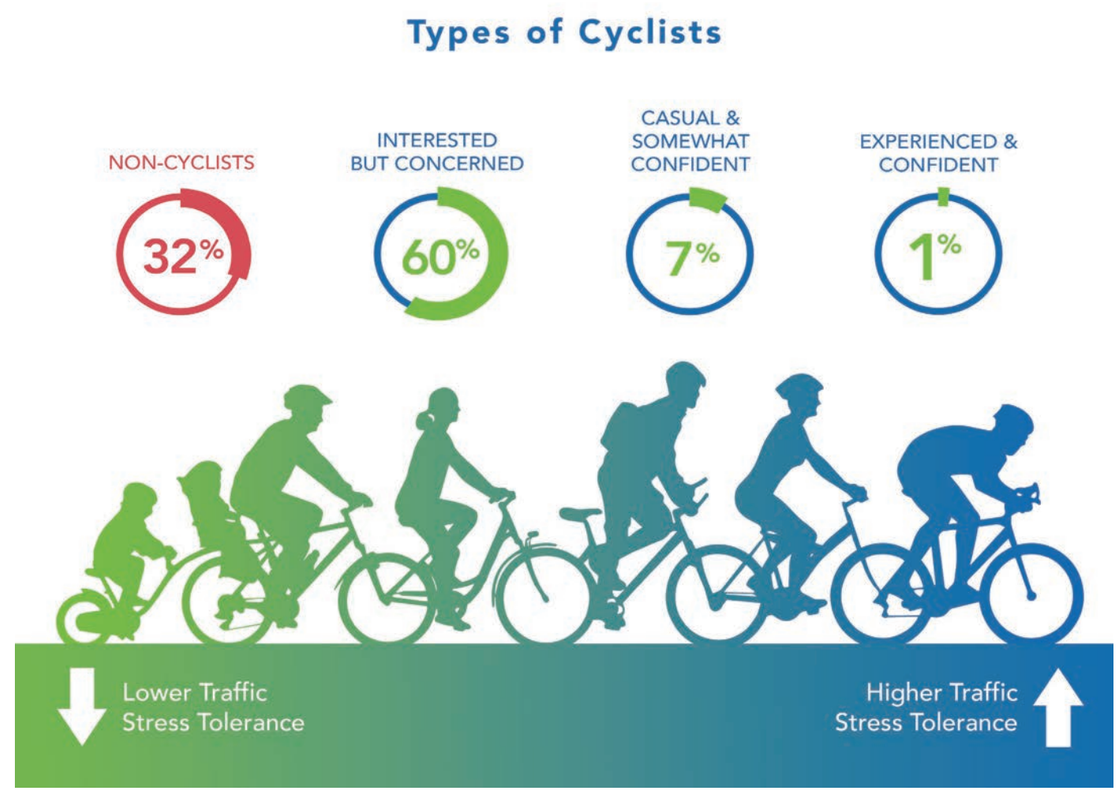
Table 4-9 Level of Traffic Stress Classifications and Descriptions

Level of Stress Category	Level of Stress Description	Collisions	Cyclist Comfort Level
LTS 1	Presenting little traffic stress and demanding little attention from cyclists; suitable for almost all cyclists, including children trained to safely cross intersections.	▪ Facility that is physically separated from traffic or an exclusive cycling zone next to a slow traffic stream with no more than one lane per direction ▪ A shared roadway where cyclists only interact with the occasional motor vehicle with a low speed differential ▪ Ample space for cyclist when alongside a parking lane ▪ Intersections are easy to approach and cross	Interested but Concerned – Vulnerable Populations
LTS 2	Presenting little traffic stress but demanding more attention that might be expected from children.	▪ Facility that is physically separated from traffic or an exclusive cycling zone next to a well-confined traffic stream with adequate clearance from parking lanes ▪ A shared roadway where cyclists only interact with the occasional motor vehicle (as opposed to a stream of traffic) with a low speed differential ▪ Unambiguous priority to the cyclist where cars must cross bike lanes (e.g. at dedicated right-turn lanes); design speed for right-turn lanes comparable to bicycling speeds ▪ Crossings not difficult for most adults	Interested but Concerned – Mainstream Adult Populations
LTS 3	Presenting enough traffic stress to deter the Interested but Concerned demographic	▪ An exclusive cycling zone (lane) next to moderate-speed vehicular traffic ▪ A shared roadway that is not multilane and has moderately low automobile travel speeds ▪ Crossings may be longer or across higher-speed roadways than allowed by LTS 2, but are still considered acceptably safe to most adult pedestrians	Enthused & Confident
LTS 4	Presenting enough traffic stress to deter all but the Strong & Fearless demographic	▪ An exclusive cycling zone (lane) next to high-speed and multilane vehicular traffic ▪ A shared roadway with multiple lanes per direction with high traffic speeds ▪ Cyclist must maneuver through dedicated right-turn lanes containing no dedicated bicycling space and designed for turning speeds faster than bicycling speeds	Strong & Fearless

Source: Mekuria, et al., 2012; Chen Ryan Associates, 2018

Figure 4-14 visually depicts the Four Types of Cyclists. The first category, the "Non-Cyclists" are people who, for a variety of reasons, would never get on a bicycle for any reasons; about 32% of the population identifies with this category. The second category, the "Interested But Concerned," as are people who would like to ride their bike, but are cautious; this category of cyclist prefers facilities that have little traffic stress. Approximately 60% of the population falls into this category. As the largest category, this is the category which is taken into consideration when recommending and designing facilities. The third category is referred to as either "Enthused and Confident" or "Causal and Somewhat Confident" category. Approximately 7% of the population falls into this category. The final category is referred to as the "Strong & Fearless" or the "Experienced & Confident"; these are the cyclists who are willing to ride their bicycles regardless of the facilities. Approximately 1% of the population falls into this category.

Figure 4-14 Four Types of Cyclists



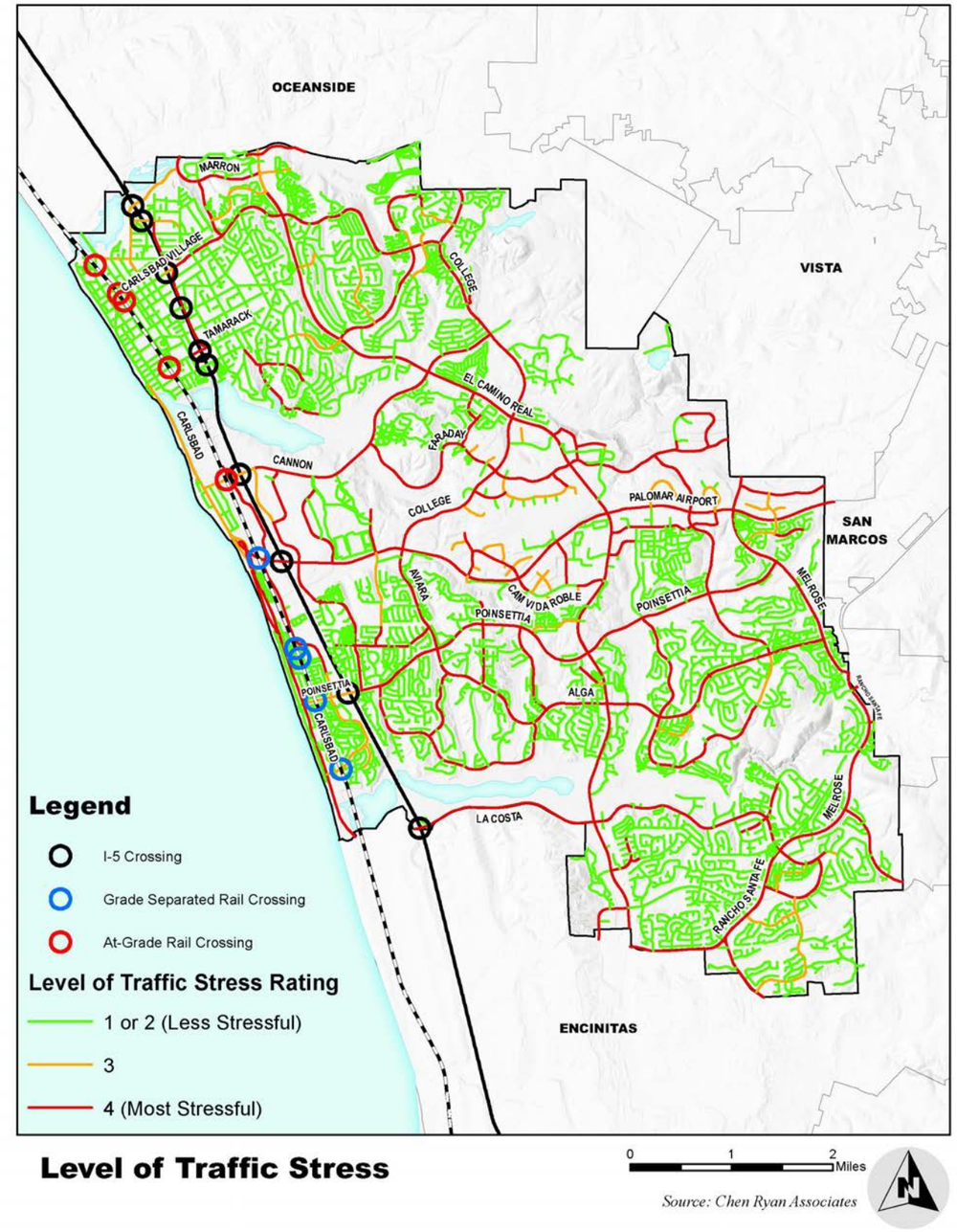
As noted in Table 4-9, each category of cyclists is comfortable with a certain level of traffic stress.

Figure 4-15 below displays the bicycle Level of Traffic Stress results for all roadways and paths where cyclists are permitted. As shown, roadways in the City of Carlsbad predominantly exhibit characteristics of LTS 1/ 2 or 4 environments. Roadways with an LTS 1 or 2 environment are generally residential streets and collectors. These types of roadways are generally characterized as having one lane in each direction while providing adequate width for cyclists and vehicles, with a low posted speed.

A number of roadways in the city offer an LTS 3 environment. In these cases, speed limits, vehicular volumes, and roadway widths were sufficient to garner an LTS score which has room for improvement relative to most roadway conditions in the City, but would still not be deemed comfortable enough for an average cyclist.

Figure 4-16 shows the percent of census block groups which are accessible by a low stress connection. As can be seen, there are large portions of the city which are not accessible by low stress connections. Additionally, there a number of destinations which are not accessible via a low stress connection.

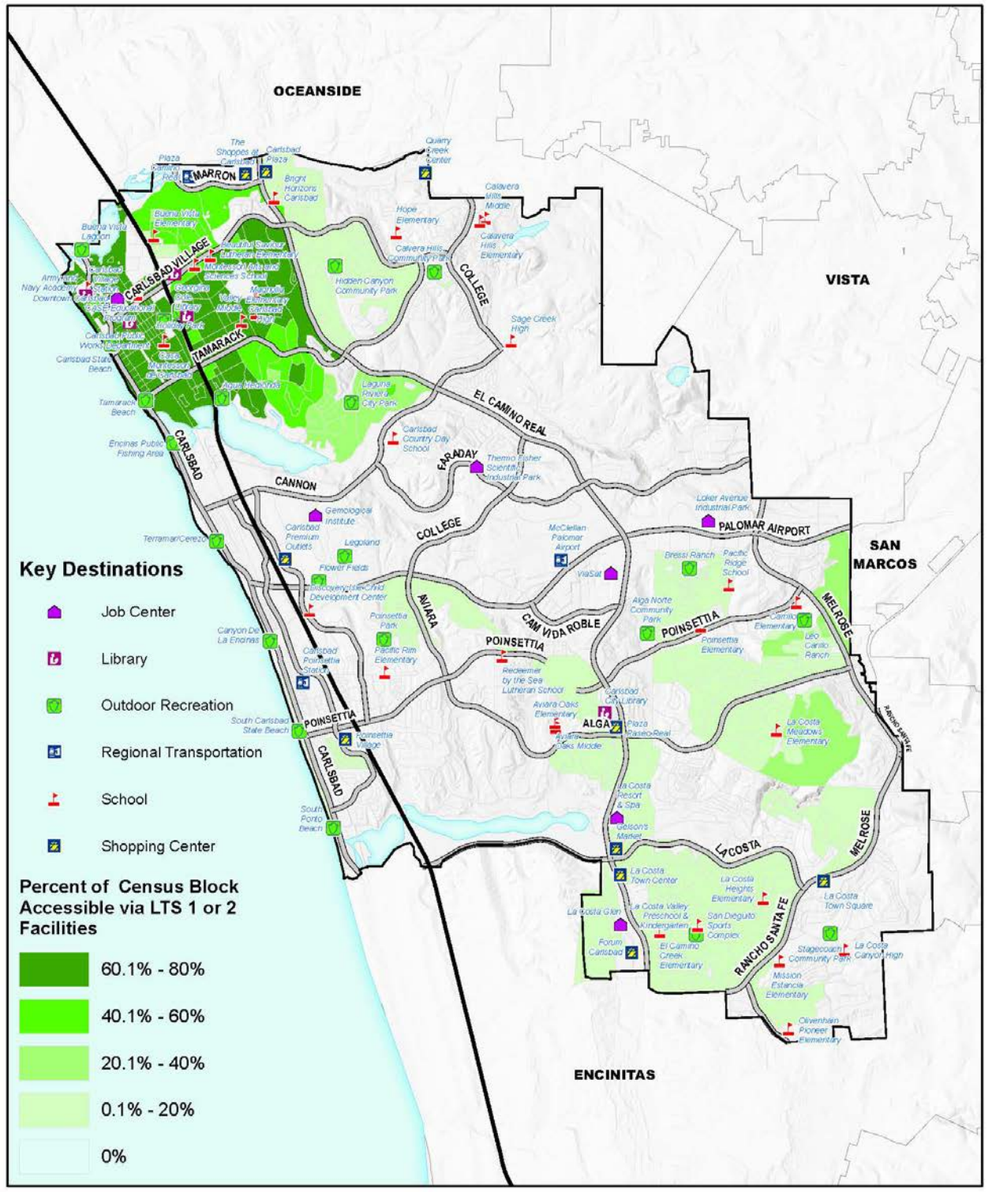
Figure 4-15 Level of Traffic Stress



Level of Traffic Stress

Source: Chen Ryan Associates

Figure 4-16 Low Stress Bicycle Connectivity by Census Block Group



Low Stress Bicycle Connectivity by Census Block Group

0 1 2 Miles

Source: City of Carlsbad; Chen Ryan Associates

5.0 People in Transit

5.1 Network Summary

5.1.1 Existing Transit Routes & Ridership

Transit service in the City of Carlsbad is provided by North County Transit District (NCTD), consisting of COASTER commuter rail, BREEZE fixed route bus service, and LIFT demand response service. SPRINTER light rail service is also offered, but has no service within the City of Carlsbad.

As shown in Figure 5-1, NCTD operates seven bus routes in the City of Carlsbad. Headways defines the amount of time between buses; a 30-minute headway indicates that the bus arrives every 30-minutes.

Figure 5-2 shows the bus stop amenities by color coding. As can be seen, there are a number of stops which offer different level of amenities ranging from a bus shelter with lighting to stops which neither have lighting, a shelter or a bench. The bus stops and amenities are itemized below in Table 5-1.

Table 5-1 NCTD Bus Stops and Amenities in the City of Carlsbad

Stop Amenity	Quantity of Stops
Stops with Shelters and lighting	15
Stops with benches and lights	65
Stops with benches but no lights	47
Stops with lighting only	103
Stops without benches	112
Total Stops	**342**

Source: Chen Ryan Associates (2018)

Figure 5-3 shows average daily NCTD ridership rates within the City of Carlsbad. As can be seen, there is a greater amount of ridership in the northern portion of the city. There is also a higher ridership rate surrounding the Coaster Station and on College Boulevard close to El Camino Real and again on El Camino Real. The areas that show higher transit ridership rates on College Boulevard and El Camino Real also correspond to the areas of higher employment density in Figure 5-4.

Figure 5-4 shows employment density by census block group. This map clearly depicts that the main employment areas are located in the geographic middle of the City of Carlsbad, with smaller areas of employment in Carlsbad Village, and the area surrounding Marron Road.

Figure 5-5 shows the NCTD Breeze's annual activity, in other words the hours of operation by routes, in relation to City of Carlsbad's employment centers. The layering of the employment density and the annual operation of NCTD's Breeze brings to light a discrepancy between the main areas of employment, which are located in the geographic center of the city, stretching from west to east, and the most frequently operated transit service which spans north to south.

Figure 5-1 NCTD Fixed Routes Service in the City of Carlsbad

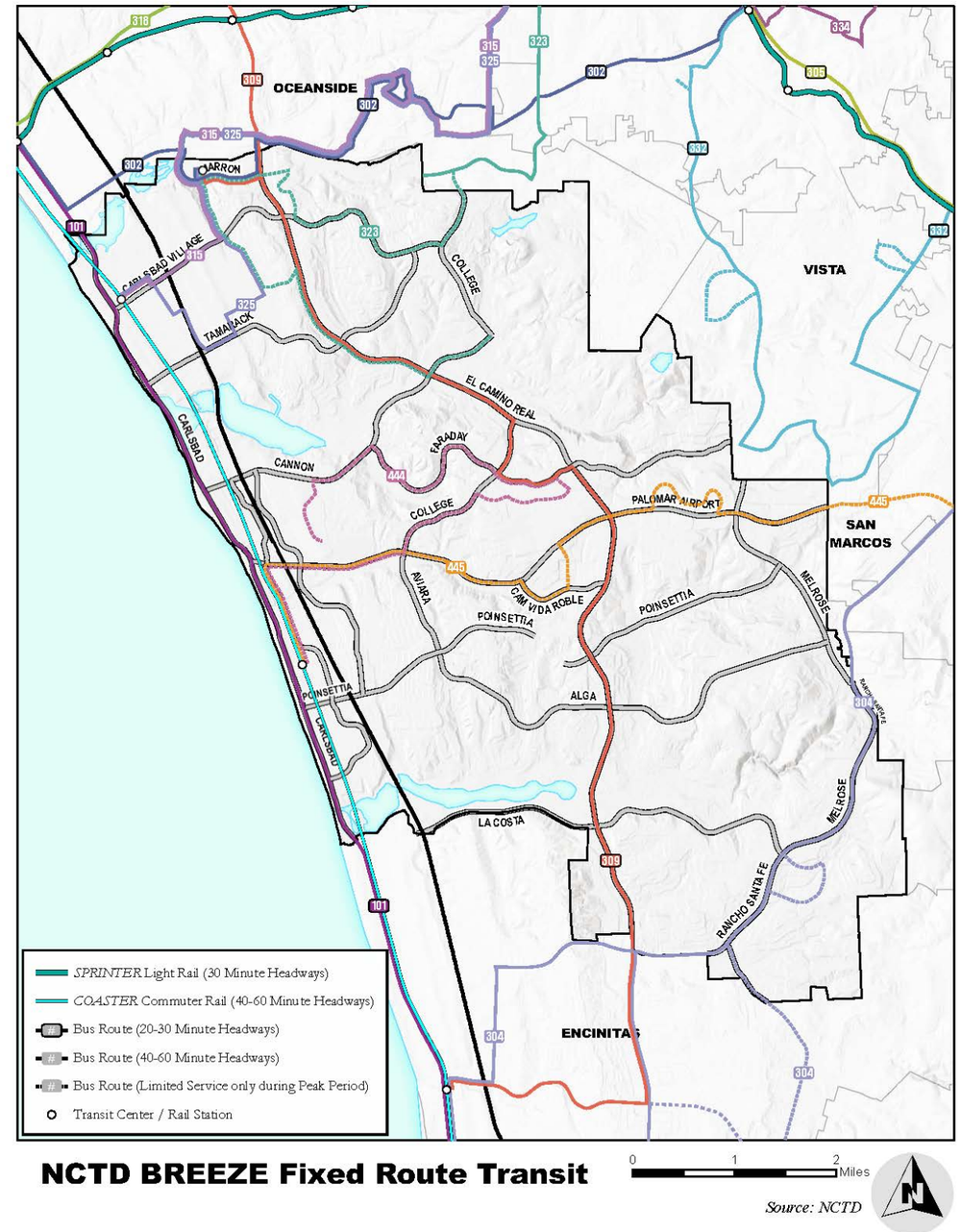
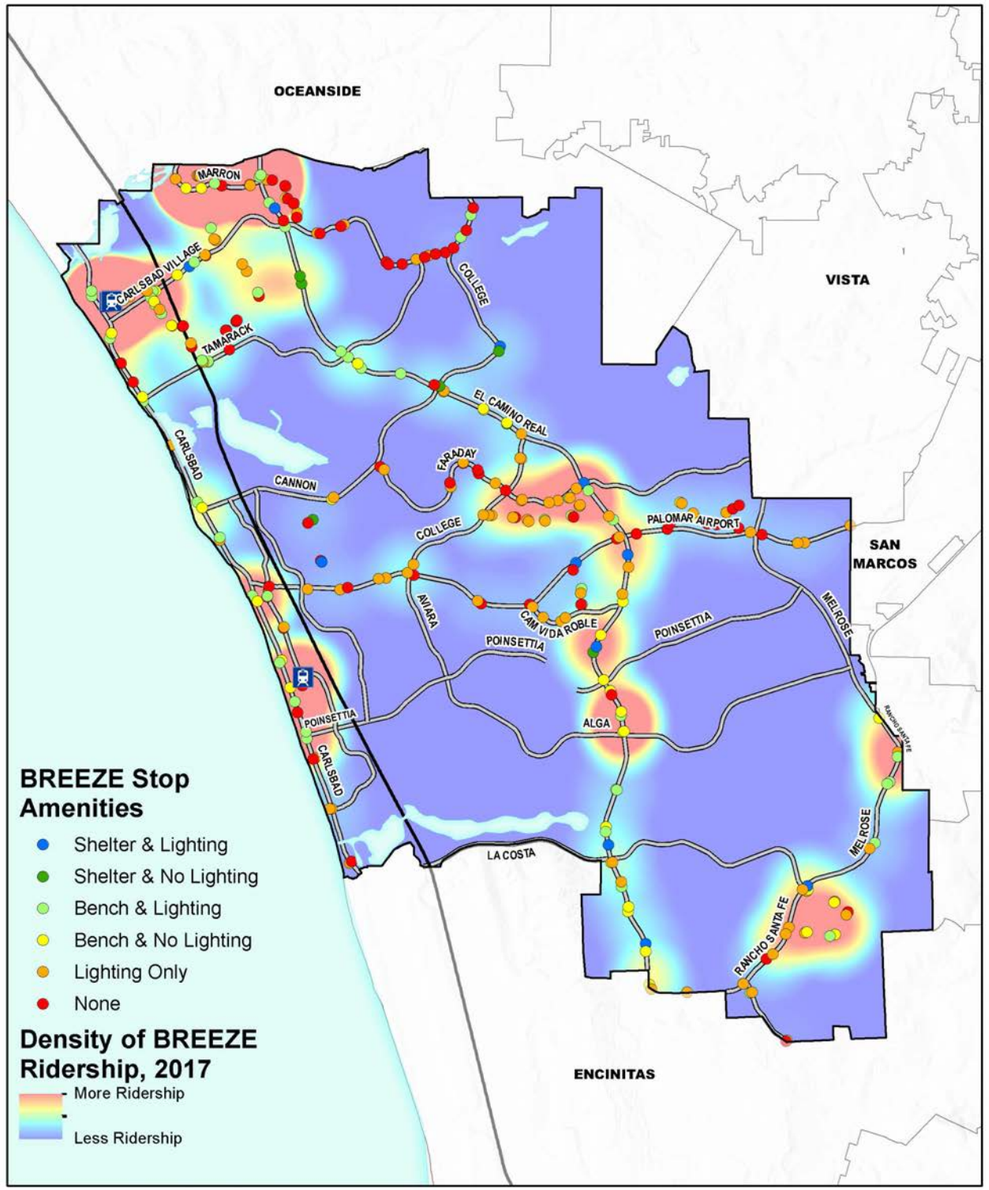


