

South Orange County Multimodal Transportation Study

Final Report

Orange County Transportation Authority
(OCTA)

November 2022



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1 Introduction

1.1 Purpose

The purpose of the South Orange County Multimodal Transportation Study (SOCMTS) is to recommend a long-range vision for the transportation system in South Orange County. SOCMTS updates the 2008 South Orange County Major Investment Study (SOCMIS) by identifying potential multimodal transportation improvements for South Orange County and adopting a new locally preferred strategy to set the stage for future transportation project development in the area. Findings from the SOCMTS will provide input to the Orange County Transportation Authority's (OCTA) 2022 Long-Range Transportation Plan (LRTP) and the Southern California Association of Governments' (SCAG) 2024 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

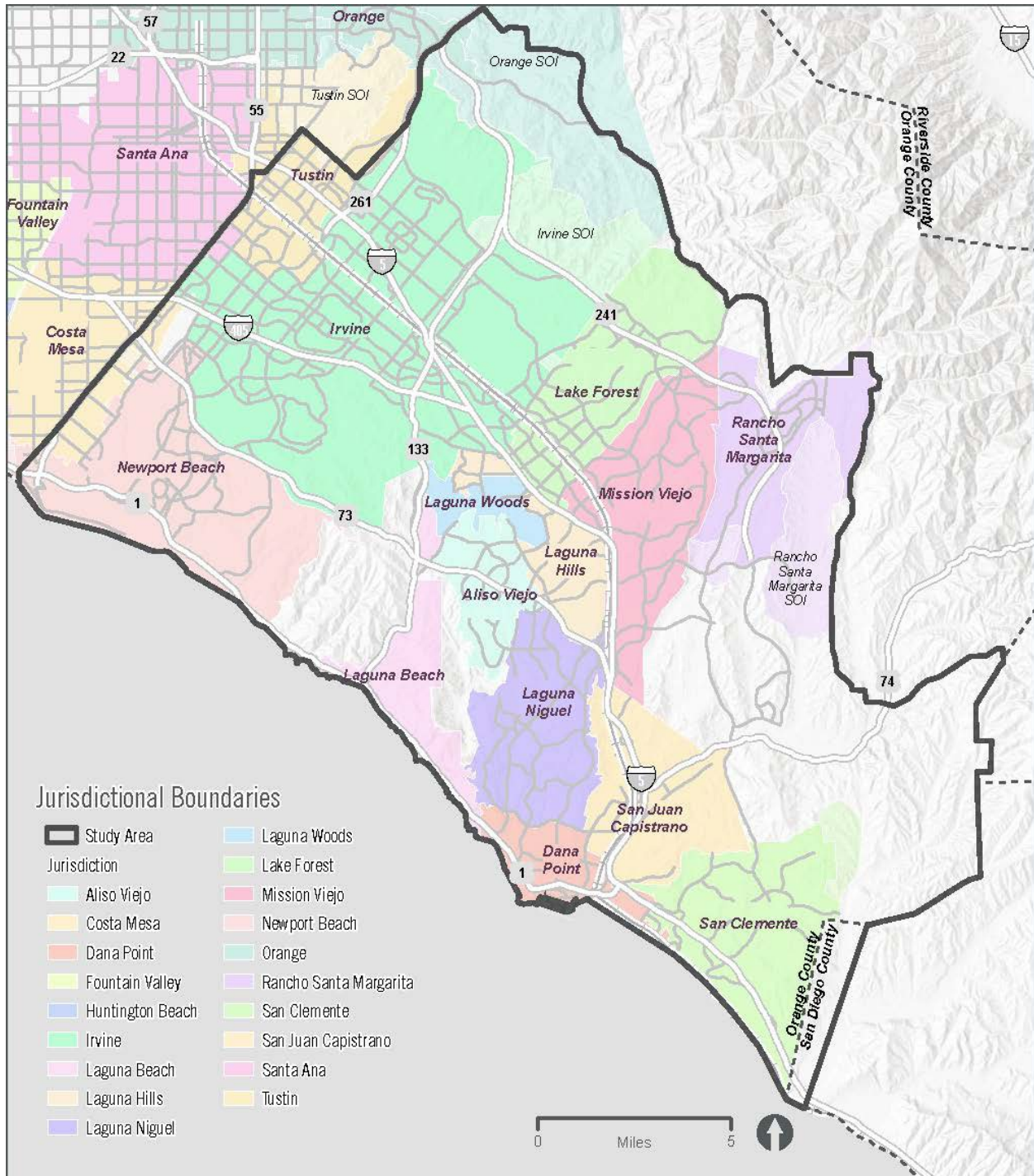
1.2 Study Area

The South Orange County study area is generally bounded by State Route (SR) 55 to the north, Santiago Canyon Road to the east, the San Diego County Line to the south, and the Pacific Ocean coastline to the west. The South Orange County study area includes (in whole or in part) the following jurisdictions:

- City of Aliso Viejo
- City of Costa Mesa
- City of Dana Point
- City of Irvine
- City of Laguna Beach
- City of Laguna Hills
- City of Laguna Niguel
- City of Laguna Woods
- City of Lake Forest
- City of Mission Viejo
- City of Newport Beach
- City of Rancho Santa Margarita
- City of San Clemente
- City of San Juan Capistrano
- City of Santa Ana
- City of Tustin
- Unincorporated Orange County

Figure 1-1 shows a map of the South Orange County study area.

Figure 1-1. South Orange County Study Area



Source: Orange County Local Agency Formation Commission (OC LAFCO), 2020

1.3 Role of Multimodal Transportation Studies in Project Development

OCTA conducts multimodal studies to develop a vision for the transportation system to address long-term needs and develop consensus on a set of multimodal transportation improvements that can form a Locally Preferred Strategy (LPS). Once the LPS receives OCTA Board approval, study recommendations can be considered in the LRTP for implementation. The OCTA LRTP is a long-term plan (20+ years) that is updated on a four-year cycle. The LRTP feeds into the SCAG RTP/SCS, which is also on a four-year cycle with a 20+ year planning timeframe. Once included in the SCAG RTP, projects can be programmed in the Federal Transportation Improvement Program.

1.4 Study Process

The study consisted of three phases. In Phase 1, existing and future conditions were assessed to identify issues and opportunities, develop a Purpose and Need statement, and develop initial multimodal solutions addressing the Purpose and Need. In Phase 2, multimodal solutions were screened and packaged into two Multimodal Vision Alternatives. In Phase 3, the Multimodal Vision Alternatives were evaluated in greater detail and the Locally Preferred Strategy was developed.

1.5 Community, Agency, and Stakeholder Participation

Public engagement was conducted from the start of the study to establish a trusted relationship and offer transparency to the stakeholders in the study area. Each of the three phases of outreach had engagement methods and tailored messaging that aligned with the stages of the study process. The first phase assessed public perception of transportation challenges and improvement strategies, the second phase assessed the public's priorities on draft strategies and transportation solutions, and the third phase looked at priorities on the proposed multimodal alternatives.

To align with OCTA's diversity, equity, and inclusion goals, several outreach tactics were implemented to engage diverse and hard-to-reach communities and encourage meaningful engagement with all people regardless of ethnicity or socioeconomic backgrounds. The online qualitative survey and fact sheets were translated into Spanish, Vietnamese, Korean, and Mandarin. In addition, a helpline was available for people who preferred to call or did not have internet access so they could leave comments and ask questions. Postcards were also mailed to targeted disadvantaged and low-income communities in the south county area so they received information about the surveys, helpline number and public meetings.

Communications toolkits were sent to all South Orange County cities, key stakeholders, local churches, school districts, higher education facilities, and OCTA's Citizens Advisory Committee, Accessible Transit Advisory Committee, and Diverse Community Leaders Group. Targeted Facebook and geofencing ads were also placed in the aforementioned multiple languages.

A Technical Working Group (TWG) was formed at the study's inception in 2020. A total of seven TWG meetings took place from August 13, 2020, through March 7, 2022. The 24-member group comprised a mix of city public works and planning staff and agency department representatives from the study area.

A Technical Advisory Working Group (TAWG) was formed at the study's inception in 2020. A total of seven TAWG meetings took place from September 2, 2020, through March 8, 2022. The Technical Advisory Working Group comprised staff from Caltrans, TCA, SCAG, the San Diego Association of Governments (SANDAG), the Southern California Regional Rail Authority, and the Federal Highway Administration. The full Public and Stakeholder Participation Report for the study is provided in Appendix A.

2 Purpose and Need

2.1 Existing and Future No-Build Conditions

This analysis is based on 2016 as the base year and 2045 as the projected future year. As SOCMTS is a long-term transportation study, pre-Covid-19 pandemic conditions were assumed to be more relevant to future years than conditions during or immediately following the height of the pandemic. The full Existing and Future Conditions analysis is included in Appendix B.

2.1.1 Demographics and Land Use

Population and Employment

Table 2-1 provides a summary of population within the study area between 2016 and 2045 based on Orange County Projections (OCP) 2018. The population in Orange County as a whole is anticipated to grow by 11 percent from 3.18 million people in 2016 to 3.53 million in 2045. The population within the South Orange County study area is anticipated to grow by 16 percent from 1.11 million in 2016 to 1.29 million in 2045. The population within the South Orange County study area comprises approximately 35 percent of the entire county's population.

Table 2-1. Study Area Population			
Population	2016	2045	% Change
Orange County	3,179,626	3,534,620	11%
South Orange County Study Area	1,112,381	1,286,002	16%
Study Area as a Percent of the Total County	35%	36%	-
Population per Square Mile			
Orange County	3,980	4,424	11%
South Orange County Study Area	2,225	2,572	16%

Source: Orange County Projections (OCP) 2018

Table 2-2 provides a summary of employment within the study area between 2016 and 2045 based on OCP 2018. Employment in Orange County as a whole is anticipated to grow by 16 percent from 1.71 million jobs in 2016 to 1.98 million in 2045. Employment within the South Orange County study area is anticipated to grow by 18 percent from 760,000 jobs in 2016 to 893,000 in 2045. Thus, similar to the population growth rate, the employment growth rate in the South Orange County study area is forecast to be slightly greater than that of Orange County as a whole.