Figure 5-2 NCTD Bus Stop Amenities

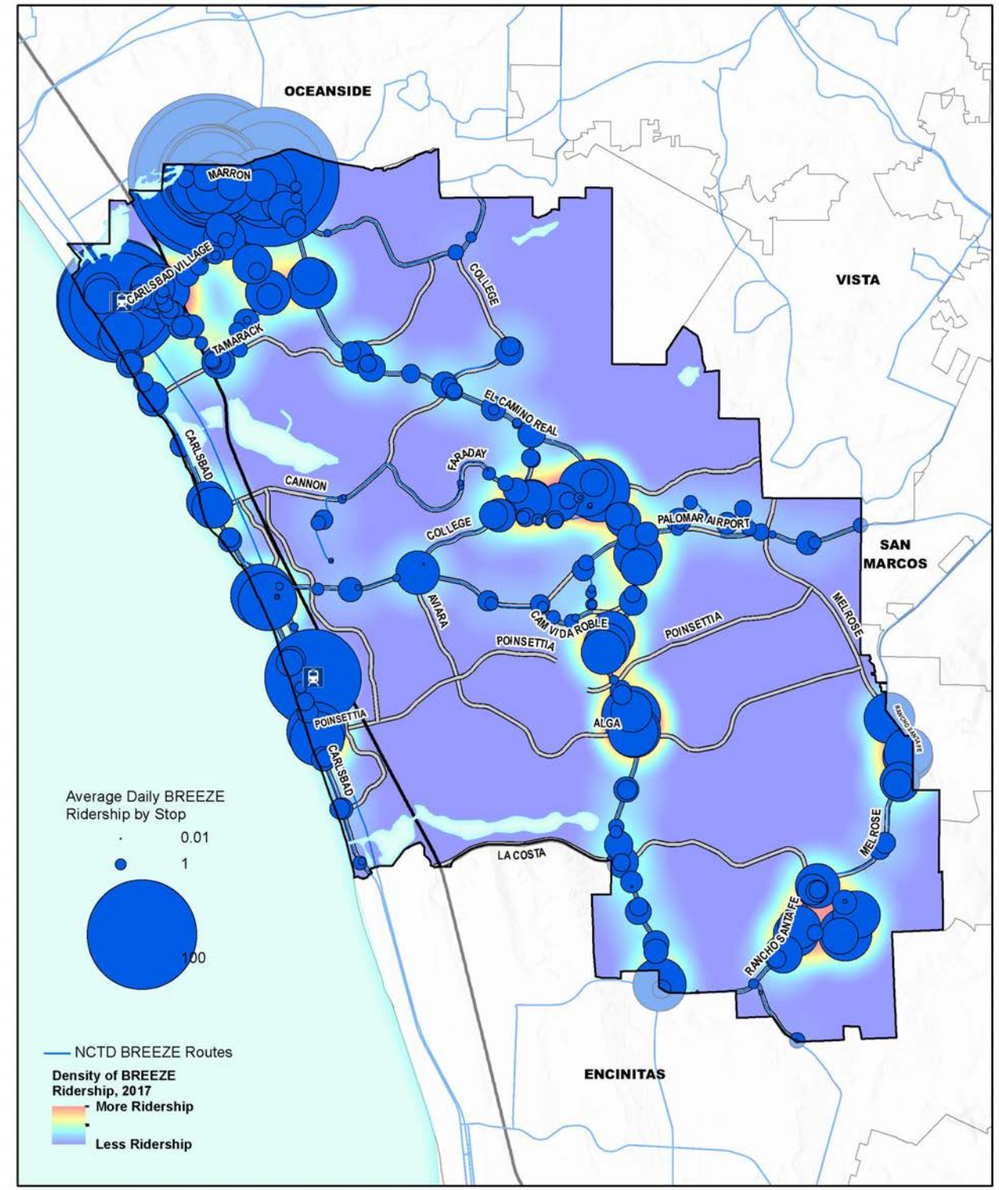


NCTD BREEZE Stop Amenities

0 1 2 Miles

Source: NCTD

Figure 5-3 Average Daily Ridership

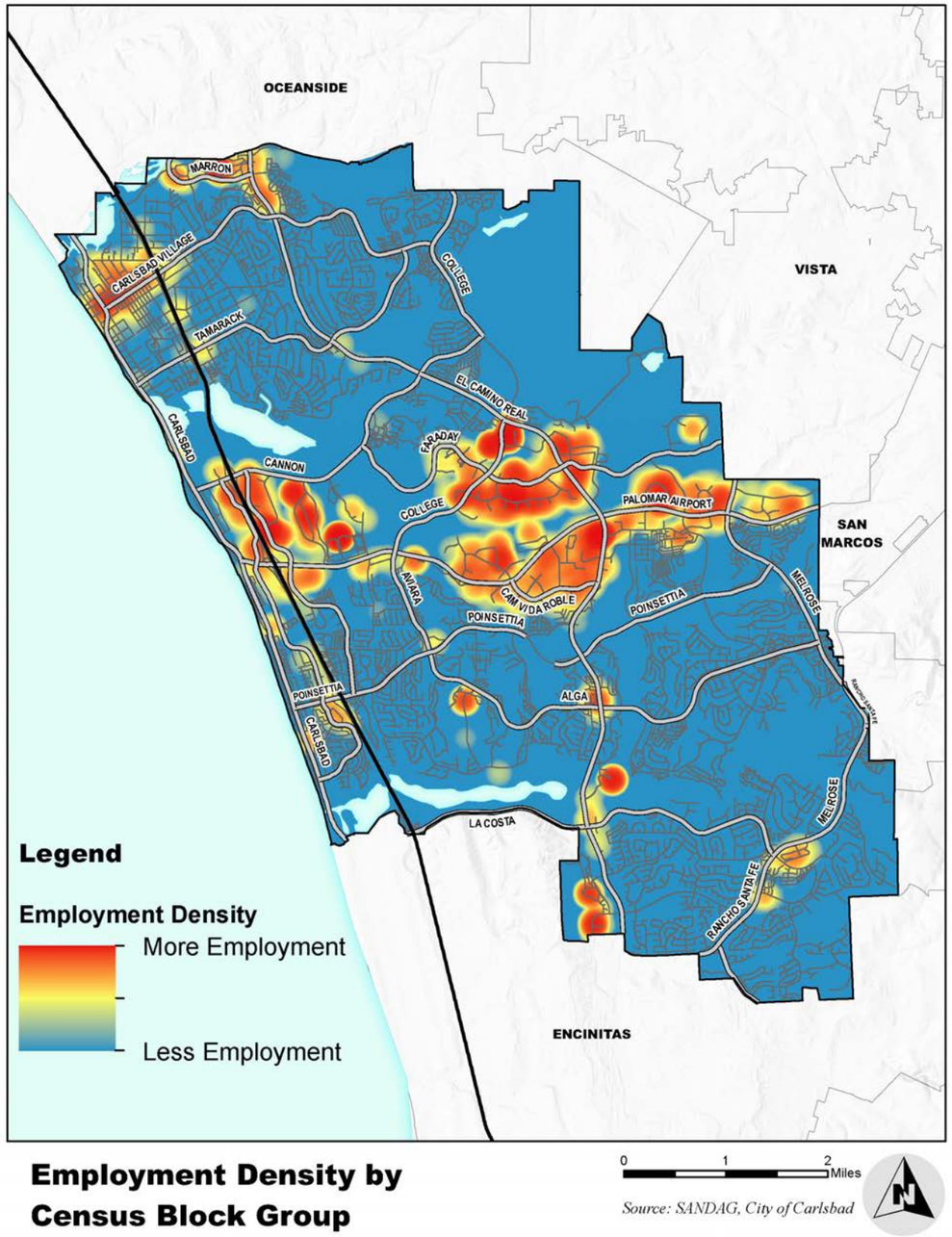


NCTD BREEZE Average Daily Ridership

0 1 2 Miles

Source: NCTD, 2017

Figure 5-4 Employment Density by Census Block Group

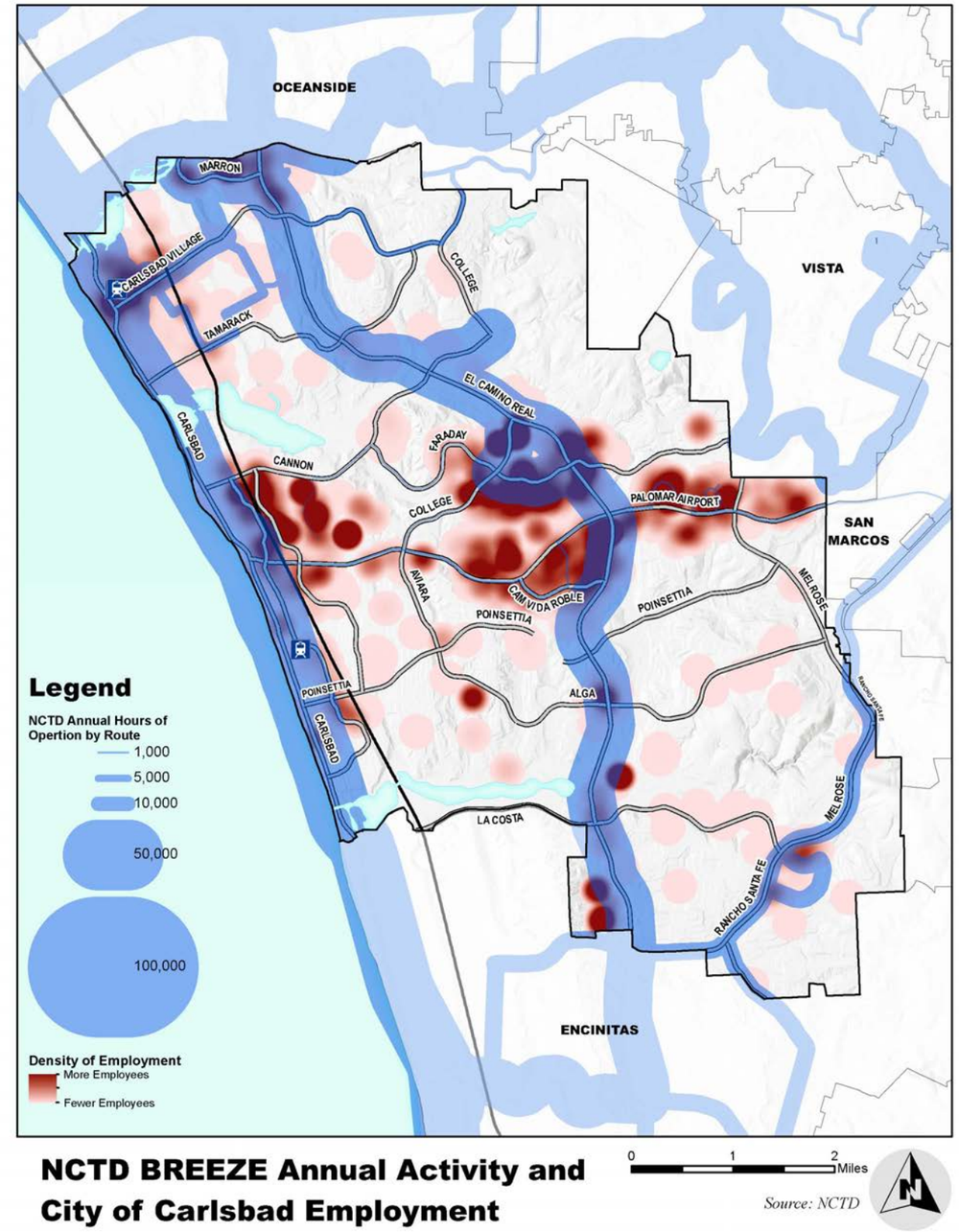


Employment Density by Census Block Group

0 1 2 Miles

Source: SANDAG, City of Carlsbad

Figure 5-5 NCTD Breeze Annual Activity and City of Carlsbad Employment Centers



NCTD BREEZE Annual Activity and City of Carlsbad Employment

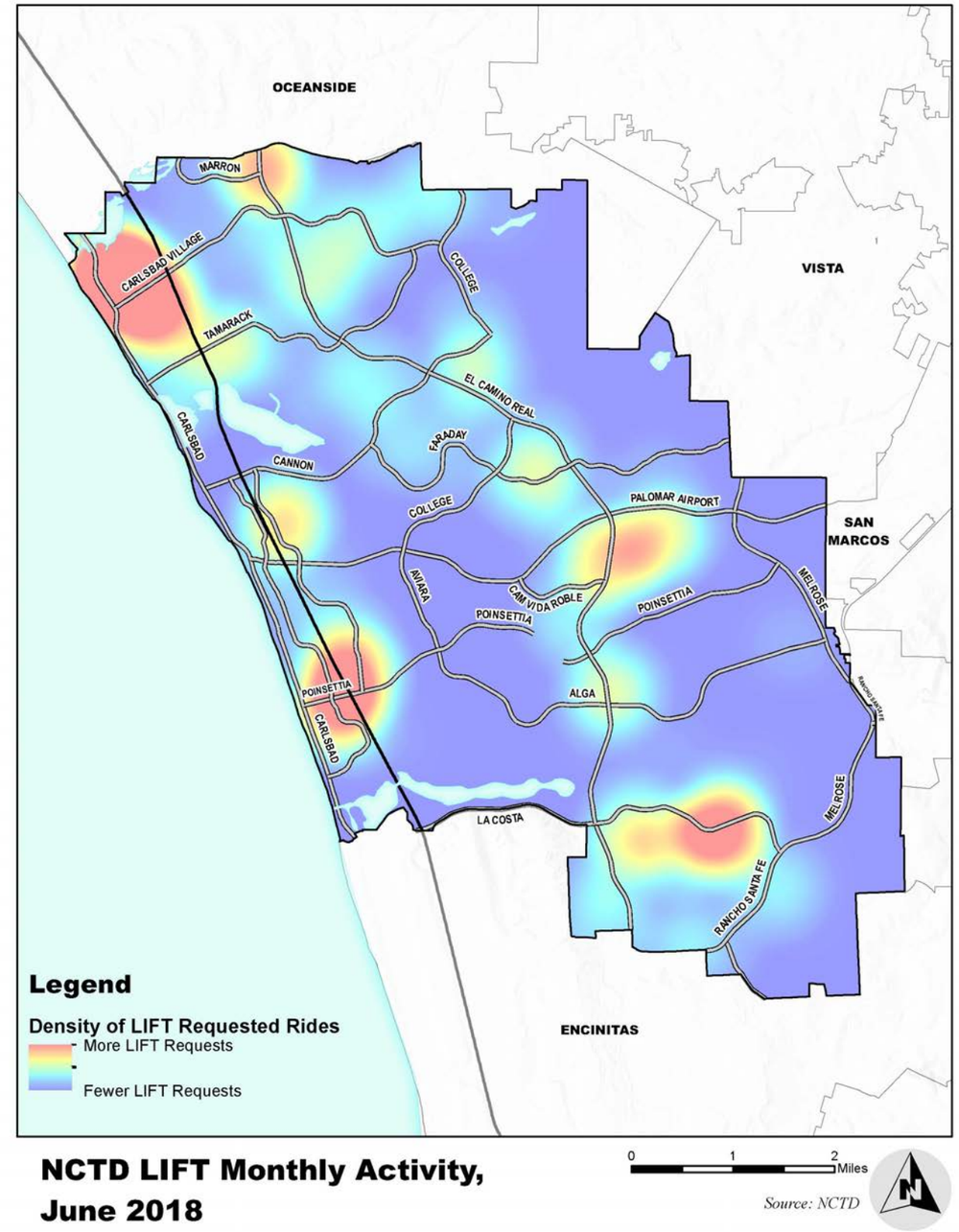
0 1 2 Miles

Source: NCTD

5.1.2 Paratransit

NCTD's paratransit operates under the name of LIFT. LIFT provides origin-to-destination service for people with disabilities. However, LIFT service is only provided within a defined service area. The service area is defined in NCTD's LIFT Paratransit Rider's Guide (July 1, 2017). The service area in which LIFT operates is within ¾ mile of a fixed bus route or SPRINTER rail station. SPRINTER is the light rail operated by NCTD which runs between Oceanside and Escondido. Figure 5-6 shows lift activity for the month of June 2018 as a representative sample.

Figure 5-6 NCTD LIFT Monthly Activity, June 2018



5.2 Gap Analysis

5.2.1 Transit Access Needs Model

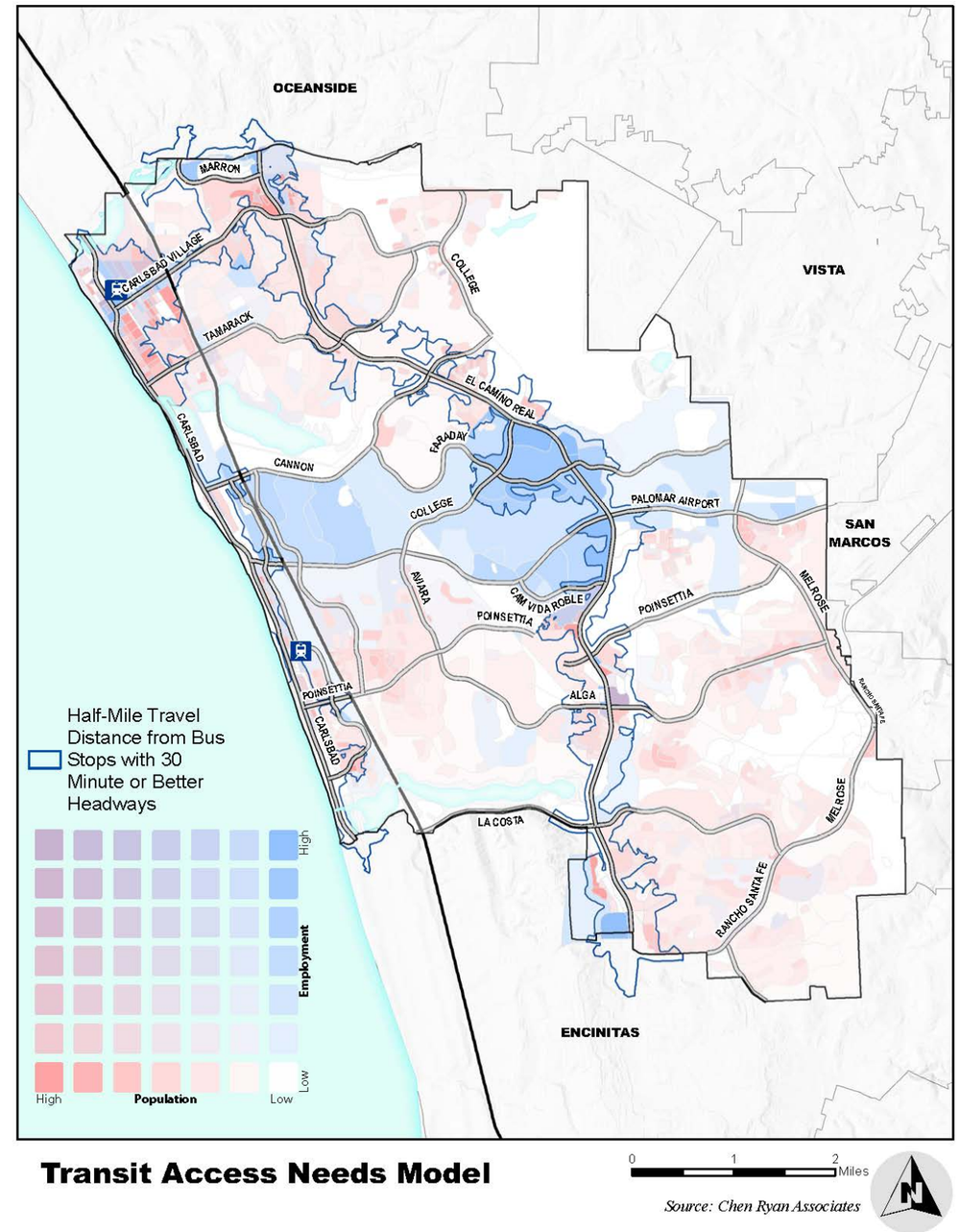
Figure 5-7 shows a composite of population and employment density overlaid with where regular transit service (headways of every 30 minutes) is provided in the city. Population and employment density are displayed in red shades and blue shades, respectively. Purple shades identify locations with a mixture of population and employment.

As shown, there are two north-south corridors which traverse the entire extents of the City with regular transit service: Carlsbad Boulevard – served by Route 101 and El Camino Real – served by Route 309. Grand Avenue in Carlsbad Village and Monroe Street in a portion of Old Carlsbad also have regular transit frequency provided by Routes 315 and 325, which are two routes of 60-minute headways alternating every 30 minutes with predominantly the same alignment, with a brief deviation in Old Carlsbad to provide coverage to different parts of that neighborhood. Routes 309 and 315/325 converge at the Plaza Camino Real (*Shoppes at Carlsbad*) Transit Center. Most of Carlsbad Village is within a half-mile walking distance of regular transit service, as this is where Routes 101 and 315/325 converge near Carlsbad Village Station.

Population and employment density are largely segregated within the city, with the exception of Carlsbad Village, where some blending of population and employment occur as a result of the greater diversity of land uses. Employment-based land uses such as office and light industrial parks are dominant in the central belt of the city, clustered along Palomar Airport Road, El Camino Real and Faraday Avenue. Paradoxically, while Palomar Airport Road corridor traverses the densest employment areas within the city, transit service and access to transit is difficult to provide effectively due very few of the land uses along this corridor providing frontages or access points along Palomar Airport Road. Providing better transit access for the land uses along Palomar Airport Road will require deviations, such as those in the alignment of Route 445 at Loker Avenue, which increase the travel time of the transit vehicle.

As noted, a strength of the system is that most of Carlsbad Village is within a half-mile walk of regular transit service. A weakness of the system is that while the bulk of the employment is clustered along Palomar Airport Road, El Camino Real and Faraday Avenue, however there is limited transit service and transit access on these corridors.

Figure 5-7 Transit Access Needs Model



Transit Access Needs Model

6.0 People in School

To lay the ground work for future Safe Routes to School (SRTS) efforts within the city, field data were collected within the immediate vicinity of twenty schools in the Carlsbad Unified School District. The twenty schools were selected based upon a combination of factors, which included ensuring that data collection efforts covered an even geographic distribution throughout the City, reached a combination of primary, middle, and high schools to serve student populations of all ages, as well as City staff input.

Schools were visited on a standard weekday during the drop-off and pick-up periods before and after school hours. Data were recorded in an ArcGIS-compatible field application. The data collected by these field visits encompassed several aspects of the roadway environment:

- The presence or lack of safety-related roadway features (including speed limits, congestion, roadway maintenance needs, or the presence of bike lanes)
- Crossing-related issues (such as a lack of time to cross the street safely, drivers not yielding to pedestrians, faded crosswalk paint, or missing curb ramps)
- Sidewalk issues (including missing, narrow, and uneven pavement, or sidewalks that are unlit at night), and
- Unsafe behavioral issues on the part of pedestrians, cyclists, and motorists.

Additionally, the data collection process served as a means of verifying school features such as bus loading areas, drop-off locations, school driveway locations, bike racks, and the presence of crossing guards, safety patrol or temporary traffic control. Additionally, the process served as field verification of sidewalk coverage for a half-mile around each school (also known as a walkshed), as well as along adjacent streets designated as "School Streets" by the City of Carlsbad.

6.1 School Profiles

Each of twenty schools which had a site visit has a school profile. The school profiles reflect the field observations and include information regarding the roadway classifications and the collision history in the area. The schools are presented in alphabetical order as Figure 6-1 through Figure 6-20.