Table 2-2. Study Area Employment

Employment	2016	2045	% Change
Orange County	1,710,147	1,980,433	16%
South Orange County Study Area	759,599	893,184	18%
Study Area as a Percent of the Total County	44%	45%	-
Employment per Square Mile			
Orange County	2,140	2,479	16%
South Orange County Study Area	1,519	1,786	18%
Source: Orange County Projections (OCP) 2018			

Land Use

General Plan land use elements within the study area provide the long-term vision for build-out of each community (over a typical 20-year horizon). Table 2-3 identifies the total acreage assigned to existing and future land use categories within the study area. Within the built environment, residential uses comprise the largest number of acres, with single-family being the largest residential type with over 33,000 acres devoted to it, or 16 percent of the study area. This is expected to increase to over 50,000 acres over the next 20–25 years.

Table 2-3. Existing and Future Land Use

Land Use	Existing Acreage	Future Acreage
Rural Residential	316.8	—
Single-Family Residential	33,229.4	50,670.7
Mixed Residential	1,278.0	9,765.5
Multifamily Residential	12,909.7	10,165.4
Mobile Homes	640.5	97.5
Commercial	6,237.5	5,024.7
Commercial-Office	2,459.5	1,517.7
Public Facilities	2,577.4	3,867.0
Education	4,445.3	3,112.0
Military	2,645.2	2,571.2
Industrial	2,970.4	3,586.2

Table 2-3. Existing and Future Land Use

Land Use	Existing Acreage	Future Acreage
Transportation/Communication/Utility	6,732.9	4,267.9
Mixed-Use (Commercial and Industrial)	2,522.2	4,744.4
Mixed-Use (Residential and Commercial)	130.5	3,444.1
Under Construction	624.1	—
Open Space and Recreation	68,875.5	51,293.4
Agriculture	4,367.2	752.7
Specific Plan	4,313.4	407.6
Vacant	7,076.7	—
Water	2,456.9	794.9
Undevelopable or Protected Land	20,695.4	31,356.2
Unknown	29.4	94.9
Total	187,534.1	187,534.1

Source: SCAG 2016

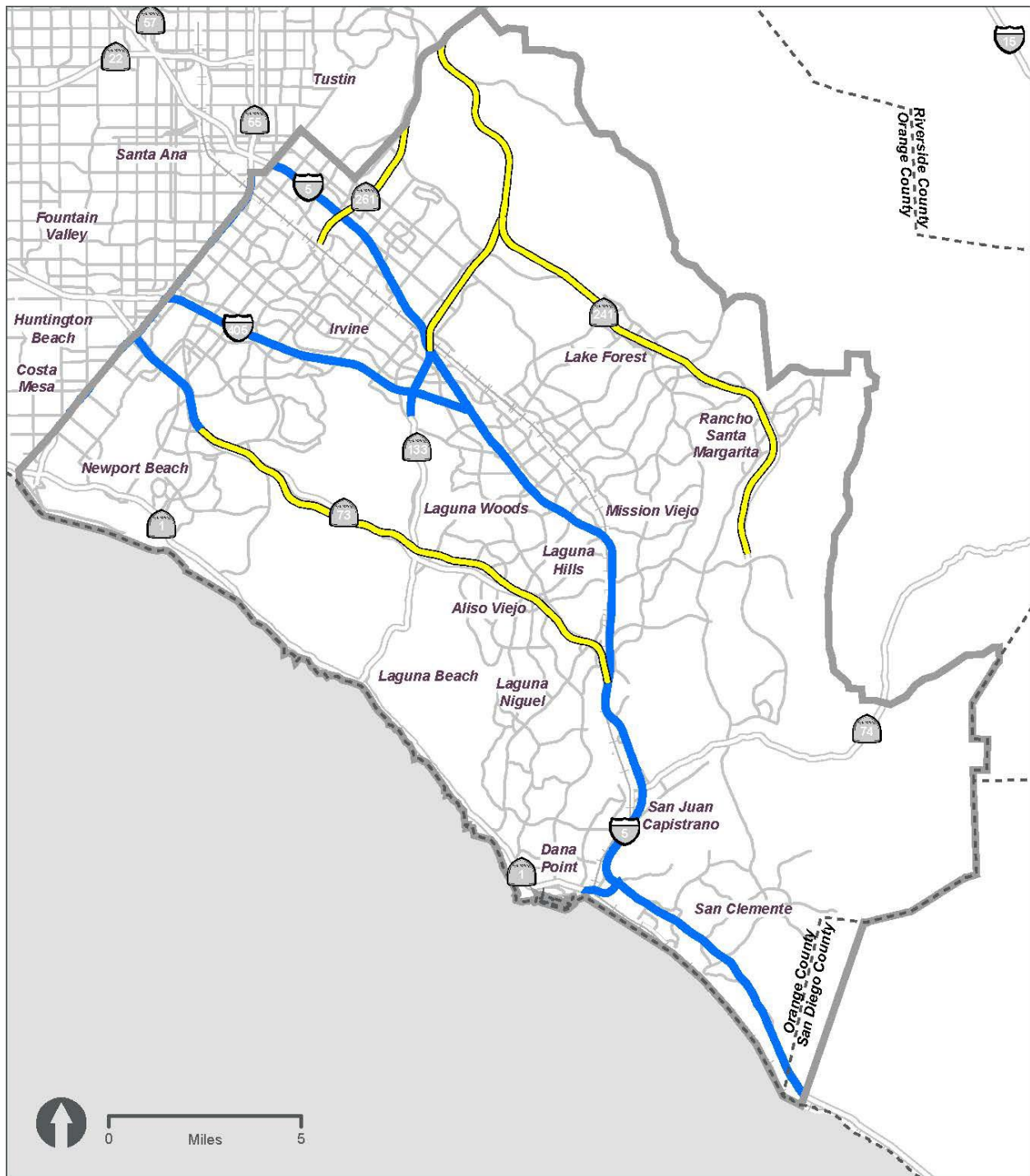
There are areas within South Orange County that are undergoing a change and intensification of use. These include lands east of SR-55 in Santa Ana, Tustin, and Irvine that will ultimately be a more intense mix of industrial, office, and high-density multifamily uses. There will also be development of underutilized and vacant buildings, including the proposed mixed-use project at the former Laguna Hills Mall, which is anticipated to ultimately include 1,500 dwelling units and over 1.5 million square feet of office, entertainment, and retail uses. Opportunities to repurpose retail centers or infill within parking lots along major corridors are another location where multifamily residential and other uses are likely to emerge over time.