Figure 6-1 Aviara Oaks Elementary School Profile

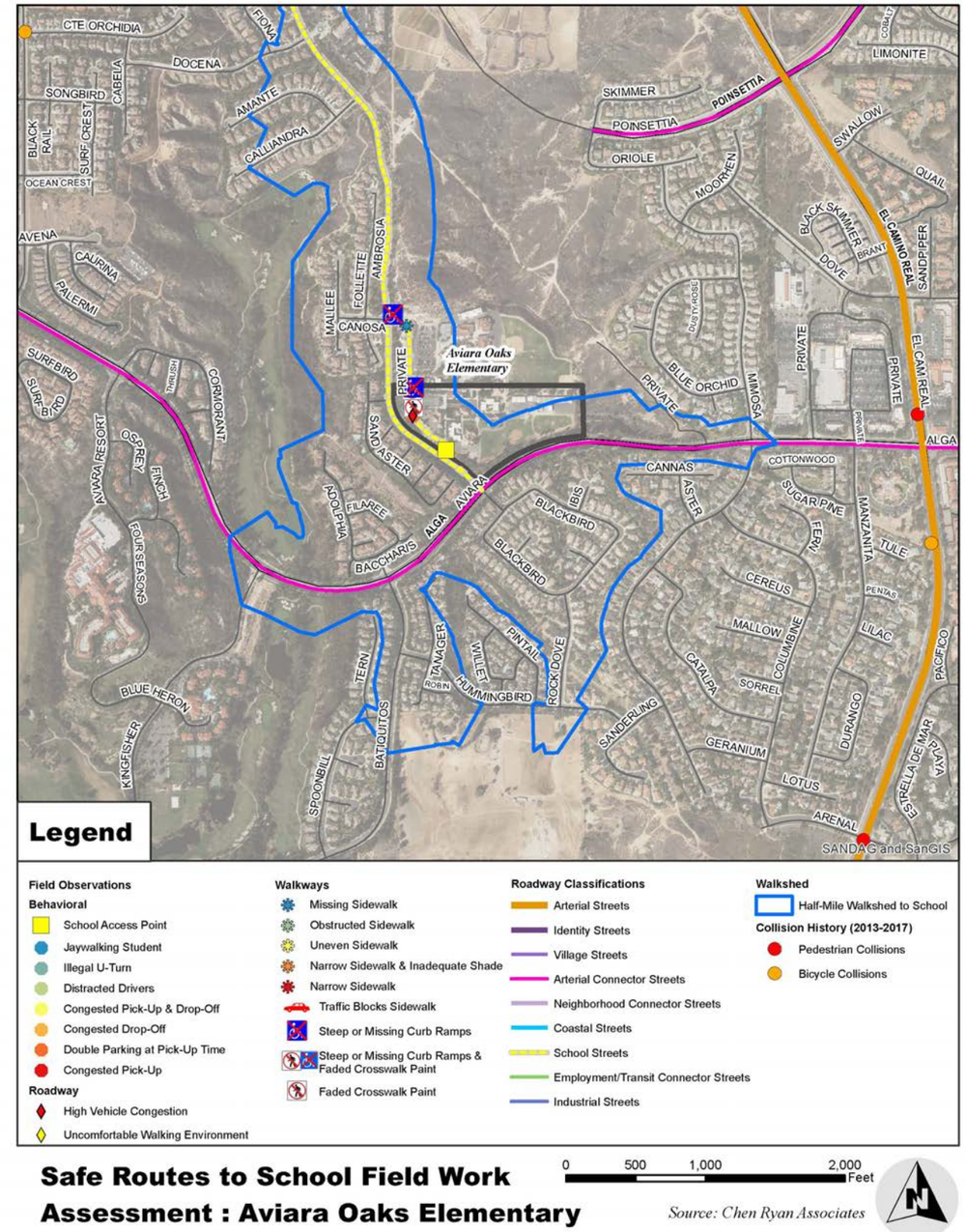
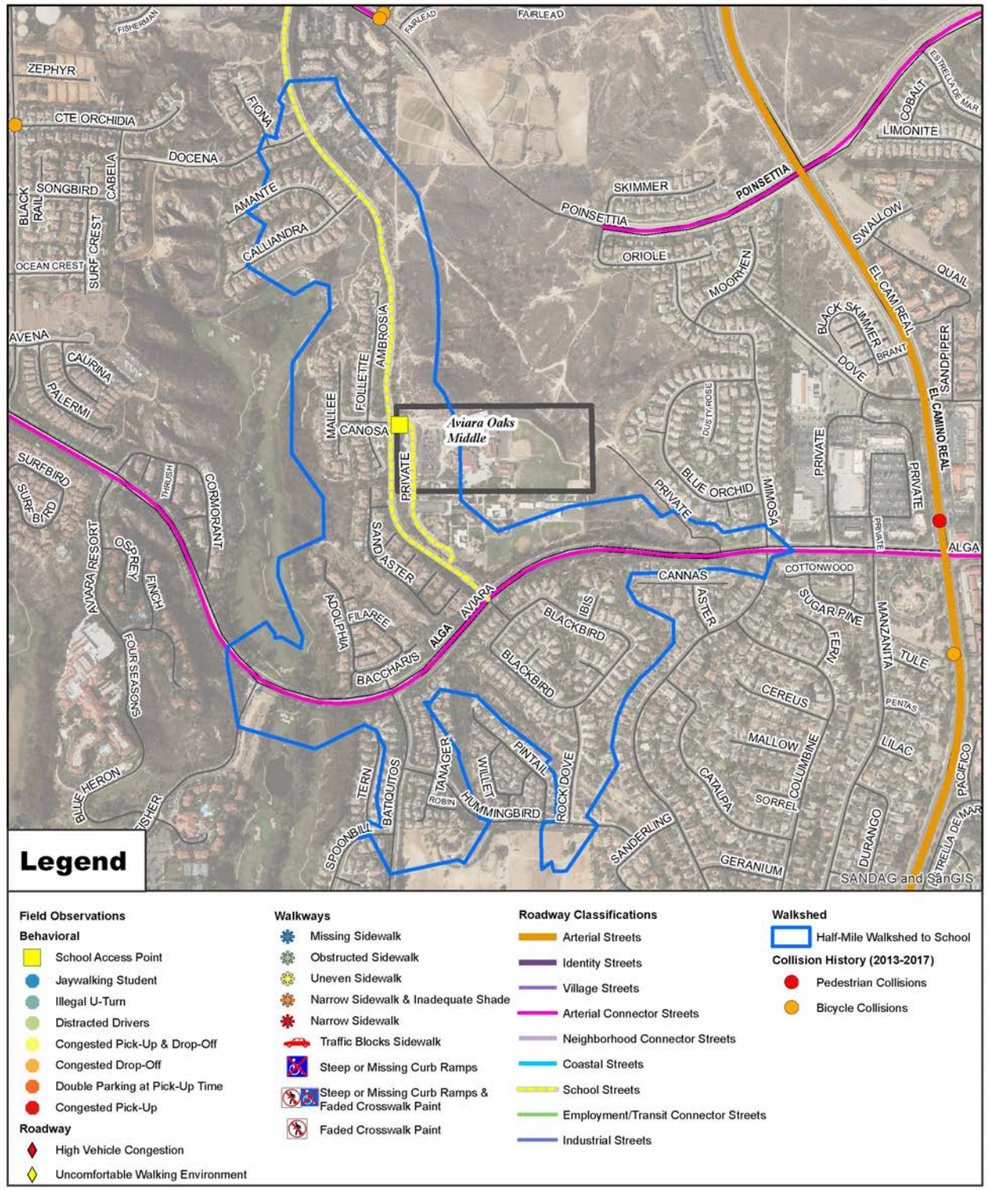


Figure 6-2 Aviara Oaks Middle School Profile

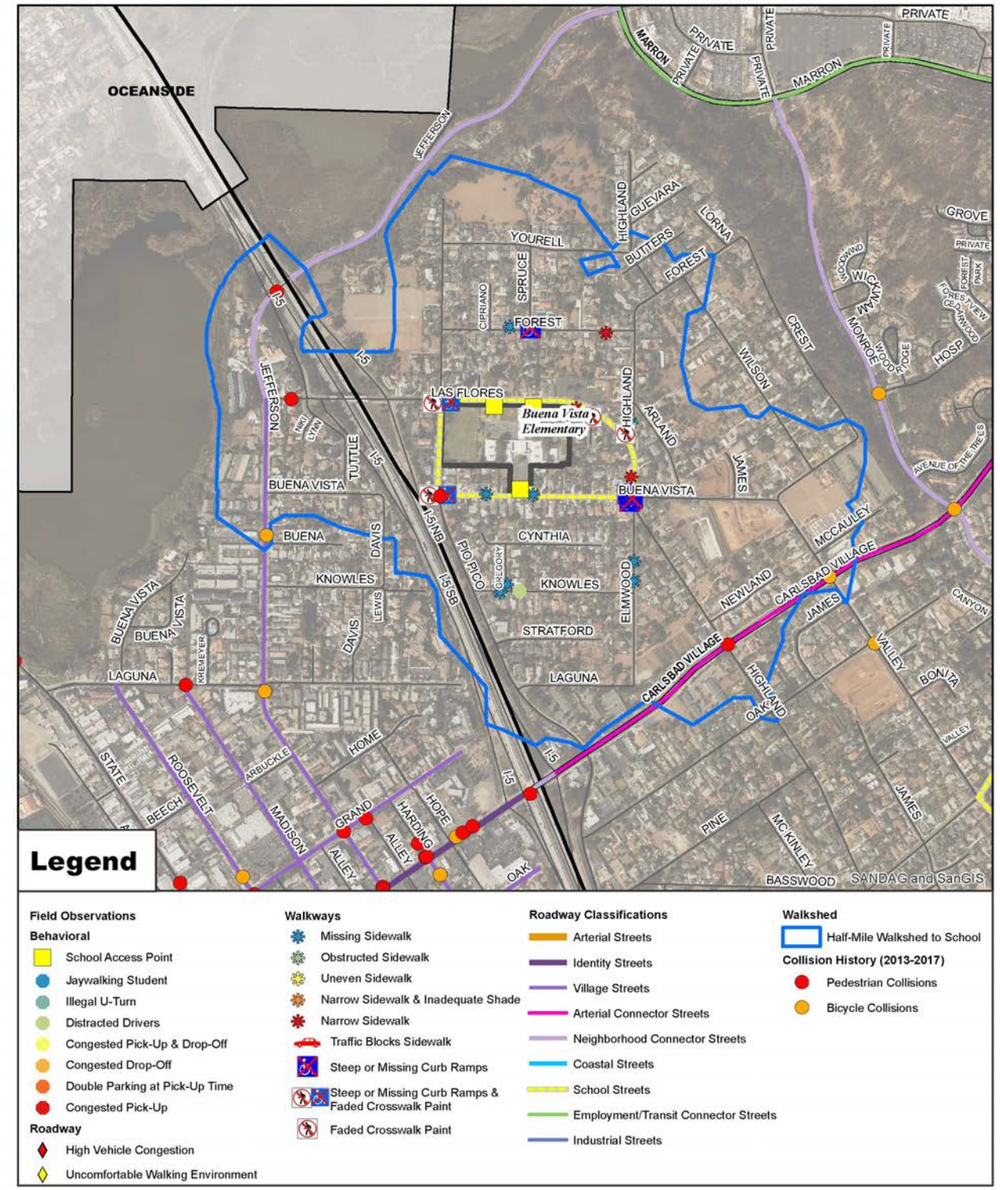


Safe Routes to School Field Work Assessment : Aviara Oaks Middle

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-3 Buena Vista Elementary School Profile

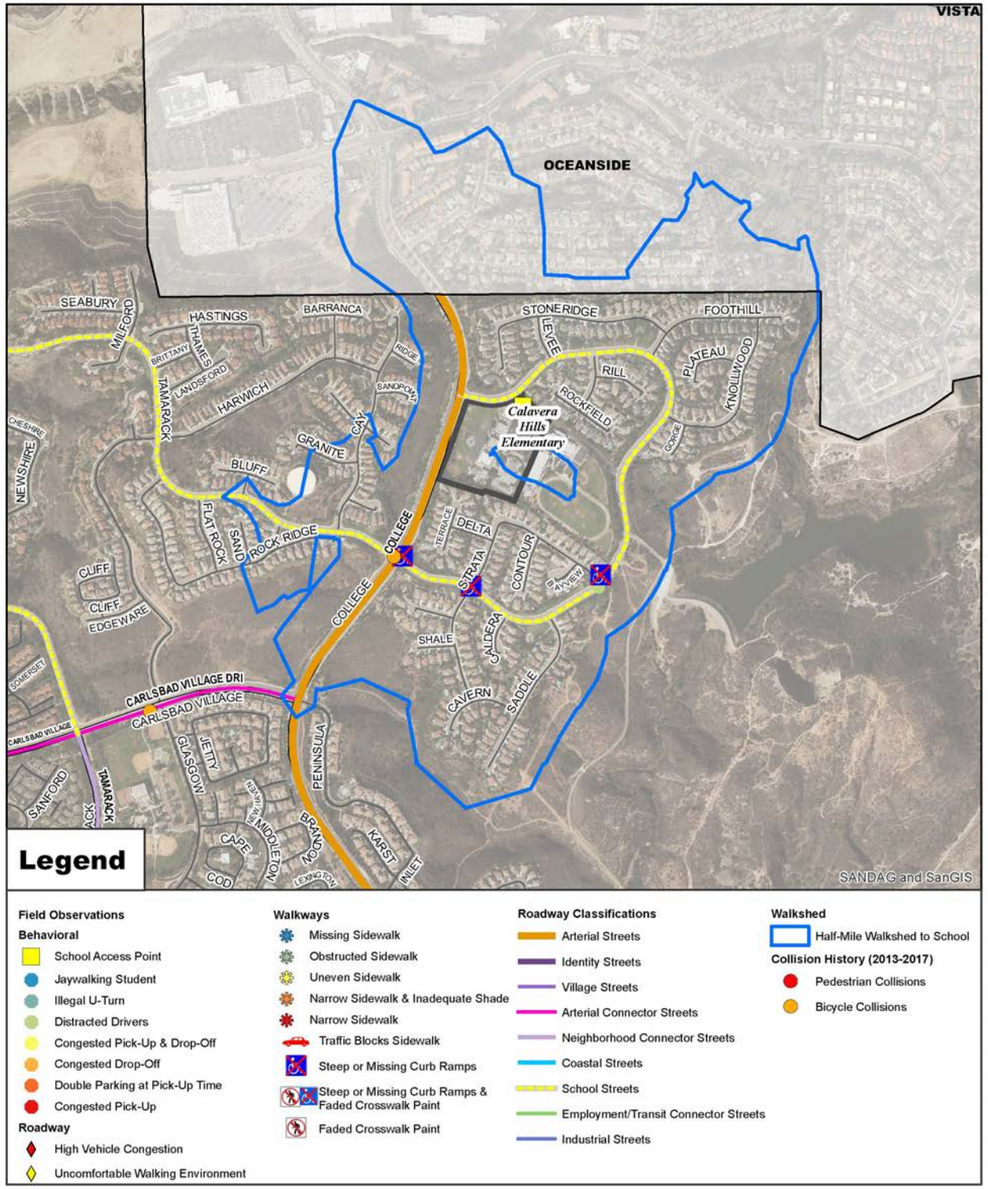


Safe Routes to School Field Work Assessment : Buena Vista Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-4 Calavera Hills Elementary School Profile

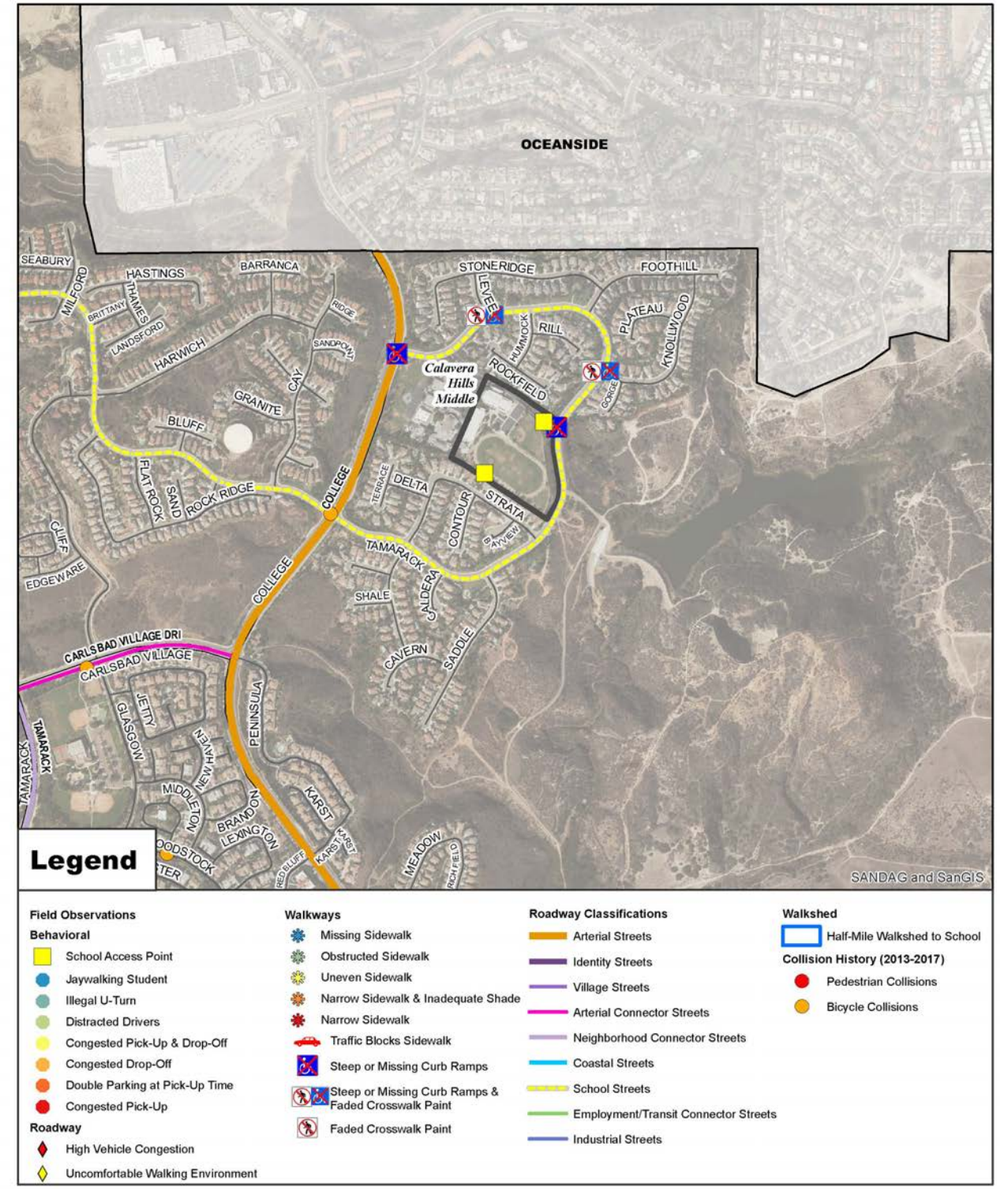


Safe Routes to School Field Work Assessment : Calavera Hills Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-5 Calavera Hills Middle School Profile