Appendix B includes maps of existing and planned land uses, a list of major projects in the study area, and map of project locations in the study area.

2.1.2 Freeways and Toll Roads

Figure 2-1 shows the existing freeway and toll road network in the study area. Interstates 5 and 405 provide the backbone of highway travel through the study area, supported by a network of state routes, many of which are tolled. Detailed performance data for traffic volumes, speed, congestion, and safety are included in Appendix B. Traffic volumes are highest on I-5 and I-405. Congestion and speed are worst on I-405, but I-5 accounts for the highest number of fatal and injury collisions.

Figure 2-1. Study Area Freeway and Toll Road Corridors

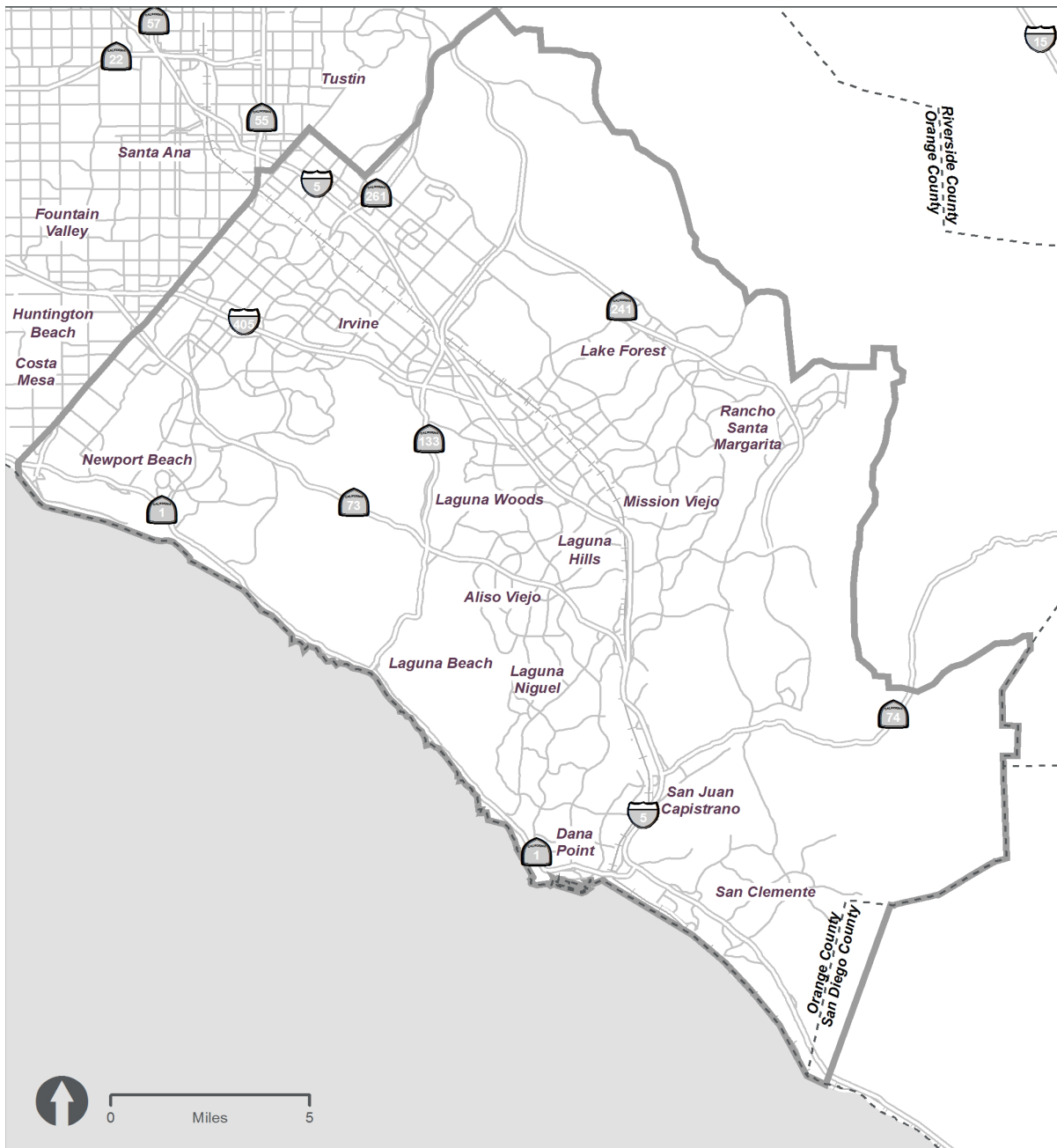


-  Study Area
-  Study Area Freeways
-  Study Area Toll Roads

2.1.3 Arterial Highways

Figure 2-2 shows the existing arterial network in the study area. Arterial segments with high traffic volumes are spread throughout the study area, as are segments with low levels of service. The Lake Forest/Laguna Woods/Laguna Hills area contains a concentration of arterials with lower speeds and higher rates of fatal or injury collisions. Pedestrian and bicycle collisions account for 25 percent of the total number of fatal and severe collisions. Detailed maps and data for the traffic volumes, speeds, congestion, buildout of the Master Plan of Arterial Highways, and safety are included in Appendix B.

Figure 2-2. Arterial Network in South Orange County



2.1.4 Transit

Figure 2-3 shows the bus and rail transit systems serving the South Orange County study area, along with supporting facilities. The Los Angeles – San Diego – San Luis Obispo (LOSSAN) Rail Corridor serves South Orange County at six station locations. Metrolink operates the Orange County Line and Inland Empire-Orange County Line commuter rail services, while the Amtrak Pacific Surfliner provides long-distance passenger rail service within the study area. OCTA and local providers operate bus and shuttle services and community circulators throughout the study area, including OC Flex on-demand service. The facilities supporting transit services include transit centers, rail stations, and park-and-ride lots. OC Bus Transportation Centers are major points of access and transfer to the OC Bus system. There are three major transit centers in the study area: Laguna Hills Transportation Center, Laguna Beach Bus Station, and Newport Transportation Center.

Park-and-ride facilities provide vital transit access and collection points that enable commuters to connect with regional bus and rail services. The public park-and-ride facilities within South Orange County are operated by OCTA as well as Caltrans. LOSSAN Rail Corridor stations also offer park-and-ride amenities. The number of available spaces offered at park-and-ride facilities varies by location.

2.1.5 Active Transportation

Active transportation refers to all modes of transportation that are non-motorized as well as electric and electric-assist micro-transit devices. Active transportation includes but is not limited to bicycling, walking, rollerblading, skateboarding, and scootering. For this study, the focus will be primarily on walking and bicycling infrastructure; however, sidewalks and bicycle facilities enable access for all active transportation users. Figure 2-4 depicts all the existing bikeways in the study area, which provide the foundation for a robust network to support active transportation.

The study area has a sufficient sidewalk network to facilitate many walking trips. Sidewalks are complemented by shared-use paths in the study area providing connectivity within neighborhoods, downtowns, and employment centers. Figure 2-5 displays the 2019 sidewalk network, which, while extensive, still has significant gaps along major regional corridors.