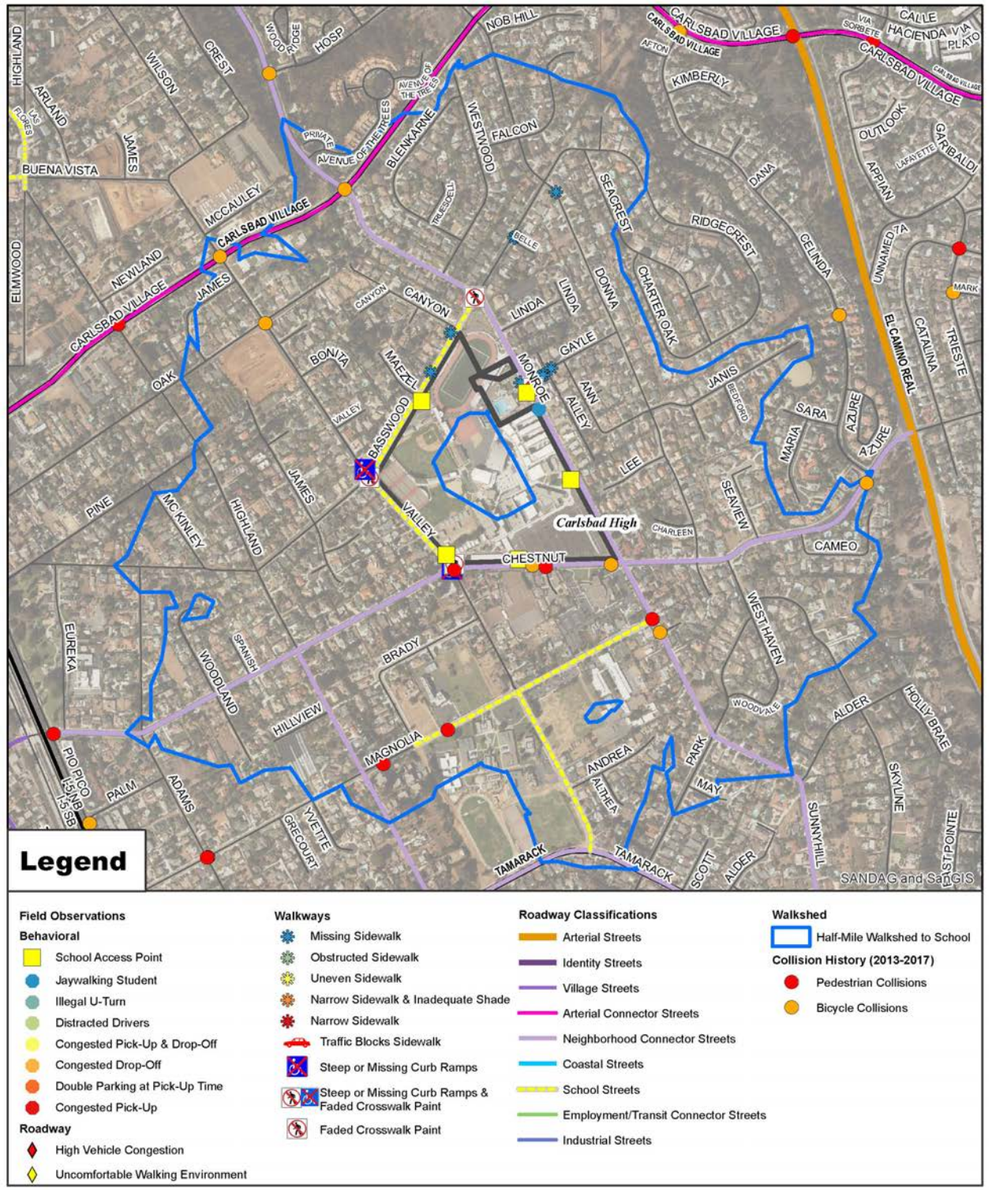


Safe Routes to School Field Work Assessment : Calavera Hills Middle

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

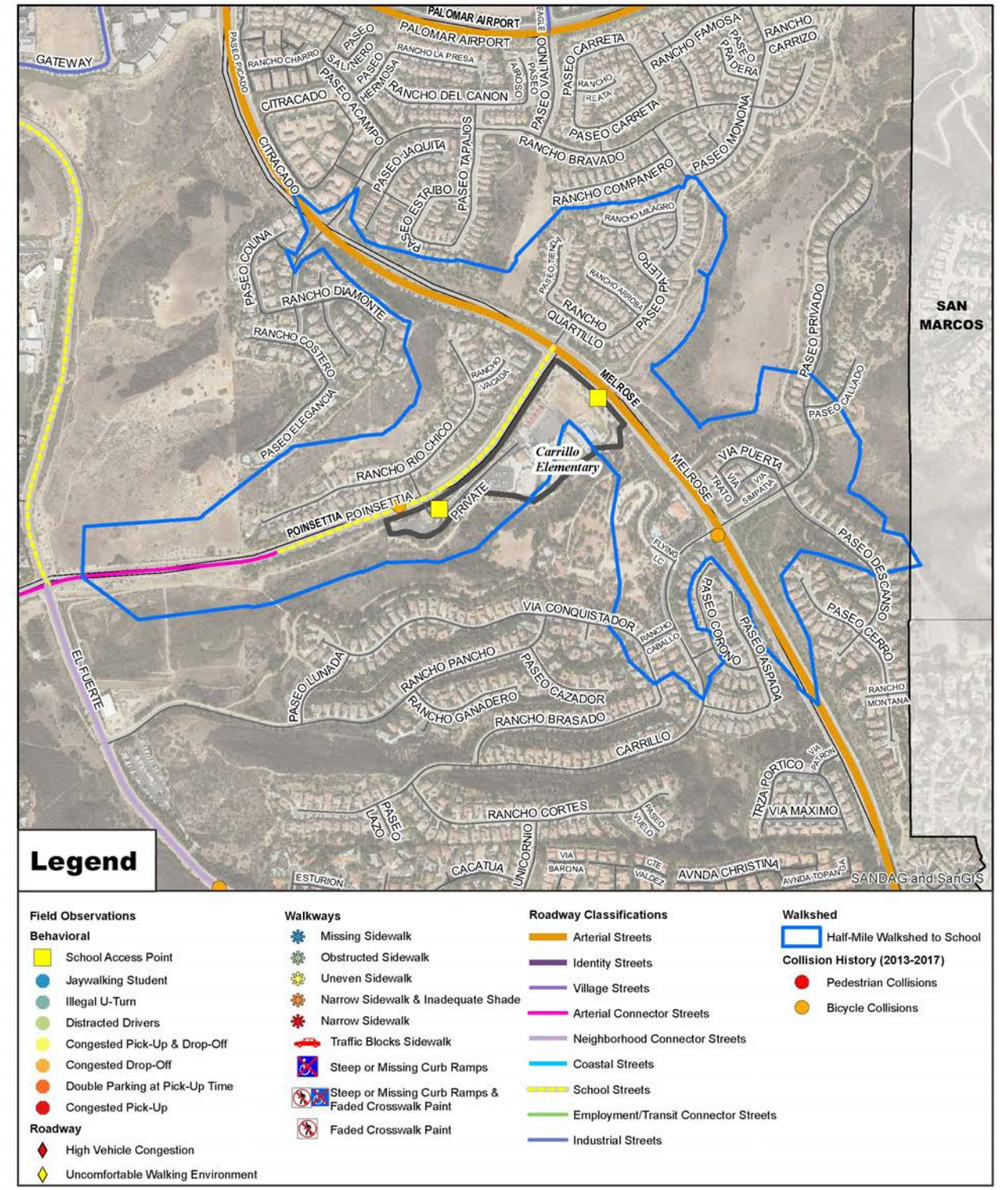
Figure 6-6 Carlsbad High School Profile



Safe Routes to School Field Work Assessment : Carlsbad High

Source: Chen Ryan Associates

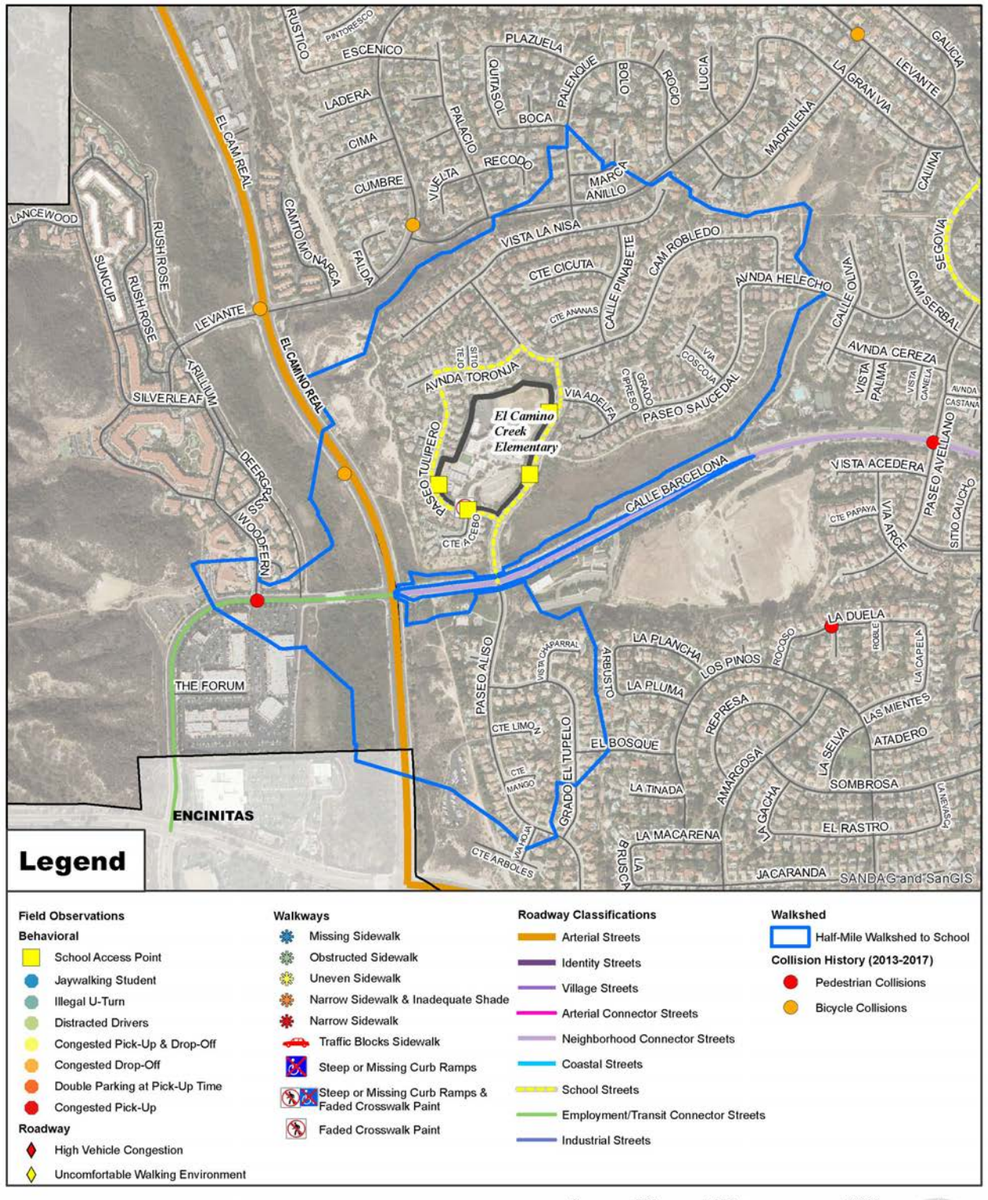
Figure 6-7 Carrillo Elementary School Profile



Safe Routes to School Field Work Assessment : Carrillo Elementary

Source: Chen Ryan Associates

Figure 6-8 El Camino Creek Elementary School Profile



Safe Routes to School Field Work Assessment : El Camino Creek Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-9 Hope Elementary School Profile

Safe Routes to School Field Work Assessment : Hope Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

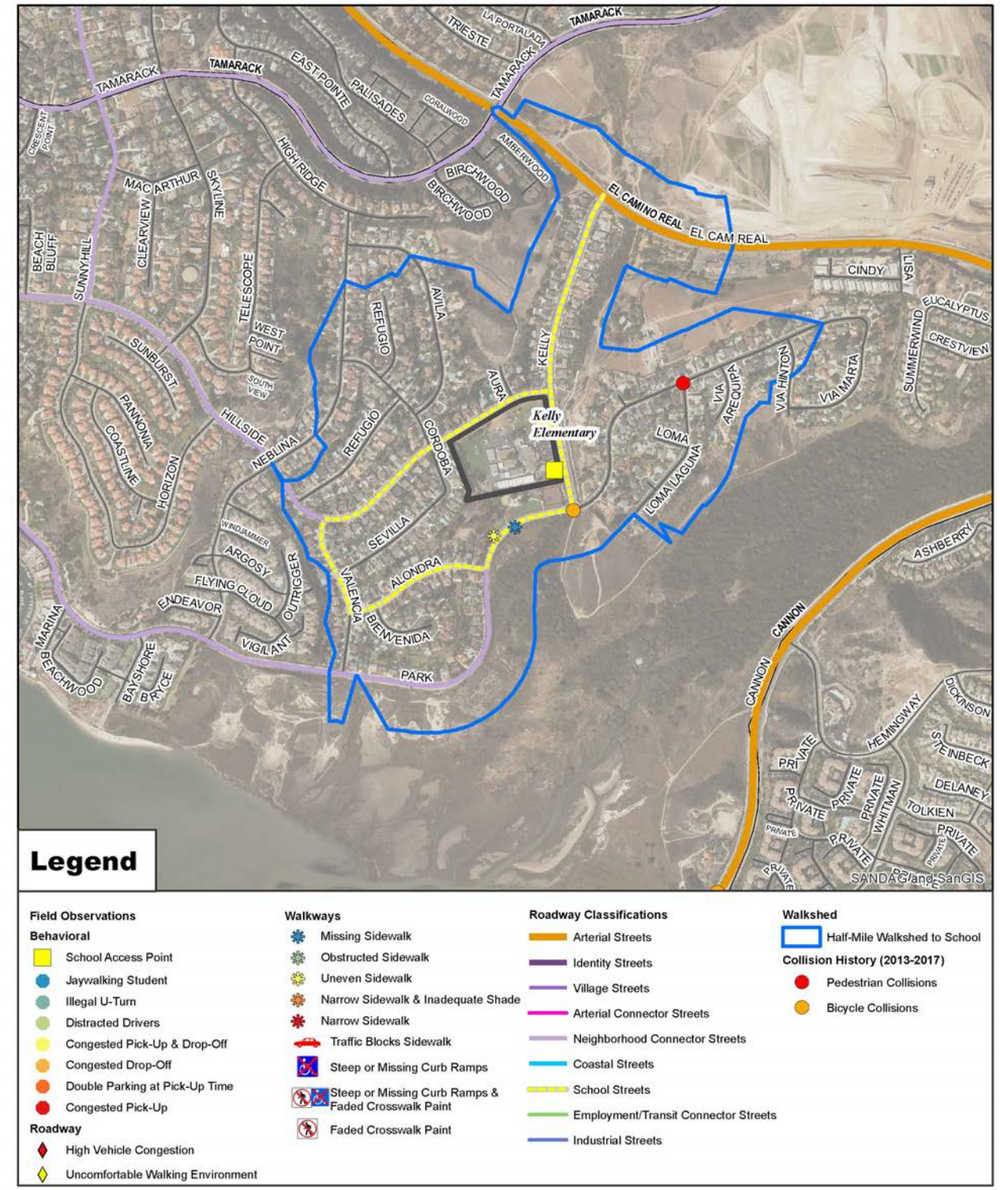
Figure 6-10 Jefferson Elementary School Profile

Safe Routes to School Field Work Assessment : Jefferson Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-11 Kelly Elementary School Profile

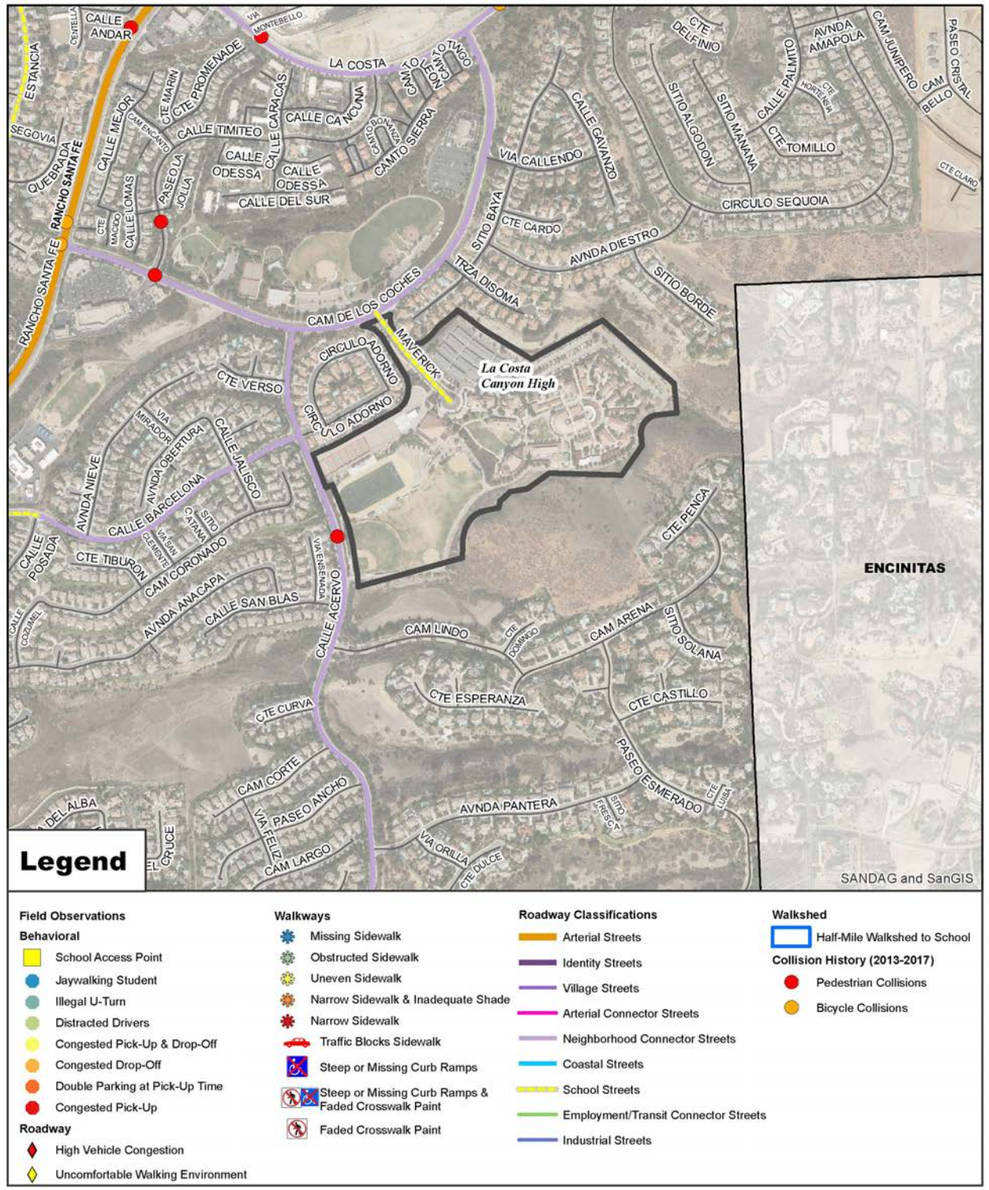


Safe Routes to School Field Work Assessment : Kelly Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

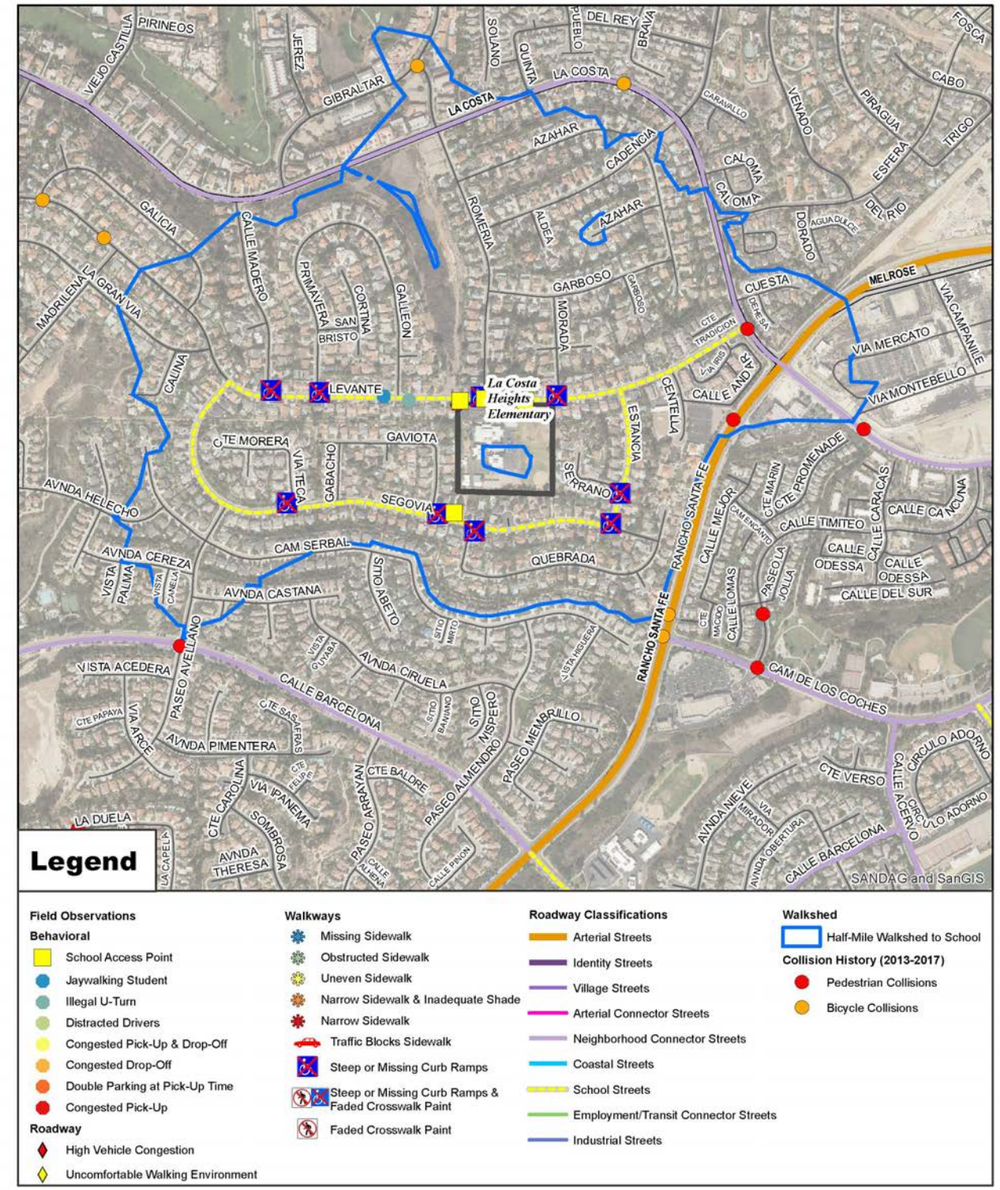
Figure 6-12 La Costa Canyon High School Profile



Safe Routes to School Field Work Assessment : La Costa Canyon High

Source: Chen Ryan Associates

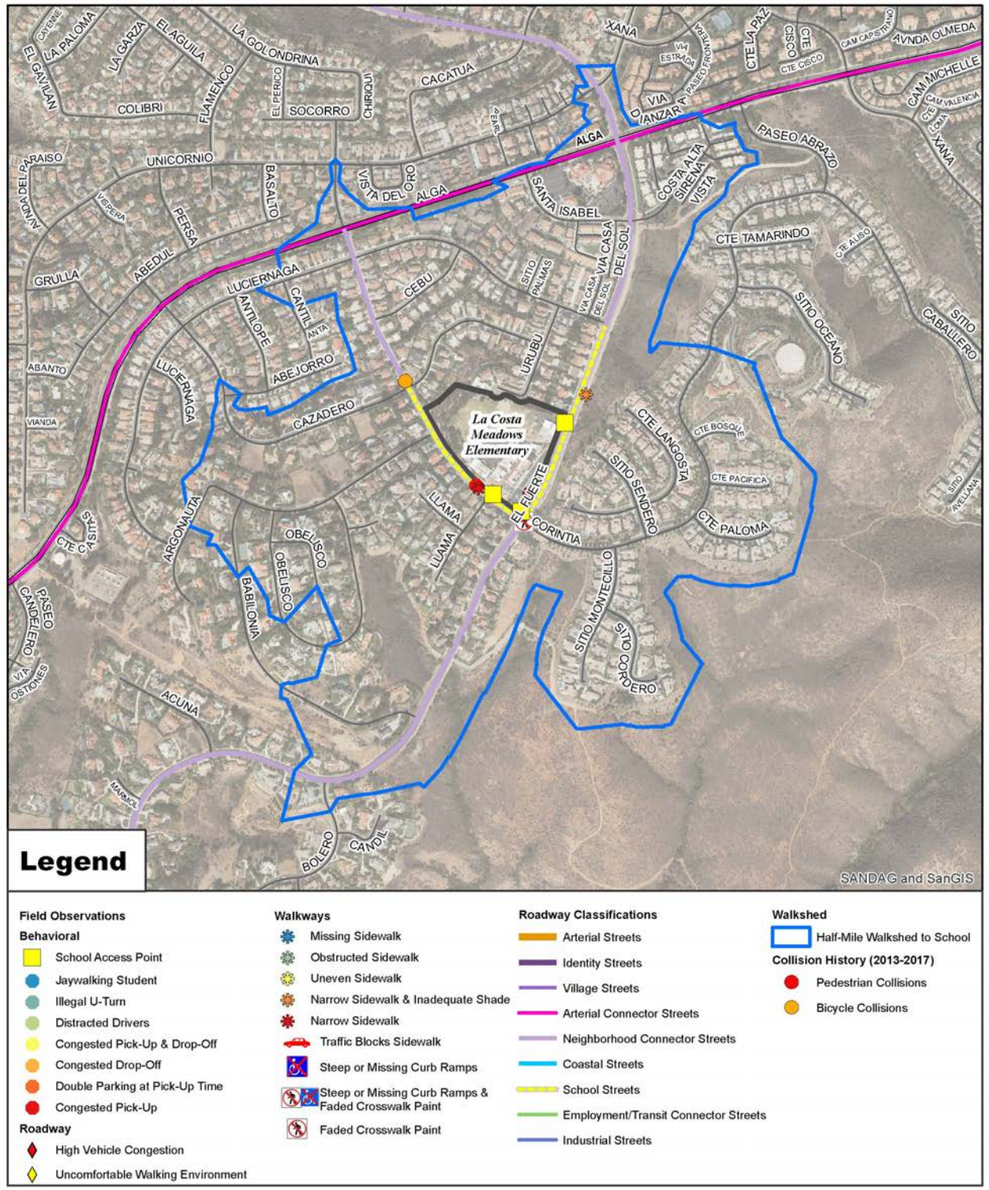
Figure 6-13 La Costa Heights School Profile