Figure 2-3. South Orange County Fixed Route Transit Network and Facilities

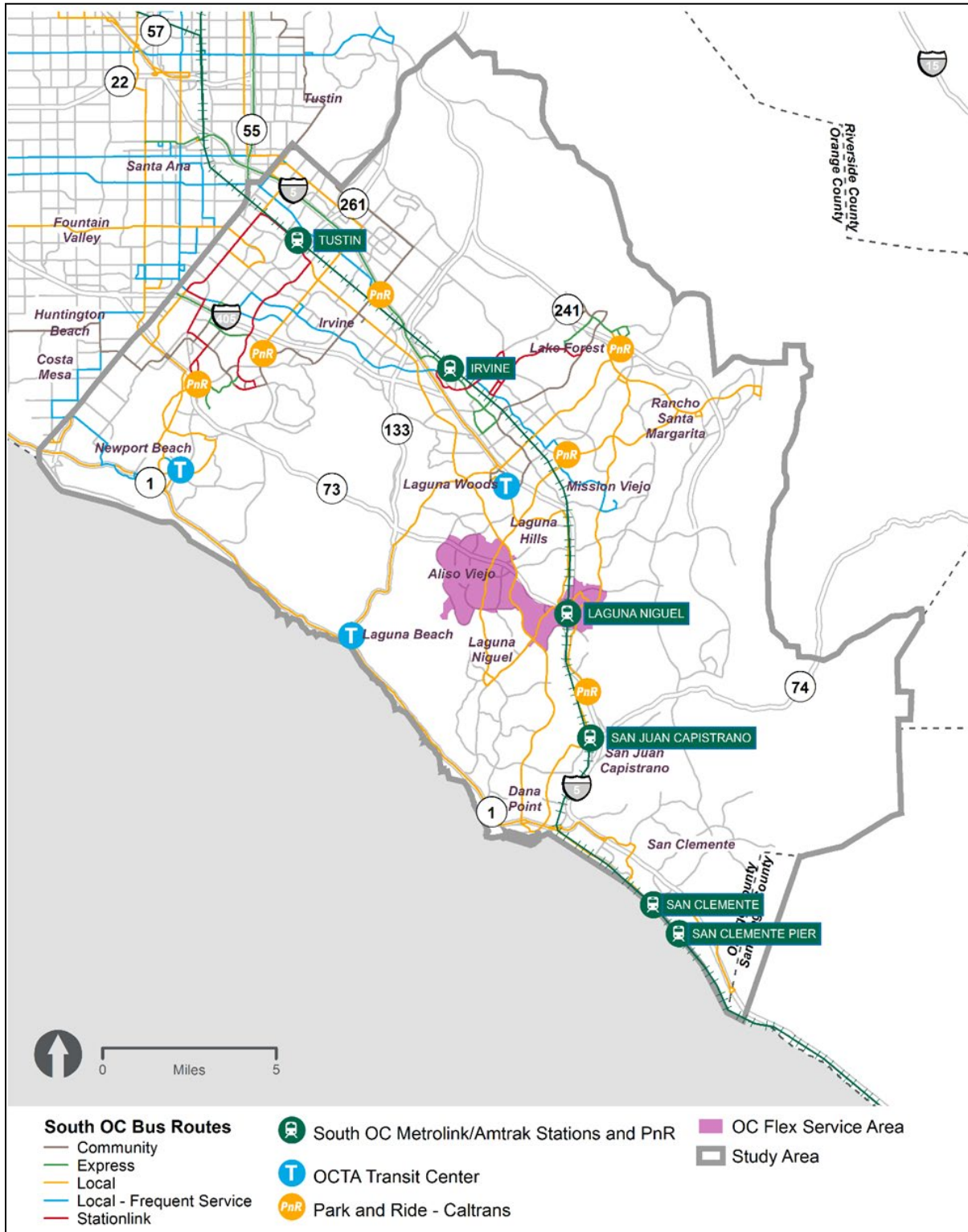