Safe Routes to School Field Work Assessment : La Costa Heights

Source: Chen Ryan Associates

Figure 6-14 La Costa Meadows School Profile

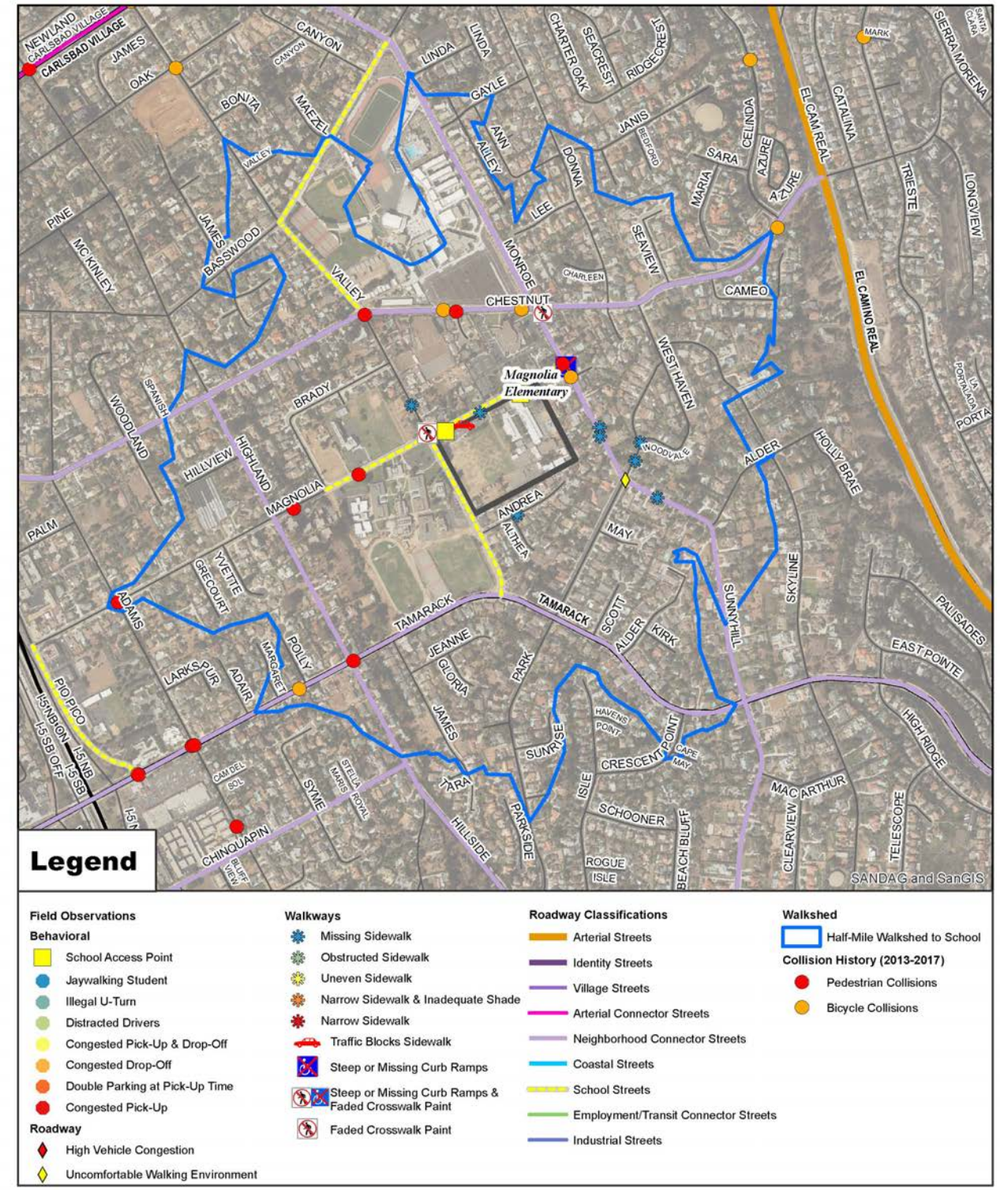


Safe Routes to School Field Work Assessment : La Costa Meadows

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

Figure 6-15 Magnolia Elementary School Profile

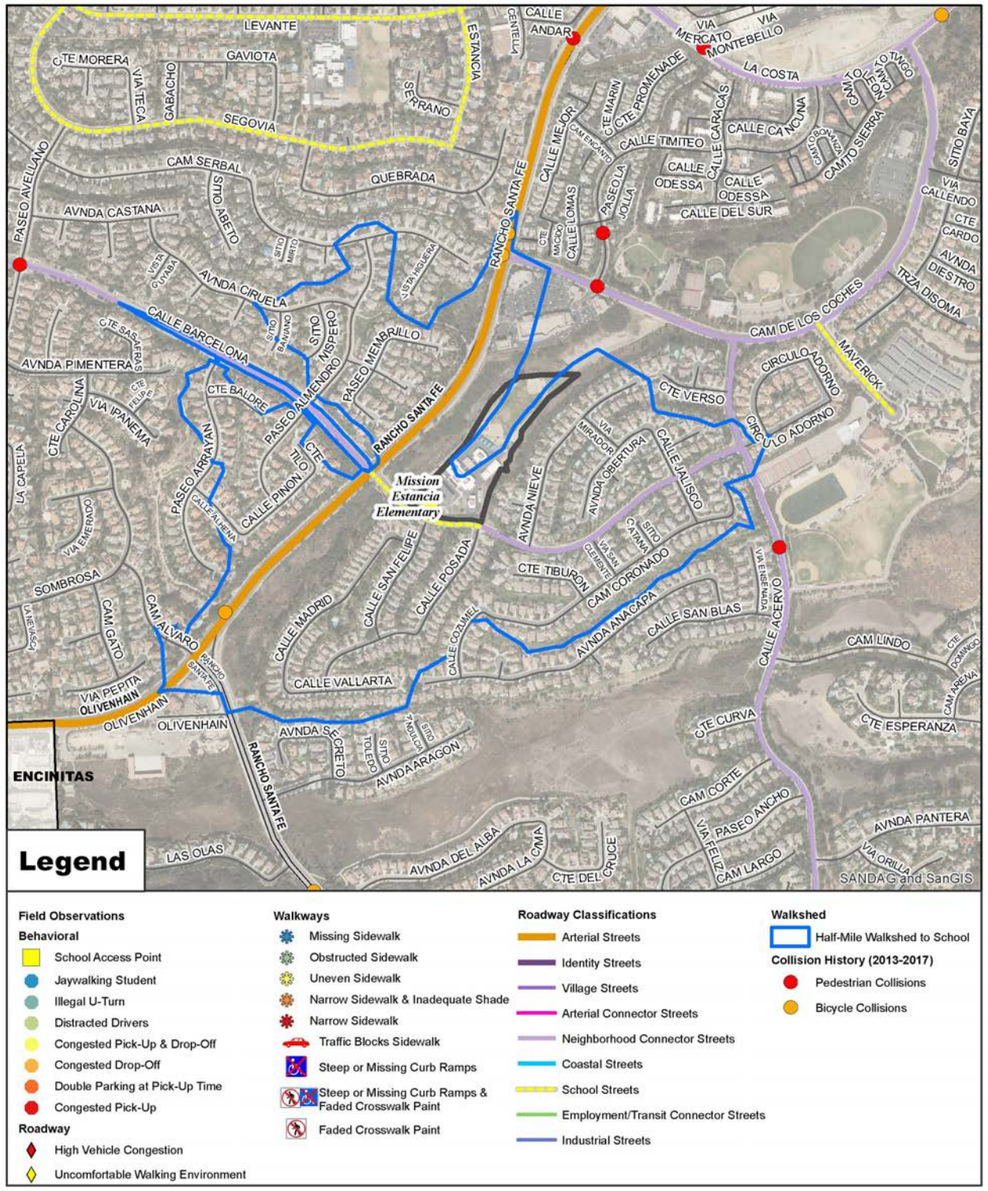


Safe Routes to School Field Work Assessment : Magnolia Elementary

0 500 1,000 2,000 Feet

Source: Chen Ryan Associates

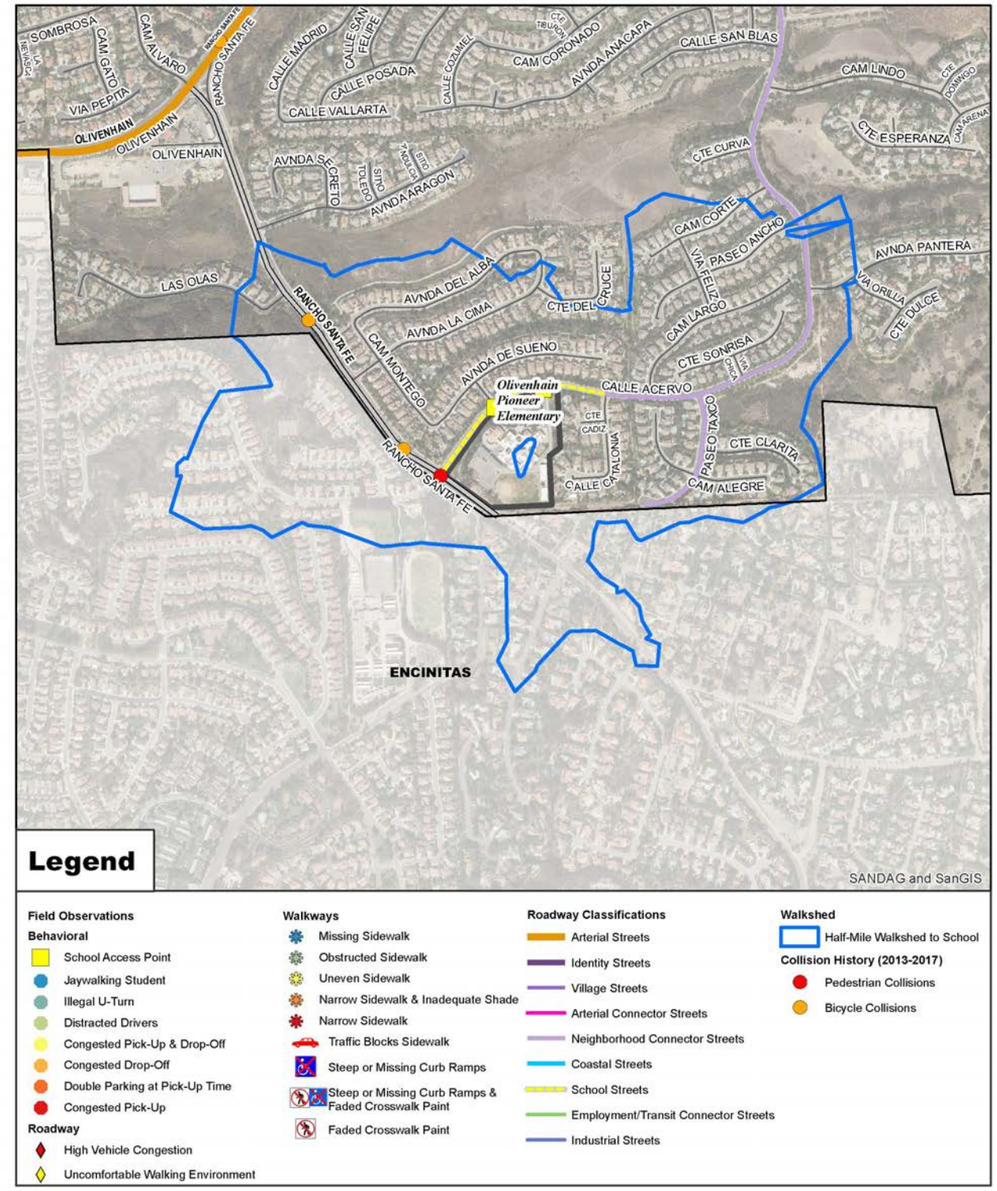
Figure 6-16 Mission Estancia Elementary School Profile



Safe Routes to School Field Work Assessment : Mission Estancia Elementary

Source: Chen Ryan Associates

Figure 6-17 Olivenhain Pioneer School Profile



Safe Routes to School Field Work Assessment : Olivenhain Pioneer

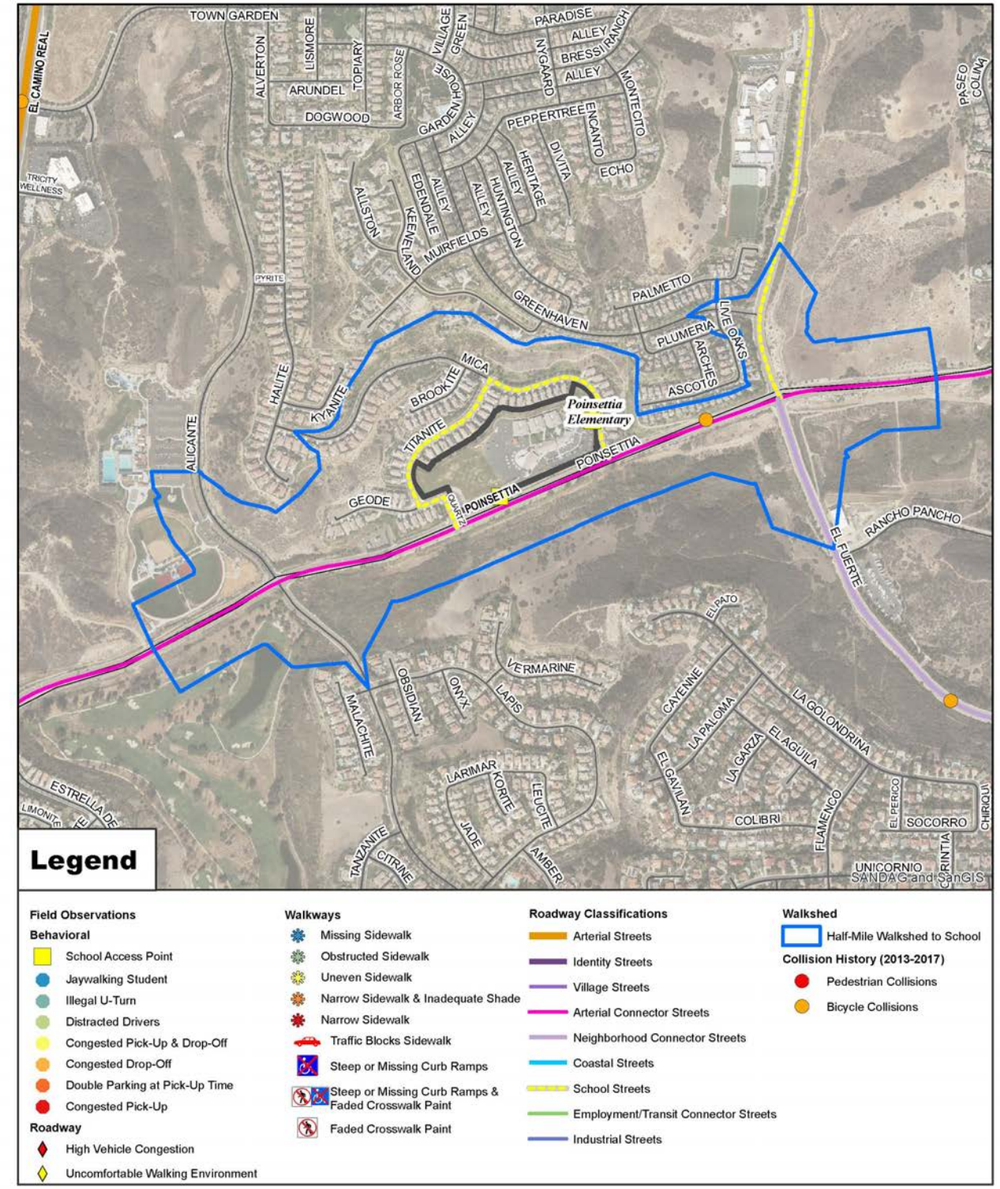
Source: Chen Ryan Associates

Figure 6-18 Pacific Rim Elementary School Profile

Safe Routes to School Field Work Assessment : Pacific Rim Elementary

Source: Chen Ryan Associates

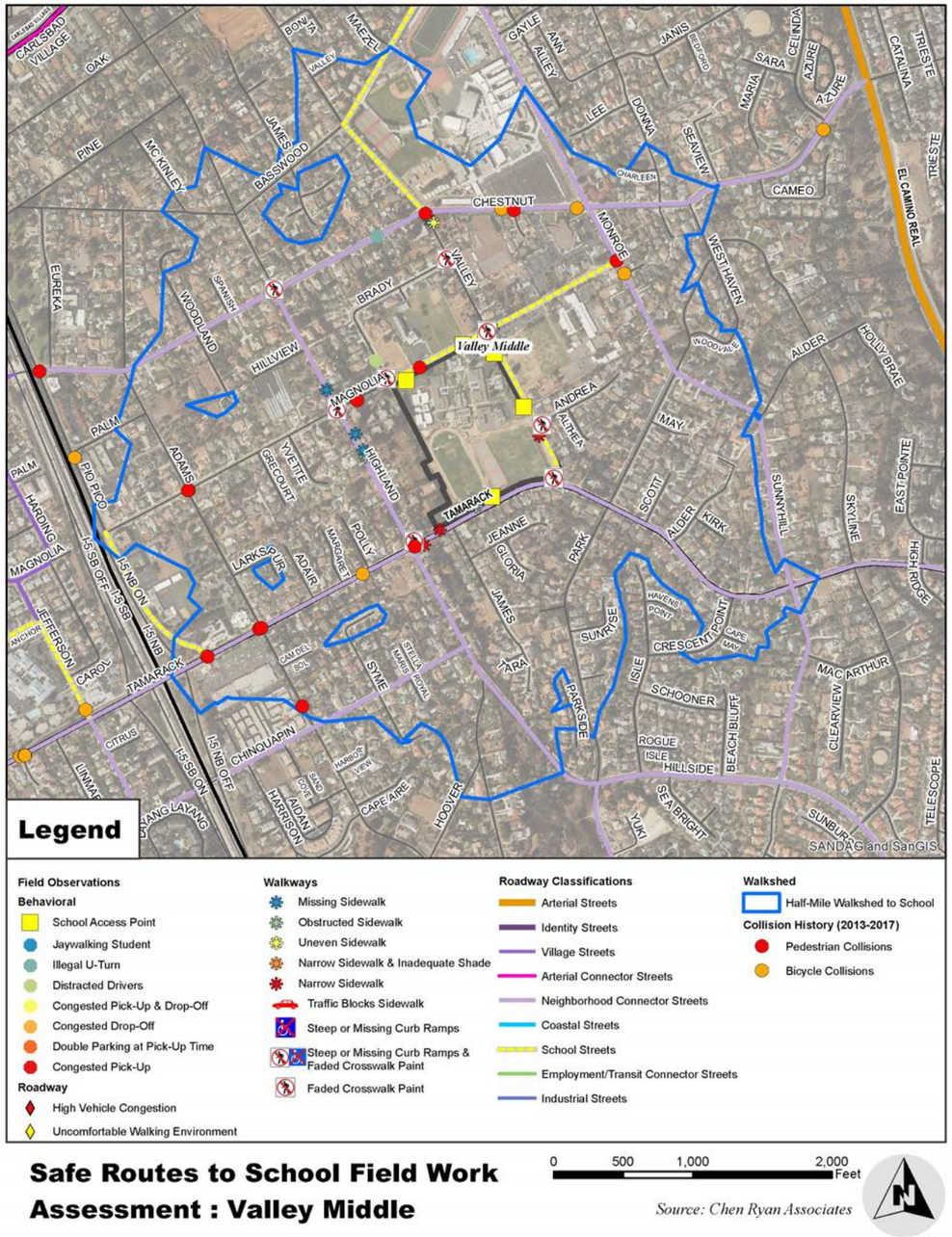
Figure 6-19 Poinsettia Elementary School Profile



Safe Routes to School Field Work Assessment : Poinsettia Elementary

Source: Chen Ryan Associates

Figure 6-20 Valley Middle School Profile



Safe Routes to School Field Work Assessment : Valley Middle

7.0 Key Findings and Next Steps

This section summarizes the existing conditions presented in this report and identifies opportunities and constraints related to people on foot, people on bicycles and people in transit, as well as people in school in the City of Carlsbad, and lays the groundwork for the development of the Sustainable Mobility Plan in early 2019.

7.1 People on Foot

Most of the streets in the City of Carlsbad that are programmed for sidewalks have sidewalks present. The overriding issue for people walking is the curvilinear nature of the street network, which limits direct connectivity to adjoining land uses. In addition, the streets that connect land uses are typically high-speed, high-volume vehicular arterials, with long block lengths and generally disconnected walking environments, despite the presence of cosmetic amenities such as planting strips, and adequate sidewalks.

This auto-oriented street network and land use mix limits the attractiveness of walking for transportation in all but a few selected locations in the City. Retrofitting arterials to facilitate crossings for students, the elderly, and other vulnerable users will require careful consideration of the Mobility Element's guiding principles and may necessitate revisions to corridors not currently designated "School Streets," among others, to evaluate the feasibility of midblock crossings and other treatments designed to mitigate the connectivity challenges presented by long, vehicular arterials.

In addition, intersections citywide may be upgraded when feasible to improve visibility and conflicts with turning vehicles and other high-frequency collision actions.

7.2 People on Bicycles

As with the conditions present for people on foot, people on bicycles suffer from a lack of practical connections between areas of the City, as while the City maintains an extensive network of bicycle facilities, these facilities are often present alongside high-speed and high-volume vehicular arterials, and lack physical protections for people bicycling, which discourages all but the most confident users of the network.

An exception to this can be found in Carlsbad Village, which features a number of low-speed and connected streets, and a completed section of the Coastal Rail Trail, all of which are appealing places to ride and represent excellent opportunities to shift travel behaviors away from vehicle trips for people who choose to bike when conditions are comfortable and perceived as safe by the user.

7.3 People in Transit

A significant constraint for people in transit is the lack of connection between the employment centers located along College Boulevard, Faraday Avenue, El Camino Real and Palomar Airport Road and the COASTER Stations. Lack of travel times competitive with private automobiles, lack of transfer locations, and lack of amenities at fixed route stops present significant barriers to attracting "choice" riders to the network and the resultant improvements in vehicle miles travelled metrics, greenhouse gas emission reductions, and other benefits.

Recent City initiatives will provide a policy framework for the development of Transportation Demand Management strategies to assist in the efforts of the public and private sectors to better connect jobsites and other key

destinations, and should be developed alongside improvements to other modes to encourage seamless connections for transit riders throughout the City of Carlsbad.

7.4 People in School

Students represent one of the greatest areas of opportunity for the City to recognize its goal of reducing private automobile trips. Vehicular trips to and from school create significant congestion and create a feedback loop where parents drive their children to school because walking and biking is perceived as too dangerous.

Infrastructure improvements can help mitigate these safety concerns, and can be supplemented by non-infrastructure investments in education, encouragement, and enforcement activities.

Exhibit 2

Appendix B

B SMP COMPLETE STREET DESIGN GUIDELINES

Exhibit 2

City of Carlsbad

CARLSBAD SUSTAINABLE MOBILITY PLAN

COMPLETE STREETS DESIGN GUIDELINES - DRAFT

FEBRUARY 2020

DRAFT

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Exhibit 2

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Exhibit 2

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1 INTRODUCTION

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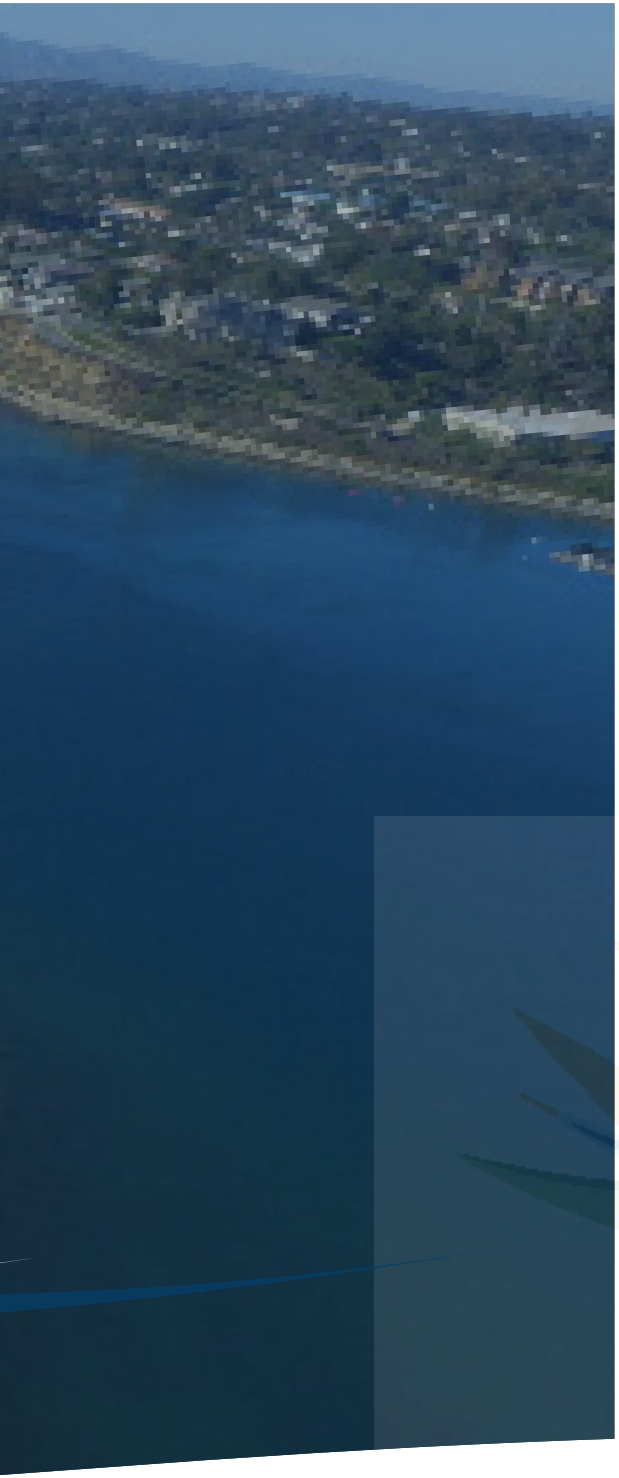

1 INTRODUCTION

BACKGROUND

PURPOSE AND NEED

The purpose of this guide is to provide a set of best practices that can be incorporated by the City of Carlsbad to create safer, more vibrant streets that serve all users going forward. These guidelines were developed using best practices in street design from Carlsbad, San Diego County, the state of California, and around the world. As such, they are intended to evolve and adapt to incorporate new treatments and techniques as they are developed and proven successful. These standards are meant only to guide future street design work in Carlsbad. While there may be streets that exist in Carlsbad today that are not consistent with these standards, it is intended that those conditions be addressed over time as street reconstruction or resurfacing projects are proposed.

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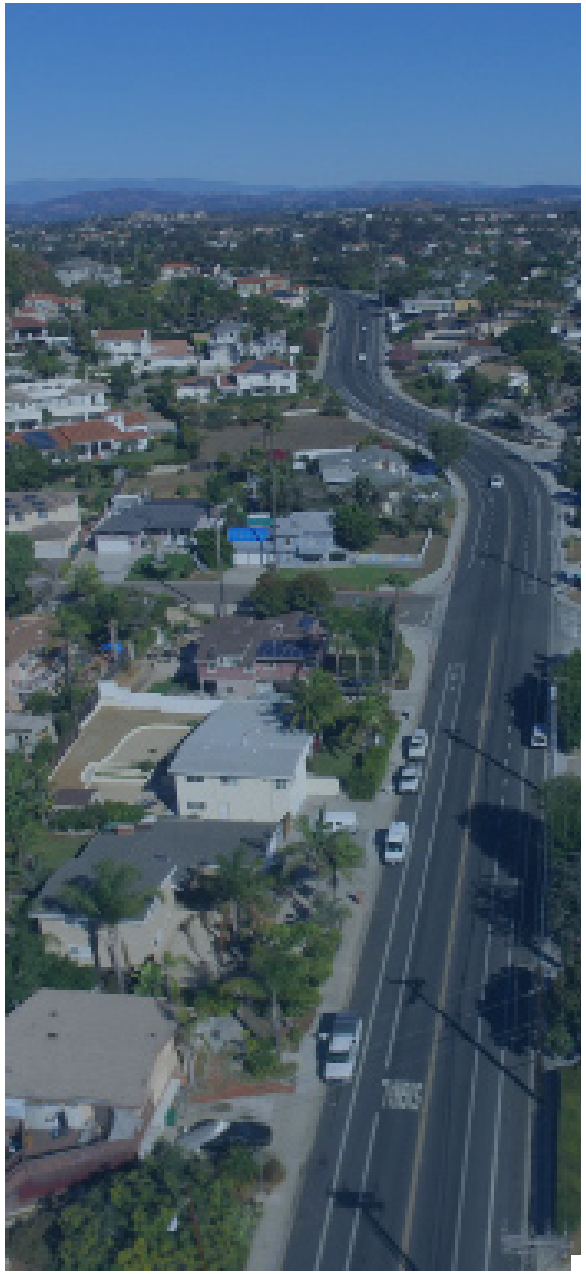
OBJECTIVES

This design guide supports the objectives of the Sustainable Mobility Plan to help improve transportation-related safety, reduce emissions, and increase travel choices within the City of Carlsbad. Key to this vision is the principle of "8 to 80 cities" meaning that the transportation network should be designed for users of all ages and abilities. The concept suggests that if a city is designed for the use and needs of an 8 year old and an 80 year old then it should be safe and comfortable for the use of everyone. Objectives of this design guide are as follows:

- Delineate high-quality design principles and practices for multimodal street design
- Emphasize network connectivity as an underpinning of multimodal design
- Provide a performance measurement and evaluation framework to assess design decisions
- Update Engineering Standards for consistency with Mobility Element
- Improve intersection design to enhance safety for all users and provide opportunities for pedestrian improvements

INTENDED AUDIENCE

While primarily a tool for City staff use, these guidelines are a public document that will be a policy and design resource for a variety of stakeholders engaged in the design and decision-making for transportation projects. City departments, design professionals, private developers, and consultants should all use these guidelines as a reference in their work. The guidelines will also be relevant to other transportation agencies operating in and around Carlsbad. State highways maintained by the California Department of Transportation (Caltrans) may intersect with streets designs found in these guidelines. Caltrans may also use these guidelines to inform their own street design decisions within the City of Carlsbad. Finally, the guidelines will also be useful to the North County Transit District (NCTD) which operates transit services on Carlsbad streets. NCTD can use the guidelines to work with the City to ensure bus shelters, transit amenities located along the street, and transit routes work together to achieve a seamless transportation network for city residents.



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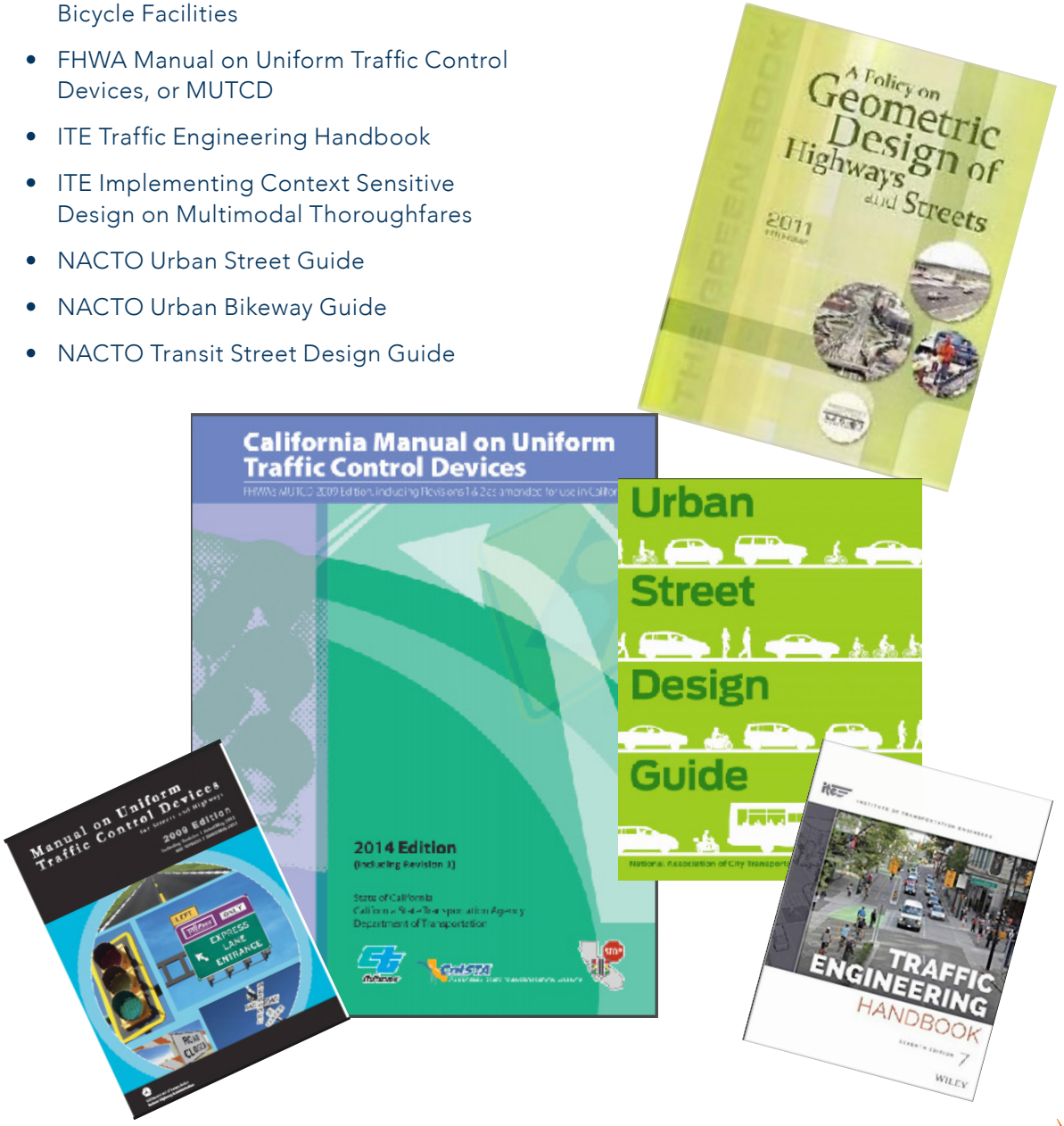
SUPPORTING DOCUMENTS

The development of these guidelines builds on national research, engineering standards, and best practices. Baseline precedents for these guidelines are set by the California Manual for Uniform Traffic Control Devices (CAMUTCD) and national standards such as the Geometric Design of Highways and Streets published by the American Association of State Highway and Transportation Officials (AASHTO) and the FHWA. The National Association of City Transportation Official's (NACTO) Urban Street Design Guide and Urban Bikeways Design Guide provides a secondary source on complete streets best practices. Caltrans endorsed the NACTO design guides in 2014 and to the maximum extent possible; the principles and approach of these documents has been reflected. The guidelines refer to local policies and documents throughout, such as:

- The Carlsbad General Plan Mobility Element
- Carlsbad Engineering Standards
- Carlsbad Residential Traffic Management Program
- California Manual for Uniform Traffic Control Devices (CAMUTCD)
- AASHTO Geometric Design of Highways and Streets, better known as the "Green Book"
- AASHTO Guide for the Development of Bicycle Facilities
- FHWA Manual on Uniform Traffic Control Devices, or MUTCD
- ITE Traffic Engineering Handbook
- ITE Implementing Context Sensitive Design on Multimodal Thoroughfares
- NACTO Urban Street Guide
- NACTO Urban Bikeway Guide
- NACTO Transit Street Design Guide



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HOW PROJECTS HAPPEN IN CARLSBAD

PROJECT DECISIONS

Designing streets often entails making tradeoffs about the use of limited rights of way. This document is meant to establish guidance for such street design decisions in Carlsbad using the best information available. As such, the hierarchy of information to be used is as follows:

1. Legal Compliance (State)
2. Local Data and Research
3. National Data and Research
4. Anecdotal Observations
5. Engineering Standards (how things have been conducted historically)

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PHASE 1

PROJECT IDENTIFICATION

Street design projects typically initiate from one of four project types: maintenance and operations projects, capital improvement projects, private development projects, and partner agency projects (i.e. Caltrans). Each of these project types has a different set of needs and opportunities that informs physical changes in the street design. Key steps of this phase include:

- Define the project, including boundaries
- Establish performance metrics related to specific desired outcomes and define methods for measurement
- Generate ideas and basic design features
- Identify any overlapping projects that could be coordinated
- Determine if supplementary funding can be obtained for additional improvements, beyond original scope of project
- Propose a design and construction timeline
- Estimate the project costs

MAINTENANCE AND OPERATIONS

These projects arise from routine maintenance needs, safety interventions and/or operational changes. Projects of this type may include street resurfacing, pavement markings/re-striping, landscaping, street tree plantings, signage/signalization changes, street furnishings, sidewalk repairs, and curb repairs.

CAPITAL IMPROVEMENT

Capital projects typically provide the most profound change in street environment and function, but are also less frequent. Capital designs often require an intensive public engagement process and broad coordination across departments. Given the typically higher cost and greater complexity of these projects, capital projects may take several months to years to be fully planned, designed, and implemented. Whenever possible, capital projects should be phased to coincide with maintenance needs. Projects of this type may include full street reconstruction, major utility improvements, comprehensive streetscaping, and lane and/or curb reconfigurations.

PRIVATE DEVELOPMENT

When private development projects impact the street or sidewalk during construction, they must rebuild the street and affected portions or elements within it to the same standards and expectations as for public projects. These provide an opportunity to ensure that improvements are made in alignment with community goals. While improvements may occur in only segments of a block, they contribute to the incremental transformation of a street. Projects of this type may include repair or reconstruction of the sidewalk and amenity zones, changes to curbs or curb-cuts, utility infrastructure, landscaping, lighting, street furnishings, repair or reconstruction of the roadway, sidewalk, and parking and/or lane closures for construction.

PARTNER AGENCY

While these design guidelines represent the desires of the City, some streets such as State Routes are under the jurisdiction and control of a partner agency (i.e. Caltrans). While the agency's standards may be the controlling guidance, these guidelines should serve as a starting point for negotiation of expectations and variances from partner standards.

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PHASE 2

PRELIMINARY DESIGN

This design guide recognizes that all street user needs must be met by the system, but individual streets may emphasize certain uses over others as a necessary design balance. Examples of potential trade-offs include: choices between wider sidewalks or a wider roadway; providing bicycle facilities or providing on-street parking; vehicle volumes or transit service reliability. Key elements of this phase are as follows:

- Examine the Carlsbad Mobility Element roadway classification to understand the context for each street.
- Understand the context of the street and its role in the overall transportation system.
- Collect and analyze any relevant data.
- Establish a transparent community engagement/decision-making process.
- Determine the preferred elements for the site.
- Identify any conflicts between those elements and the street dimensions.
- Explore modifications of the design alternatives to meet the greatest number of needs.
- Select a preferred alternative, taking community input into consideration.

PHASE 3

REVIEW & COORDINATION

Project designs will be reviewed to ensure they are both compliant with all city standards and advancing the objectives of this guide.

- Maintenance and operations projects will be reviewed by maintenance and operations staff to identify any opportunities to further align the street with the goals of this guide.
- Capital improvement projects will be reviewed by the designated street design staff, who will consult with maintenance staff for coordination purposes.
- Private development projects will be responsible for meeting the street design standards as part of the site review process; planning staff will coordinate with designated street design staff as necessary.
- Partner agency projects will be recommended to follow the standards set out by this guide and coordinate with City staff as appropriate.

PHASE 4

PERFORMANCE MONITORING

Both before and after a project is constructed, data should be collected for the purpose of performance monitoring. Monitoring and measurement are important components of street design that are often neglected due to limited resources. This data is invaluable for verifying that street designs function as intended, and also for informing future design and planning decisions. It will be critical to establish a system for collecting, managing, and analyzing this data. This should be done for any project that requires a public input process.

Performance metrics and methods for measurement should be identified during the initial project definition process. Those methods may be quantitative (e.g. number of cyclists, number of crashes, etc.) or qualitative (e.g. online preference surveys, intercept surveys, etc.). Data should be recorded for an appropriate period of time both prior to and after implementation.

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2 STREET CROSS SECTIONS

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2 STREET CROSS SECTIONS

FRAMEWORK

These guidelines introduce an approach to street design that seeks to ensure streets match their intended purpose within the context of the community. A holistic approach to street design takes into account the differing conditions and contexts of each street. Streets with different surrounding land uses, constraints, and significance for modes of transportation each require design considerations and treatments unique to those circumstances.

These guidelines build upon the street classification system set up in the General Plan. The system, as outlined here, will consider the transportation functional emphasis, land-use characteristics, development density, and surrounding context of each street. The resulting street types are intended to inform planning decisions when altering existing streets and sidewalks and when reviewing new streets and sidewalks as part of development projects.

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FUNCTION, CONTEXT, AND MODAL EMPHASIS

FUNCTION

The mobility function is the key characteristic that defines the design of the traveled way, or the area between the two curbs, for mobility and access. Some communities use the FHWA Functional Classifications (arterial, collector, local) and some use names that they feel better reflect those streets' role in the network. The mobility function might consider elements such as the expected mix of modes, the volume of people movement, the general lengths of trips handled by the corridor, access control requirements, etc.

The Street System proposed in the City's currently adopted General Plan Mobility Element provides the functional classifications for roadways in Carlsbad.

CONTEXT

Conventional street design practice has long favored only the wishes of automobile drivers when making street design decisions. This strategy has encouraged designing streets for speeding, and has created environments that are unpleasant for and often unsafe for other users. Changing this strategy to design streets based on a target speed keyed to the needs of all users can help to reduce speeding, and provide a safer environment for people to not only drive, but to park, bike, and walk as well. Well-designed streets should match the context of the areas that they serve. Physical characteristics such as the placement and height of buildings, the ground-floor uses within those buildings, and landscaping should pair with streets designed to match the needs of users.

Urban Village: This context represents a compact mix of uses that has a more "urban feel" than the rest of Carlsbad. Buildings are typically set at the edge of the street and contain uses that generate multimodality. Uses within the Carlsbad Village & Barrio Master Plan boundaries primarily reflect this context.

Suburban: Suburban contexts serve lower density employment centers, industrial areas, or residential land uses where buildings are set back from the road and spread further apart. Suburban areas are typically dominated by motor vehicle traffic. Uses outside the Carlsbad Village & Barrio Master Plan boundaries primarily reflect this context.

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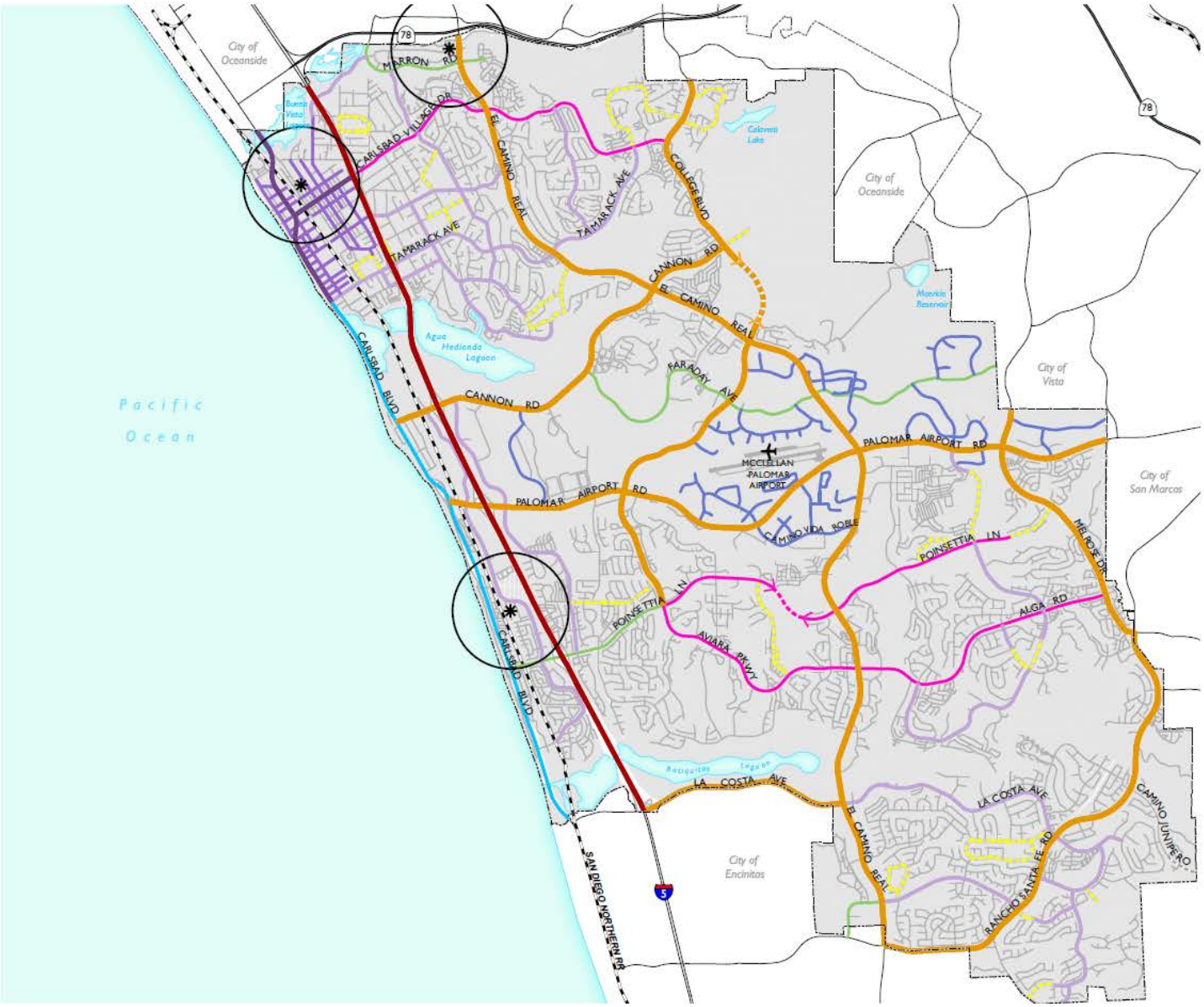

Figure 3-1: Street System

- Freeway
- Arterial Streets
- Identity Streets
- Village Streets
- Arterial Connector Streets
- Neighborhood Connector Streets
- Coastal Streets
- School Streets
- Employment/Transit Connector Streets
- Industrial Streets
- Local/Neighborhood Street
- Planned Arterial Streets
- Planned Arterial Connector Streets
- Planned Local/Neighborhood Streets
- Highways
- Railroad
- Transit Centers
- Half Mile Radius
- City Limits

500 ACRES
100 ACRES

0 0.5 1 2
Miles

Source: City of Carlsbad, 2013; SANDAG, 2013; Fehr & Peers, 2013; Dyett & Bhatia, 2013.

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MODAL EMPHASIS

Modal needs of specific users are highlighted below:

PEDESTRIANS

Users who travel on foot or with assist devices, such as wheelchairs, are the most vulnerable users of the street. At the most basic level this group is supported with a clear path of travel on sidewalks, safe and frequent opportunities to cross streets, and buffering between conflicting modes.

BICYCLISTS

Bicyclists are exposed and vulnerable users of the street who need to be accommodated with safe and comfortable facilities. Bicyclists have very levels of skill and comfort. The type of bicycle facilities that feel safe and comfortable vary based on a combination of motorist speed, traffic volume, roadway width, presence of parking, and other design elements.

TRANSIT

Bus stops are pedestrian generators that require safe crossings, lighting, and stop amenities.

AUTOMOBILES

Motorists require travel lanes sufficiently wide enough to facilitate through movement. Automobiles benefit from lighting along the street and turning radii that allows larger vehicles to complete turns at low speeds without mounting the curb.

EMERGING

A range of new users have emerged in recent years, including operators of bikeshare bikes, electric scooters, TNC vehicles (Lyft/Uber). Design needs may include reserved zones for shared mobility parking and pick-up/drop-off areas for TNCs. In the coming years, autonomous vehicles (AVs) are anticipated to have significant impacts on street design needs. It is anticipated that automation will have a significant impact on the efficiency of parking, as well as the use of curb space for passenger loading/drop-offs. Vehicle lane widths can likely be narrowed, opening up opportunities for changes to standard designs.

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Some uses are independent of a street's normal form and function, and require additional design consideration. A modal emphasis overlay identifies a special condition that can help to reconcile tradeoffs in corridors. Where space is limited, or where there are opportunities to repurpose extra space, the modal emphasis can indicate which elements should be prioritized.