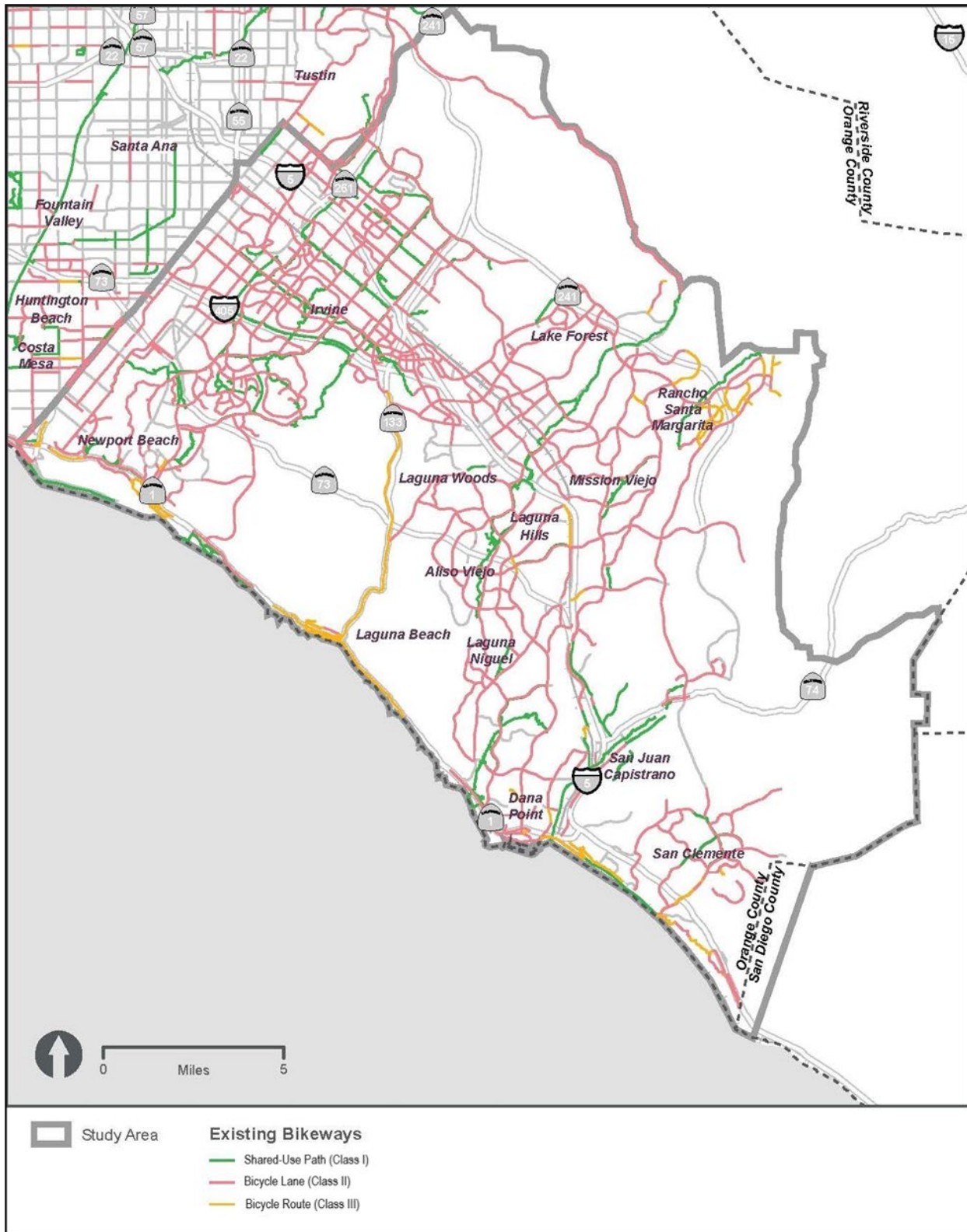
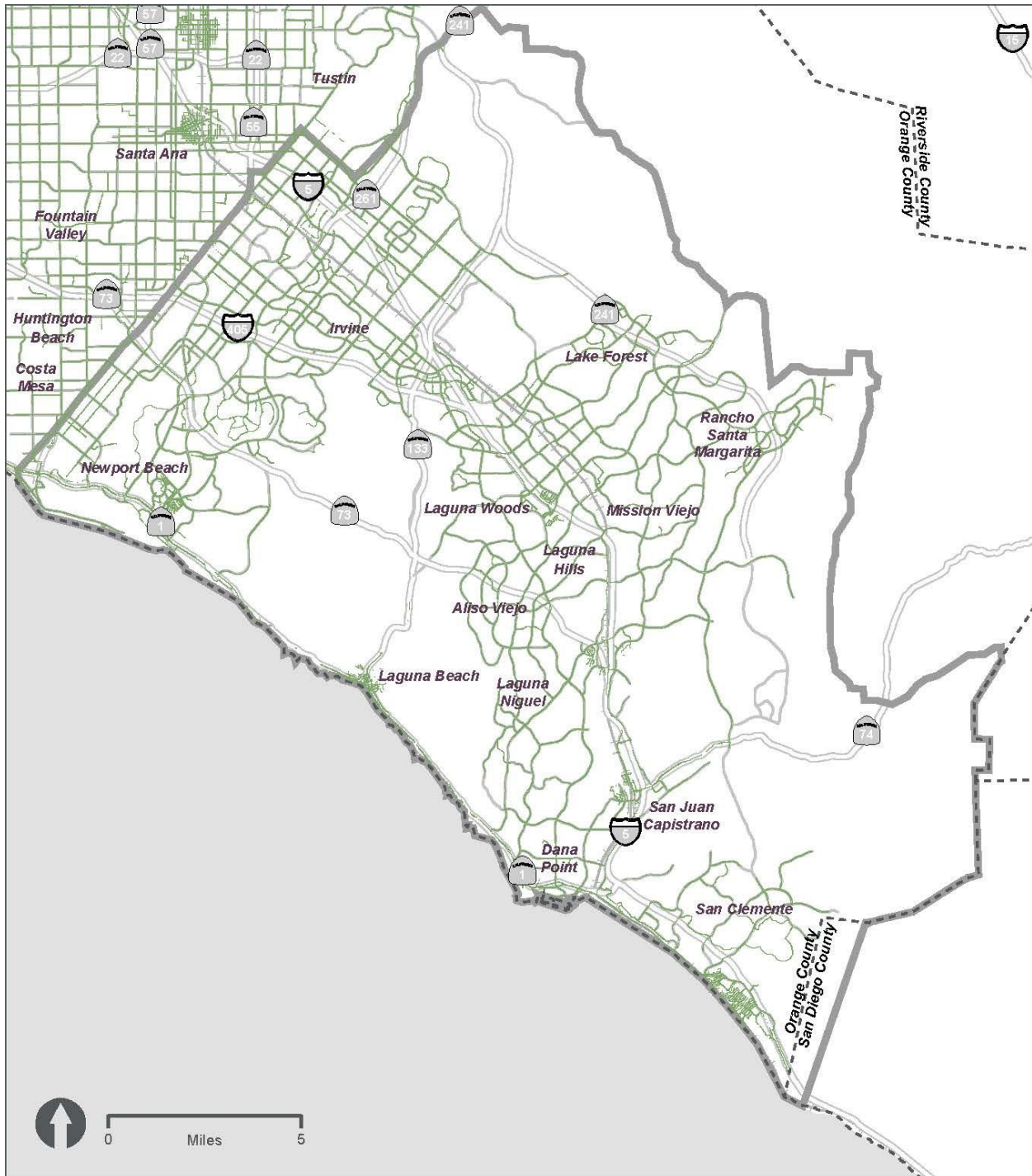