	DESIGN MODIFICATIONS
TRUCK ROUTES	
Designated truck routes provide access from Interstate-5 and State Route 78 to commercial areas, the Village, business park areas, McClelland-Palomar Airport, and points beyond the city limits.	• Corner radium dimensions • Land widths
COASTAL STREETS	
Coastal streets move people along the city's ocean waterfront and connect people to the beach, recreation, businesses and residences in close proximity to the waterfront. The street serves as a destination for people who seek to drive, walk and bicycle along the ocean waterfront.	• Speed management • Enhanced bike & pedestrian crossings
SCHOOL STREETS	
School streets connect people to schools from nearby residential neighborhoods. Emphasis should be on providing safe pedestrian and bicycle access for students traveling to and from nearby schools. Vehicle speeds should be managed to support school uses (typically 25 MPH).	• Speed management • Enhanced bike & pedestrian crossings

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STREET TYPOLOGIES

The typology of a street combines the elements of development context and transportation function to determine the best way to balance different modes of travel and preferences within limited street ROW. In the past, traditional street design processes began with automobile volume and speed as the main inputs, and designs centered on accommodating those expectations. This process inverts that approach by looking first at the building and roadway characteristics and then designing the facility for the desired automobile volume and speed. In this way, traffic volume and speed are outputs rather than inputs.

The Mobility Element defines 13 separate typologies within its Liveable Streets Guide. This guide provides a more nuanced set of typologies to effectively implement recommended strategies.

ARTERIAL STREETS

- Primary vehicle routes through the city for both local and regional vehicle trips.
- Designed to safely move all modes of travel while efficiently moving vehicles and buses throughout the city.
- Bicycle lanes shall be provided and can be further enhanced or complemented by other facilities or off-street pathways
- Pedestrian facilities to be provided consistent with ADA requirements
- Traffic calming devices, such as curb extensions (bulbouts) or enhanced pedestrian crossings should be considered and evaluated for implementation

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CONNECTOR STREETS

- Primary purpose is to move people throughout the Village/ City; providing access to businesses, residences, transit and recreation
- Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists
- Vehicle speeds should be managed to promote safe pedestrian and bicycle movement
- Promote pedestrian and bicycle connectivity through short block lengths
- Bicycle lanes should be provided
- Pedestrians should be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk)
- Mid-block pedestrian crossings and traffic calming devices should be considered, but only at locations with high pedestrian activity levels or major destinations/attractions
- On-street parking may be provided

NEIGHBORHOOD STREETS

- Primary purpose is to connect people to and through residential neighborhoods and local areas of the city
- Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists
- Vehicle speeds should be managed to promote safe pedestrian and bicycle movement
- Pedestrians should be accommodated on a sidewalk or soft surface trail (such as de-composed granite) unless those facilities are inconsistent with the existing desirable neighborhood character
- Bicycles can be accommodated with a bicycle lane or route if vehicle volumes and/or speeds necessitate; otherwise bicycles can share the street
- Bicycle boulevards can be considered
- Traffic calming measures should be considered when supported by the neighborhood or when warranted for safety reasons
- On-street parking should be considered

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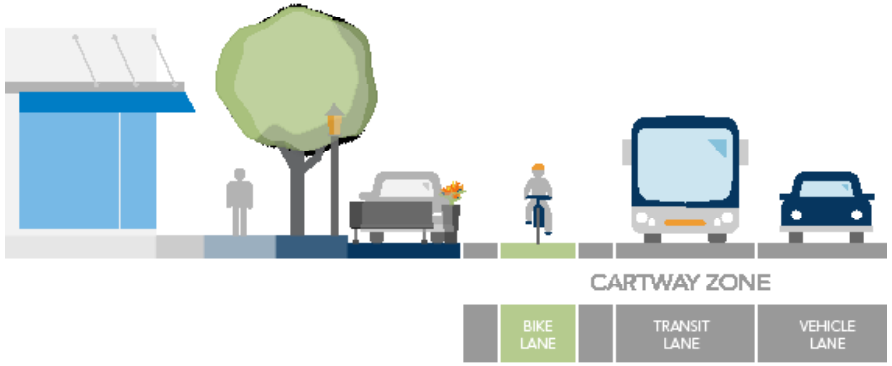
CROSS SECTIONS

The elements that make up city streets, from sidewalks to travel lanes to transit stops, all vie for space within a limited right of way. Conceptual street 'zones' that can make up the right of way of the street include the following:

CARTWAY ZONE



The cartway, also known as vehicle zone, provides facilities for moving traffic. This includes space for motor vehicles, bicycles, and transit vehicles, which may be accommodated with dedicated or shared lanes. The cartway zone is present in every street typology.

ACCESS ZONE

The access zone includes elements directly adjacent to the curb on the street side, such as parking spaces and parklets. This zone serves stationary uses and makes up part of the buffer zone. The access zone may not be present in every street typology.

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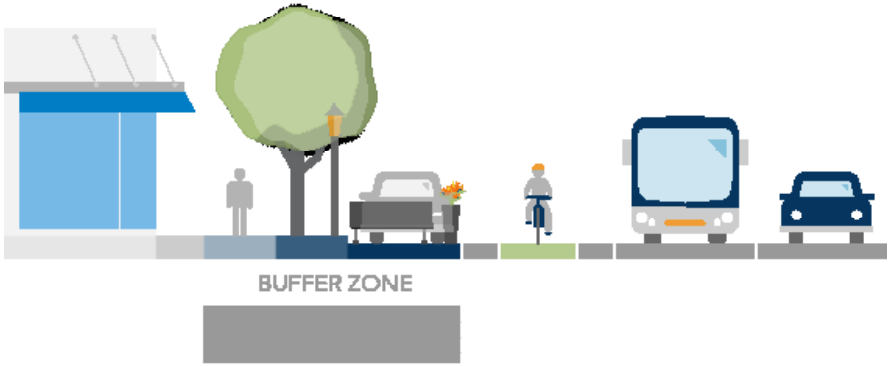
AMENITY/CURB ZONE

The amenity/curb zone is located near the curb and provides space for amenities such as lighting, trash receptacles, seating, planters, trees, green infrastructure (e.g., bioswales), bicycle racks, bikeshare, and micromobility parking. This zone makes up part of the buffer zone, but may not be present in every street typology.

BUFFER ZONE



The buffer zone is a floating zone that exists as a combination of the amenity/curb zone and the access zone. The buffer zone will always be present, while the access zone or amenity/curb zone may not. Buffer zones separate pedestrians from vehicular traffic and create a more pedestrian-friendly space.

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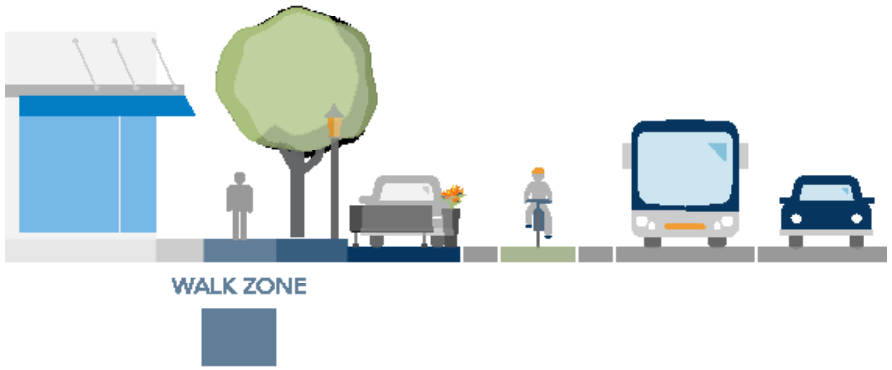
CROSS SECTIONS CONT.

WALK ZONE



The walk zone provides appropriate space for pedestrian traffic to travel without obstruction. It is a sidewalk space (or shared use path) clear of any other streetscape elements, and is present in every street typology, unless a design exception is made.

FRONTAGE ZONE

The building frontage zone complements building uses by serving entryways, or providing space for sidewalk eating spaces. It is the space immediately adjacent to the building facade, and may be replaced by front yards in some street typologies.

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		FRONTAGE ZONE	WALK ZONE	AMENITY/ CURB ZONE	ACCESS ZONE	CARTWAY ZONE				
							BIKE LANE		TRANSIT LANE	VEHICLE LANE
URBAN VILLAGE	NEIGHBORHOOD	0-2′	6′	4-6′	8′	N/A	N/A	N/A	N/A	10′
	COLLECTOR	2-4′	6′	6′	8′	3′	5′	3′	N/A	10′
	ARTERIAL	4-8′	10-12′	6′	8′	3′	5′	3′	11′	10′
SUBURBAN	NEIGHBORHOOD	N/A	5′	5′	8′	N/A	N/A	N/A	N/A	10′
	COLLECTOR	N/A	6′	5′	8′	3′	5′	3′	N/A	10′
	ARTERIAL	N/A	6′	5′	8′	3′	5′	3′	11′	11′

All widths here reflect recommended dimensions.

3 WALK ZONE

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3 WALK ZONE

The walk zone is the area dedicated to walking. Just like any travel lane, it should provide a logical path of travel. It must be ADA-compliant and clear of all obstructions. It should be straight and continuous. Attempts to create meandering walk zones usually fail because people want to walk in the most direct route possible. It should be sized to provide sufficient space for the expected pedestrian volumes, but not overly wide as to appear barren.

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SIDEWALK

A sidewalk is the paved portion of the right of way intended to provide for pedestrian through travel. Sidewalks are critical elements of property accessibility and should be designed to comfortably accommodate the pedestrian movement likely to occur in a given area. In low density residential areas this might be two strollers passing side-by-side. In the Village and Barrio area it might mean two people walking abreast with room for passing of one individual in the oncoming direction. The ideal dimension should be tailored to the density and ground floor use of the adjacent land.

MORE INFORMATION

- NACTO: Urban Street Design Guide, 2013, pg 40
- City of San Diego: Street Design Manual, Pg. 2-3

DESIGN POLICIES

- Sidewalks are required on every street except for roadways designated as Alternative Design Streets
- Each street type has a minimum clear walk zone of five feet that must be free of any obstructions (street furniture, utility poles, plantings, etc.)
- All street types also have a target clear walk dimension that should be a high priority in most circumstances

MINIMUM PREFERRED DIMENSIONS

- A minimum of five feet clear walk zone should be achieved however per PROWAG R301.3., a width of four feet is the absolute minimum to meet ADA standards
- In constrained conditions, it is recommended that the width of other zones of the street be reduced before resorting to the minimum sidewalk width

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SIDEWALK

MODAL PRIORITY

WALKING

BIKING

TRANSIT

PLACEMAKING

AUTOMOBILE

Sidewalk – Carlsbad

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

INTERSECTION CONTROL

- YIELD
- STOP
- SIGNAL

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SIDEWALK DINING

Sidewalk dining areas allow for restaurants and cafes to extend their business service area into the public right-of-way. Sidewalk dining should be encouraged within the Urban Village context and other areas where pedestrian and commercial activity is high. However, this use should never encroach into the clear walk zone.

DESIGN POLICIES

- Sidewalk dining should be restricted to the frontage(s) of the business it serves and should not encroach on the frontage of adjacent businesses. As per Section 2.6.5, Right of Way Uses, placement of sidewalk dining should satisfy the following requirements:

  a. Approval of a Right-of-way Use Permit and other permits as determined necessary by the city engineer.

  b. A signed Encroachment Agreement with the city if determined by the city engineer.

MINIMUM PREFERRED DIMENSIONS

- Maintain a minimum five feet of sidewalk free from obstruction

MORE INFORMATION

- City of Carlsbad: Carlsbad Village & Barrio Master Plan, 2018, Section 2.6.5, Right of Way Uses.

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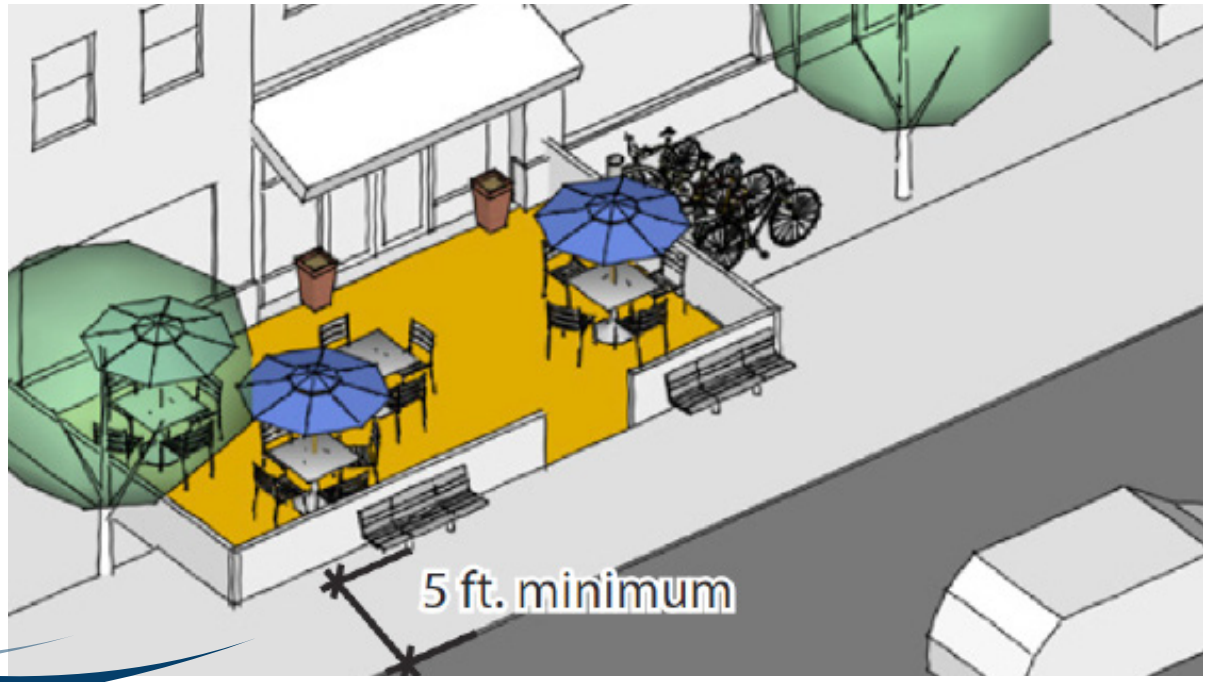
SIDEWALK DINING

MODAL PRIORITY

WALKING
BIKING
TRANSIT
PLACEMAKING
AUTOMOBILE



Sidewalk Dining – Preferred Placement

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

INTERSECTION CONTROL

- YIELD
- STOP
- SIGNAL

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4 AMENITY ZONE

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4 AMENITY ZONE

The Amenity Zone is located between the curb and sidewalk providing space for amenities to support multimodal activity in addition to standard street furniture and landscaping. Street furniture includes items such as parking meters, utility boxes, lamp posts, signs, bike racks, news racks, benches, and waste receptacles. This zone is often landscaped in residential neighborhoods and provides some level of separation between sidewalk and moving traffic.

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BUS PASSENGER WAITING AREA

Passenger waiting areas within the amenity zone provide space for enhancements at bus stops including seating, shelters, signage, wayfinding, lighting and waste bins.

DESIGN POLICIES

- Bus stops should include a shelter whenever possible and should be designed so that the shelter and surrounding area are located in the amenity area separate from the clear walk zone.
- Additional space can be allocated to accommodate a shelter using bus bulbs on streets with parallel parking or other elements in the access zone.
- Shelters should be at least 10 feet from driveways.
- All bus zones have a bus sign post, regardless of the amenities being provided at a particular stop.
- A safe street crossing (see diagram on page 133) should be located no more than 400 feet from any bus stop.

MORE INFORMATION

- MTS: Designing for Transit, 2018
- NACTO: Transit Street Design Guide
- NCTD Bus Stop Development Handbook

MINIMUM PREFERRED DIMENSIONS

Preferred dimensions for amenity zone placement are approximately seven feet wide by 27 feet long to accommodate at five foot by 12 foot shelter and two foot curb clearance from the roof of the shelter. At heavily used stops, additional space may be required to provide a waiting area for passengers beyond the shelter area that does not interfere with the clear walk zone. A minimum unobstructed boarding area of five feet must be maintained parallel to the curb.

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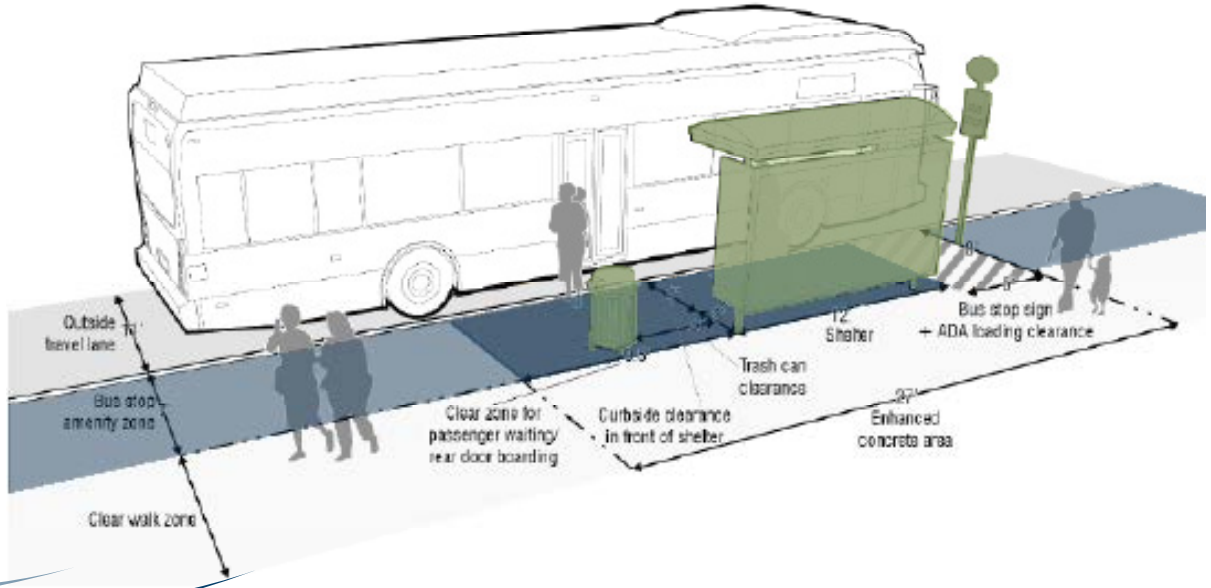
BUS PASSENGER WAITING AREA

MODAL PRIORITY

WALKING BIKING TRANSIT

PLACEMAKING AUTOMOBILE



Bus Passenger Waiting Area – Preferred Design

LOCATION

- SIDEWALK
- **CURB**
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- **COLLECTORS**
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- **SUBURBAN**

DRIVING SPEED

- **LOW (20MPH OR LOWER)**
- **MEDIUM (25-35MPH)**
- **HIGH (30-45MPH)**

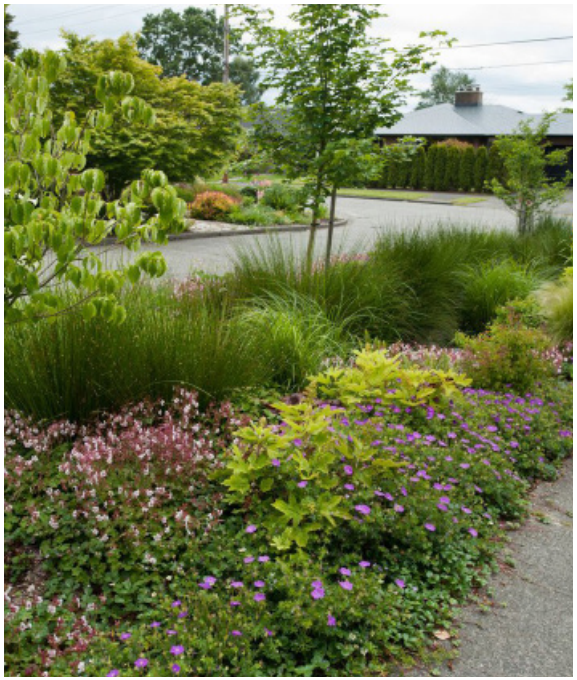
TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- **MEDIUM (2K-20K)**
- **HIGH (20K-60K)**
- **VERY HIGH (MORE THAN 60K)**

DRAFT

LANDSCAPING

Conventional stormwater management infrastructure is designed to convey the largest volume of water from a site as quickly as possible, collecting surface runoff in subsurface structures. Sustainable stormwater management, by contrast, views rainwater as an amenity, using it to improve urban ecology, microclimates, air quality, and the aesthetic quality of the public realm. Green street design utilizes landscaping, engineering, and urban design tools to mimic natural watershed capabilities. Treatments include bioretention, permeable pavement, planters, swales, infiltration, constructed wetlands, native vegetation, cisterns, and more. Each of these street design treatments increases the hydrological functionality of a street by increasing the absorption and filtration potential of a street, reducing runoff volumes into ocean-bound sewers. Commonly recommended green street treatments include the following:



BIOSWALE

Bioswales are a type of infiltration planter that allow for stormwater to infiltrate through the soil and back into the groundwater table. Vegetated swales are typically long, narrow, landscaped depressed areas or planters that are designed to slope inward and are typically of shallow depth.

PERVIOUS STRIPS

Pervious strips, like bioswales, slow and capture runoff and allow for some infiltration. They are typically long and narrow, running along the curb in the amenity zone. Pervious strips can be an inexpensive first step in stormwater management, but provide less capacity for infiltration than other elements.

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FLOW-THROUGH PLANTER

Flow-through planters have an impermeable base, but allow for runoff to be absorbed by the soil and vegetation then filtered into an underdrain system that captures water beyond the planter's capacity. Flow-through planters are appropriate in urban or high-density areas where infiltration into the water table is not possible.

PERMEABLE SURFACES

Permeable surfaces include a set of pavement options that allow for stormwater to pass through the pavement material and into a subgrade level to be captured and infiltrated or routed into the storm drain network. Permeable surfaces can be used in sidewalks or on the roadway. Permeable surfaces include the following:

- Stone aggregate
- Permeable asphalt
- Permeable clay brick pavers
- Permeable interlocking concrete pavers
- Permeable concrete

DRAFT

LANDSCAPING

MODAL PRIORITY

WALKING

BIKING

TRANSIT

PLACEMAKING

AUTOMOBILE

MORE INFORMATION

- County of San Diego: BMP Design Manual for Permanent Site Design, Strom Water Treatment and Hydromodification Management, 2019
- City of Philadelphia: Green Streets Design Manual, 2014
- NACTO: Urban Street Stormwater Guide, 2017

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

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5 ACCESS ZONE

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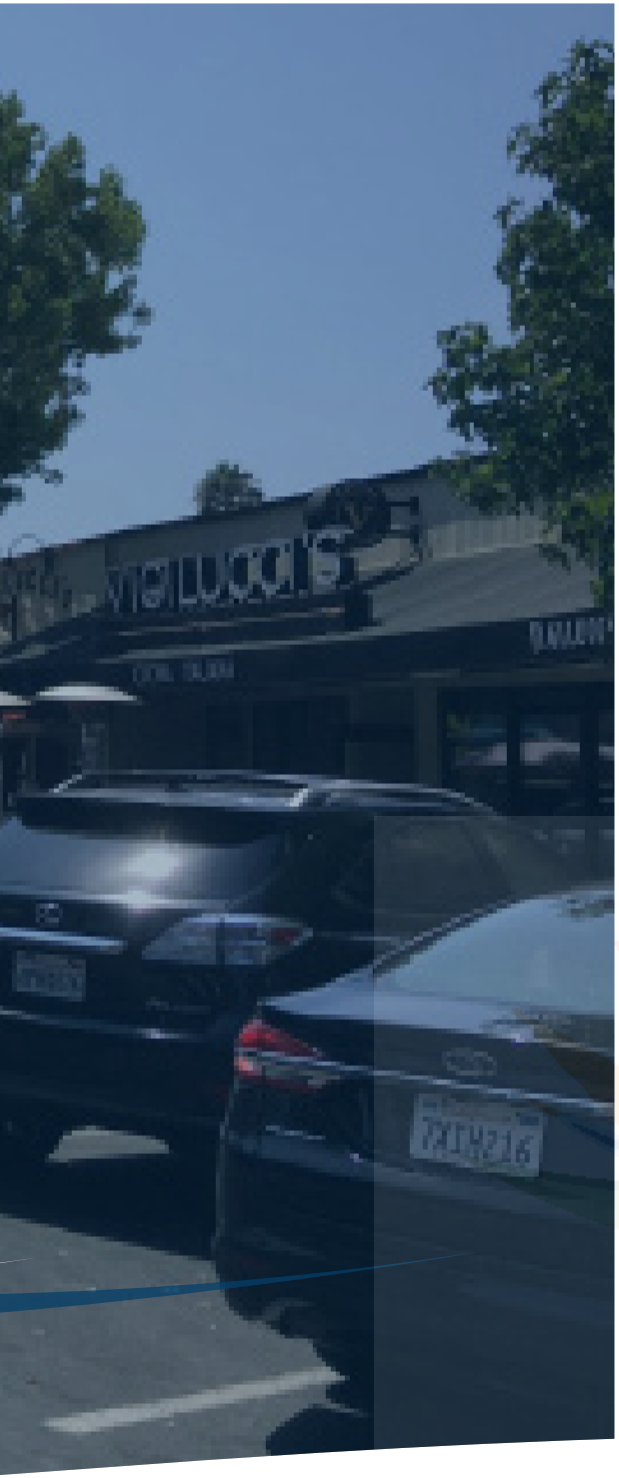

5 ACCESS ZONE

The access zone between the curb and travel lanes is a highly flexible area which can contain elements used by all modes. The primary purpose of the access zone is to accommodate the loading and unloading of passengers and goods. In lieu of on-street parking the access zone can be used to extend the realm of amenities through features like bike corrals and parklets.

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BUS LOADING ZONE

The bus loading zone, is the space in which a bus stops to pick up and drop off passengers. Streets should be designed so that transit vehicles do not have to weave in and out of the travel lane. Instead, transit vehicles should stop in lane, adjacent to a curb. In cases where the curb is separated from the travel lane by parked cars or other elements of the access zone, bus bulbs should be used to extend the curb out to the outside travel lane.

DESIGN POLICIES

- Far-side placement (after the intersection in the direction of travel) is preferred in order to ensure that passengers crossing the street walk behind the bus.
- The bus zone begins five feet from the radius return at the intersection.
- Bus stops with high levels of service (stops served by 10 or more vehicles per hour) need space to accommodate multiple vehicles simultaneously.

MORE INFORMATION

- MTS: Designing for Transit, 2018
- NACTO: Transit Street Design Guide
- NCTD Bus Stop Development Handbook

MINIMUM PREFERRED DIMENSIONS

The length of the bus loading zone is dependent on the size of the vehicles serving that stop and the placement of the bus zone within the block.

DRAFT

BUS LOADING ZONE

MODAL PRIORITY

WALKING
BIKING
TRANSIT
PLACEMAKING
AUTOMOBILE

BUS LOADING ZONE LENGTHS

LOCATION	LENGTH OF CURB FOR 40′ BUS (FEET)	LENGTH OF CURB FOR 60′ BUS (FEET)
Far-side	90	120
Near-side	100	170
Mid-block	120	140
For each additional vehicle	50	70

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

DRAFT

BUS BULBS

Bus bulbs are a type of curb extension that extends a bus stop into the parking lane for the length of the stop. Bus bulbs are used to address constrained or insufficient sidewalk space for bus stops and/or on corridors where buses have difficulty merging back into travel lanes. Bus bulbs can improve transit travel time and reduces points of conflict between buses and other vehicles.

DESIGN POLICIES

- Where on-street parking exists, bus bulbs may be installed to expand the bus stop waiting area and allow riders to board directly from the sidewalk.
- Bus bulbs are effective for rapid service but may not be appropriate for local routes or streets with one lane per direction.
- If the stop is located midblock, AASHTO notes that mid-block pedestrian crossings may be provided.

MORE INFORMATION

- AASHTO: "A Policy on Geometric Design of Highways and Streets." In Green Book, 6th ed. (2011): 7-53.
- MTS: Designing for Transit, 2018
- NACTO: Transit Street Design Guide
- NCTD Bus Stop Development Handbook

MINIMUM PREFERRED DIMENSIONS

Preferred depth of a bus bulb is six feet with a length that allows passengers to board and exit at all doors for the applicable type of bus.

DRAFT

BUS BULBS

MODAL PRIORITY

WALKING
BIKING
TRANSIT
PLACEMAKING
AUTOMOBILE

Bus Bulb – Portland, Oregon

LOCATION

- SIDEWALK
- **CURB**
- **MIDBLOCK**
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- **COLLECTORS**
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- **SUBURBAN**

DRIVING SPEED

- **LOW (20MPH OR LOWER)**
- **MEDIUM (25-35MPH)**
- **HIGH (30-45MPH)**

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- **MEDIUM (2K-20K)**
- **HIGH (20K-60K)**
- **VERY HIGH (MORE THAN 60K)**

DRAFT

ON-STREET PARKING

On-street parking supports storefront retail and serves local residents and visitors for short-term parking needs. It also helps to visually narrow the street and slow vehicular traffic, as well as provide a buffer between the sidewalk and moving vehicles.[1] The provision of on-street parking should be evaluated based on competing needs for the space. Where space is available, back-in angled is preferred over standard parallel parking stalls as a speed management solution. Back-in angled parking provides drivers with a better view of other vehicles and bicyclists when exiting, positions motorists and passengers to enter and exit away from travel lanes, and is less challenging than parallel parking.

DESIGN POLICIES

- Ensure that a clear walk zone will not be impeded by the rear end of vehicles backed up to the curb

MINIMUM PREFERRED DIMENSIONS

The target width for parallel on-street parking is eight feet, however the parking lane can be narrowed to 7 feet in constrained conditions, or for traffic calming purposes. Parking lanes that may serve other uses, such as loading zones or peak hour travel lanes, may require wider lane widths. The typical dimensions and layout of angled parking range from a 30 to 60 degree angle. The required width of an angled parking lane varies between 16 feet and 18.5 feet depending on the angle.

MORE INFORMATION

- AASHTO: "A Policy on Geometric Design of Highways and Streets." In Green Book, 6th ed, 2011: 7-72.

[1] Maintaining on-street parking should be prioritized where pedestrian activity is to be supported. "Eliminating curb parking can affect pedestrian safety and comfort, and reduce the livability of both commercial and residential districts." Source: American Association of State Highway Transportation Officials, A Policy on Geometric Design of Highways and Streets, 6th ed. 2011: 7-47.

DRAFT

ON-STREET PARKING

MODAL PRIORITY

WALKING
BIKING
TRANSIT
PLACEMAKING
AUTOMOBILE

Back-in Angled Parking – Hermosa Beach, California

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

DRAFT

DRIVEWAYS

Driveways, as defined here, are curb cuts in sidewalks that provide vehicle access in and out of private property. Too many driveways, and poorly designed driveways, can interrupt the pedestrian environment and create conflict points with pedestrians.[2] Managing the number of driveways in all contexts can improve the pedestrian experience and overall sidewalk safety and can, in many cases, reduce automobile crashes associated with unorganized left turning movements.

DESIGN POLICIES

- For streets where driveways are permitted, the apron should be placed within the curbside/amenity zone in order to maintain a level, ADA compliant Pedestrian Access Route.
- On-street parking should not be allowed within five feet of driveways. On higher speed streets, this distance may be increased to improve the visibility of pedestrians to turning vehicles.
- Appropriate markings should be used where vehicles must cross high-volume bicycle facilities to access driveways.
- Orient driveways 90 degrees to the street and use minimum radius where possible.

MORE INFORMATION

- Federal Highway Administration: Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, 2016

MINIMUM PREFERRED DIMENSIONS

As per the City of Carlsbad Engineering Standards Volume 1, minimum driveway width for multi-family/commercial should be 24 feet and 12 feet for single-family residential.[3] While the Engineering Standards indicate driveway width should not exceed 40 feet for commercial this dimension should be avoided as it will create a far less comfortable interface with pedestrians on the sidewalk.

[2] Poorly designed driveways can also contribute to congestion, as noted by AASHTO: "Conflicts and congestion occur at interfaces between public highways and private traffic-generating facilities when the functional transitions are inadequate. Examples are commercial driveways that connect directly from a relatively high-speed arterial to a parking aisle." American Association of State Highway Transportation Officials. "A Policy on Geometric Design of Highways and Streets." 6th ed. (2011): 1-2

[3] The Village and Barrio Master Plan restricts driveway widths in the Urban Village Context to 20 feet.

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DRIVEWAYS

MODAL PRIORITY

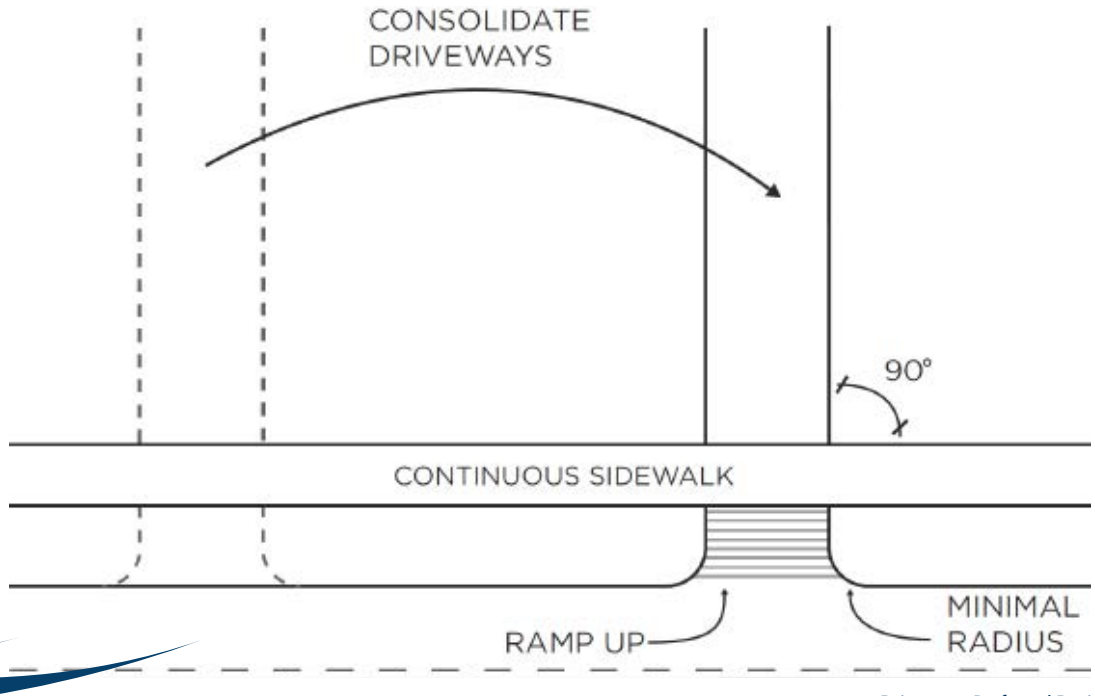
WALKING

BIKING

TRANSIT

PLACEMAKING

AUTOMOBILE



Driveway – Preferred Design

LOCATION

- SIDEWALK
- CURB
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- ARTERIALS

CONTEXT

- URBAN VILLAGE
- SUBURBAN

DRIVING SPEED

- LOW (20MPH OR LOWER)
- MEDIUM (25-35MPH)
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- HIGH (20K-60K)
- VERY HIGH (MORE THAN 60K)

DRAFT

LOADING ZONES

A loading zone is a dedicated curbside space intended for short duration parking to directly service nearby businesses or properties. Loading zones help promote a strong economy and a vibrant retail environment, particularly in downtown areas and neighborhood business districts. However, loading zones also take up space that could otherwise be used for general parking, pedestrians, or transit, and therefore should be well managed to optimize use. Alleys should be used for loading whenever possible.

DESIGN POLICIES

- Loading zones are important, particularly in areas with commercial uses.
- Loading zones should be incorporated into on-street parking lanes or places on side streets.
- Loading during off-peak hours (typically early morning or late evening) should be encouraged.
- Loading zones must be clearly signed and marked to encourage proper use.

MORE INFORMATION

- AASHTO: "A Policy on Geometric Design of Highways and Streets." In Green Book, 6th ed, 2011: 7-47

MINIMUM PREFERRED DIMENSIONS

Loading zones should be a minimum of eight feet wide; however, nine feet is preferred.

DRAFT

LOADING ZONES

MODAL PRIORITY

WALKING

BIKING

TRANSIT

PLACEMAKING

AUTOMOBILE

Loading Zone – Seattle, Washington

LOCATION

- SIDEWALK
- **CURB**
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- **COLLECTORS**
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- **SUBURBAN**

DRIVING SPEED

- **LOW (20MPH OR LOWER)**
- **MEDIUM (25-35MPH)**
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- **MEDIUM (2K-20K)**
- **HIGH (20K-60K)**
- **VERY HIGH (MORE THAN 60K)**

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SHARED USE MOBILITY ZONES

Traditional loading zones or former on-street parking spaces can be repurposed to serve as pick-up and drop-off areas for taxis, ride-hailing services (TNCs) like Lyft and Uber, on-demand microtransit, and valet parking operations. The purpose of these zones is to reduce conflicts and mitigate traffic impacts from passenger pick-up and drop-offs.

MORE INFORMATION

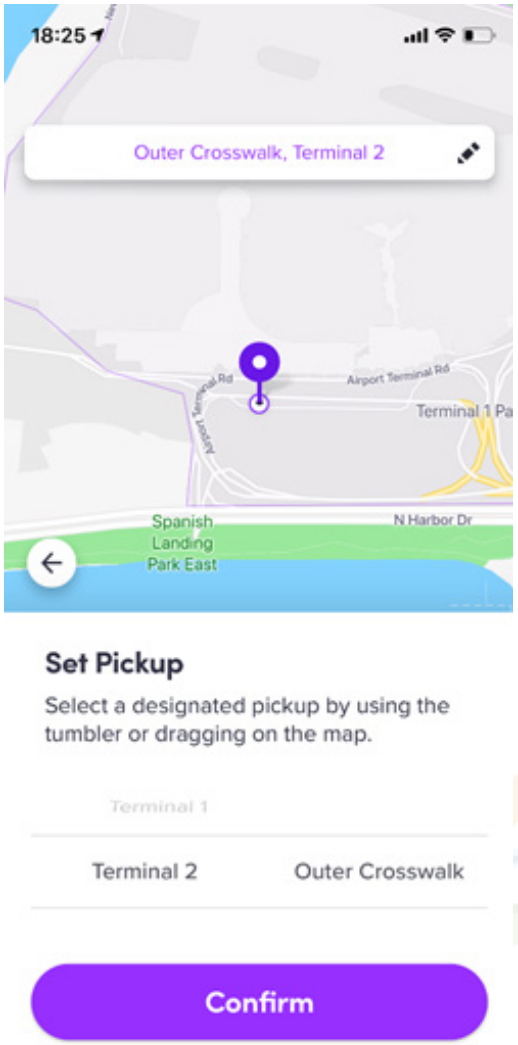
- Eno Center for Transportation: Shared-Use Mobility Zones: Fighting Congestion with a Home for Rideshare, 2015
- Eno Center for Transportation: Ahead of the Curb: The Case for Shared Use Mobility (SUM) Zones, 2017
- NACTO: Blueprint For Autonomous Urbanism, 2017
- ITE Curbside Management Practitioners Guide, 2018

DESIGN POLICIES

- Shared Use Mobility (SUM) zones may be designated with signage, curb paint, and geo-fencing. Through geo-fencing integration with ride-hailing applications, each time a ride is requested, both drivers and passengers would be shown the location of the nearest SUM zone in which pick-ups and drop-offs can legally occur.
- Place SUM zones at the beginning or end of a block with on-street parking to allow for the most efficient use of the space given applicable vehicles will ingress and egress frequently.

MINIMUM PREFERRED DIMENSIONS

SUM zones should be a minimum of eight feet wide with clear pedestrian access from the curb to the walk zone.



Designated TNC Pickup Zone – San Diego, CA

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SHARED USE MOBILITY ZONES

MODAL PRIORITY

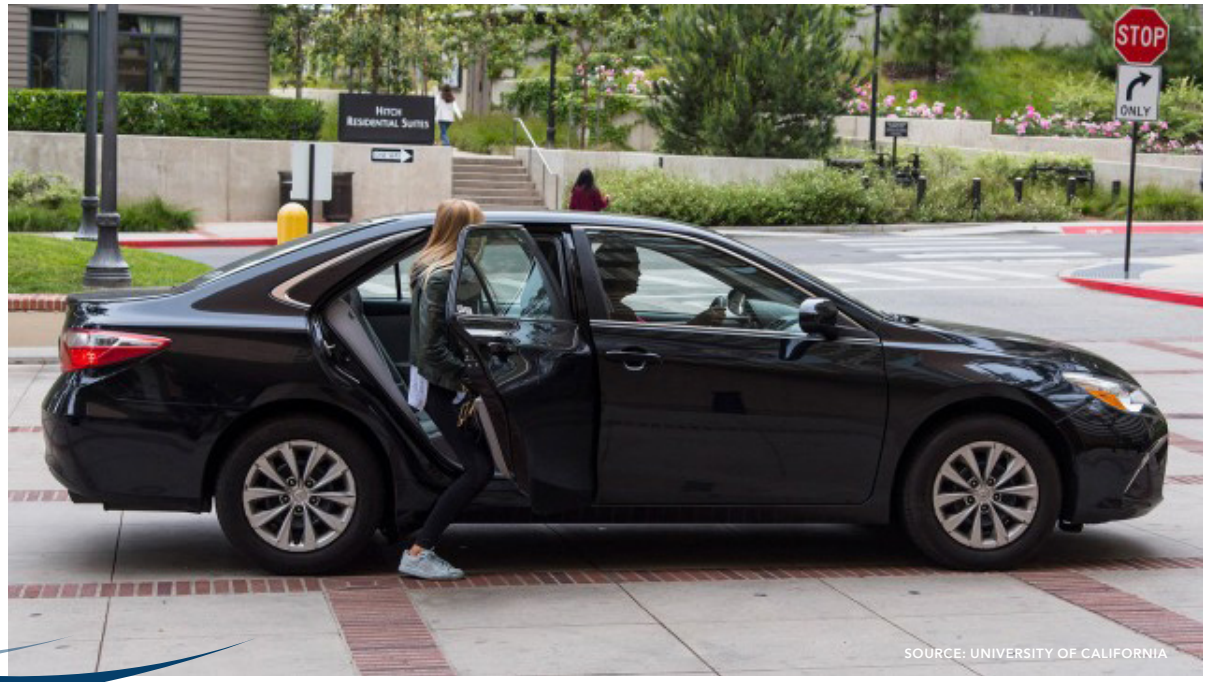
WALKING

BIKING

TRANSIT

PLACEMAKING

AUTOMOBILE



SOURCE: UNIVERSITY OF CALIFORNIA

SUM Zone – Los Angeles, California

LOCATION

- SIDEWALK
- **CURB**
- MIDBLOCK
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- COLLECTORS
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- **SUBURBAN**

DRIVING SPEED

- LOW (20MPH OR LOWER)
- **MEDIUM (25-35MPH)**
- **HIGH (30-45MPH)**

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- MEDIUM (2K-20K)
- **HIGH (20K-60K)**
- **VERY HIGH (MORE THAN 60K)**

DRAFT

BIKE CORRALS

Bicycle corrals are on-street bicycle parking facilities that typically replace one or more vehicle parking spaces. Bike corrals can replace bicycle hoops, bike racks, freeing up sidewalk space for other uses such as additional pedestrian space or cafe dining. Bike corrals are an excellent solution for accommodating a large number of bicycles near specific activity areas and in areas with narrow sidewalks. Bike corrals can be installed at corners to "daylight" an intersection since bicycle parking has no effect on the visibility of pedestrians to moving vehicle traffic. Bike corrals have been shown to have a positive impact on business. Bike corrals can serve to move parked bicycles off of sidewalks to make additional room for pedestrians. In addition, because bike corrals are shorter than parked automobiles, they do not obstruct sightlines and can be used at corners without affecting the visibility of pedestrians to moving traffic.

MORE INFORMATION

- Association of Pedestrian and Bicycle Professionals: Essentials for Bike Parking, 2015

DESIGN POLICIES

- Bike corrals may be installed in the access zone in the place of one or more car parking spaces.
- Bike corrals should be oriented so that bikes may be parked on either side of the corral.
- The rack should support the bicycle frame in at least two places, allowing both the frame and the wheel to be locked and preventing bicycles from tipping over.
- The bike corral area should be demarcated using paint, bollards, or planters. Bollards or wheel stops should be installed on either end to separate parked cars from bicycles

MINIMUM PREFERRED DIMENSIONS

Bike corrals should provide enough clearance for bicycles from the adjacent travel lane. Racks should be placed perpendicular to the curb where at least 8 feet is available and angled where a minimum 7 feet is available. Corrals should be spaced at least 3 feet apart to allow access to and from the sidewalk between corrals.

DRAFT

BIKE CORRALS

MODAL PRIORITY

- WALKING
- **BIKING**
- TRANSIT
- PLACEMAKING
- AUTOMOBILE

Bike Corral – San Mateo, CA

LOCATION

- SIDEWALK
- **CURB**
- MIDBLOCK
- CARTWAY
- **INTERSECTION**

STREET TYPE

- NEIGHBORHOOD
- **COLLECTORS**
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- **SUBURBAN**

DRIVING SPEED

- **LOW (20MPH OR LOWER)**
- **MEDIUM (25-35MPH)**
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- **MEDIUM (2K-20K)**
- **HIGH (20K-60K)**
- VERY HIGH (MORE THAN 60K)

DRAFT

PARKLET

Parklets are temporary or seasonal mini plazas located in former curbside parking spaces. Parklets provide an opportunity to turn underutilized spaces into attractive amenities for public interaction, art, dining, or other activated uses. Often the product of a partnership between the city and local businesses, residents, or neighborhood associations, these amenities have a distinctive design and accommodate unmet demand for public space, particularly on thriving retail streets or in commercial areas. Parklets convert curbside parking spaces into public seating platforms, with plantings, landscaping, and/or bike racks. Parklets are typically applied where narrow or congested sidewalks prevent the installation of traditional sidewalk dining.

MORE INFORMATION

- AASHTO: Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004: Section 3.2.13: Ambience, Shade, and Other Sidewalk Enhancements

DESIGN POLICIES

- Parklets should have a flush transition at the sidewalk and curb to permit easy access and avoid tripping hazards.
- Parklets should avoid corners and are best placed at least one parking space away from the intersection corner.
- Where installation of a parklet is under consideration for a site near an intersection, volumes of turning traffic, sightlines, visibility, and daylighting should be taken into account.
- Site selection should consider the level of utilization and nearby pedestrian volumes both during the day and at night. Seating may be integrated into the design itself or made possible with movable tables and chairs.

MINIMUM PREFERRED DIMENSIONS

Parklets have a desired minimum width of six feet (or one foot less than the width of the parking lane).

DRAFT

PARKLET

MODAL PRIORITY

- WALKING
- BIKING
- TRANSIT
- PLACEMAKING
- AUTOMOBILE

Parklet - Carlsbad

LOCATION

- SIDEWALK
- **CURB**
- **MIDBLOCK**
- CARTWAY
- INTERSECTION

STREET TYPE

- NEIGHBORHOOD
- **COLLECTORS**
- **ARTERIALS**

CONTEXT

- **URBAN VILLAGE**
- SUBURBAN

DRIVING SPEED

- **LOW (20MPH OR LOWER)**
- **MEDIUM (25-35MPH)**
- HIGH (30-45MPH)

TRAFFIC VOLUME

- LOW (LESS THAN 2K)
- **MEDIUM (2K-20K)**
- **HIGH (20K-60K)**
- VERY HIGH (MORE THAN 60K)