Figure 2-4. Existing Bikeways



Source: SCAG Regional Bikeways GIS Data, 2019

Figure 2-5. Existing Sidewalk Network



Source: SCAG Regional Bikeways GIS Data, 2019

2.1.6 Improvements Since SOCMIS in 2008

Since completing SOCMIS in 2008, numerous improvement projects representing almost \$1.4 billion in investment have been constructed or are under construction in South Orange County, many of them as part of Measure M, Orange County's voter-approved half-cent sales tax program to improve transportation, also called OC Go. Figure 2-6 illustrates projects that have been completed or are under construction as of 2022 and Table 2-4 summarizes the improvements since 2008 by project type. Some of the completed projects include:

- Freeway mainline improvements:
 - o I-5 carpool lanes from San Juan Creek Road to Avenida Pico
- Freeway interchange reconstruction:
 - o I-5/Ortega Highway
 - o I-5/Avenida Pico
- New arterial street segments:
 - o Alton Parkway extension from Irvine Boulevard to Commercentre Drive
 - o Lake Forest Drive extension from Santa Vittoria Drive to Laguna Canyon Road
 - o Bake Parkway extension from Irvine Center Drive to Lake Forest Drive
 - o Los Patrones Parkway extension from Oso Parkway to Cow Camp Road
 - o Cow Camp Road from Antonio Parkway to Los Patrones Parkway
 - o Avenida La Pata from Ortega Highway to Calle Saluda
- Rail improvements:
 - o Laguna Niguel to San Juan Capistrano Passing Siding Project
- Rail Station Improvements:
 - o Tustin Station
 - o Irvine Station
 - o Laguna Niguel/Mission Viejo Station
- Railroad grade separations:
 - o Jeffrey Road
 - o Sand Canyon Avenue
- Projects currently under construction include:
 - o I-5 improvements between SR-73 and El Toro Road
 - o SR-55 improvements between I-405 and I-5

Figure 2-6. South Orange County Transportation Improvements 2008–2022

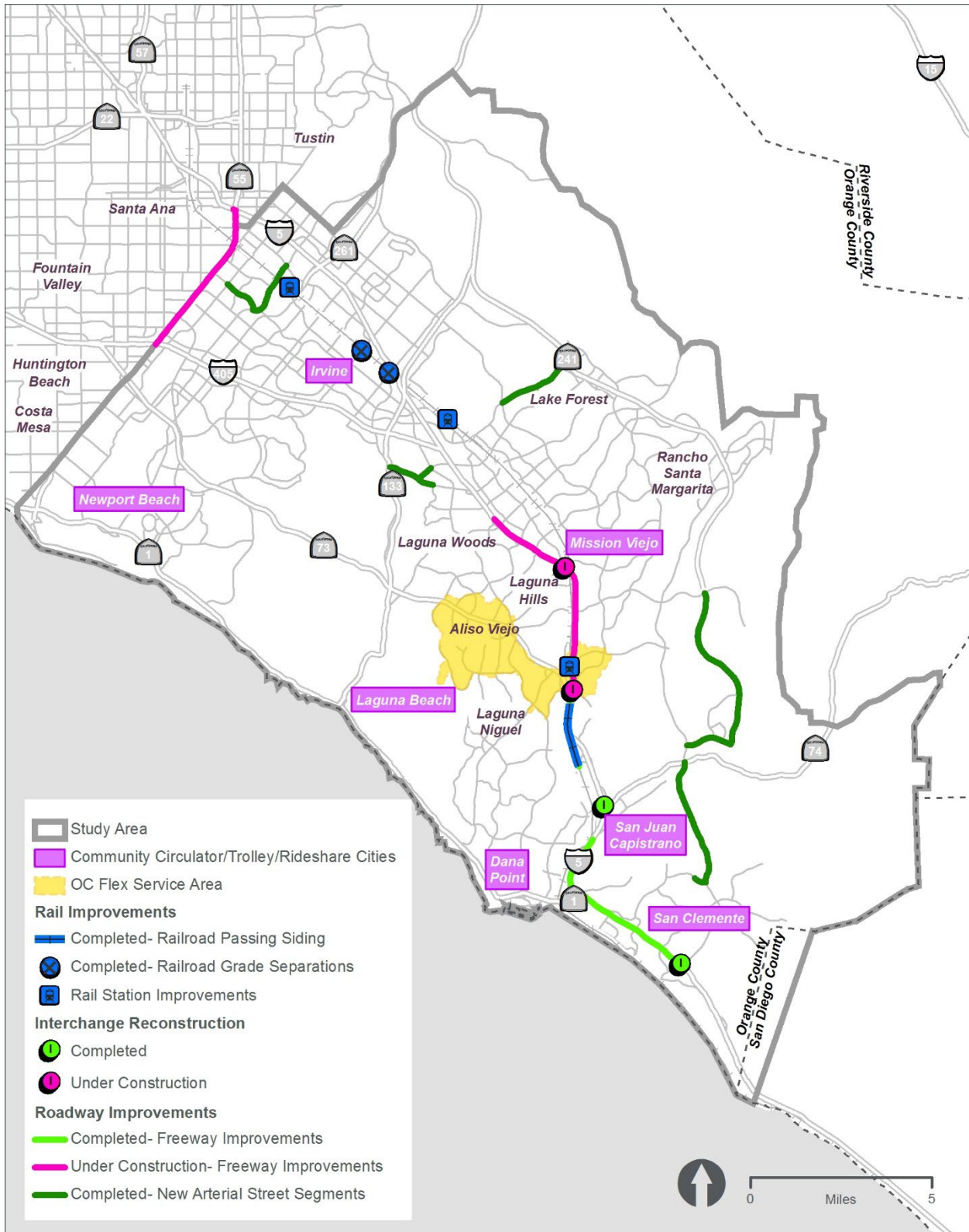


Table 2-4. Summary of Improvements in South Orange County 2008–2022

Type of Project	No. of Projects	Cost (\$ million)
Freeway/Interchange Improvements	3	\$878
Arterial Improvements	51	\$142
Arterial Intersection Improvements	18	\$11
Street Rehabilitation	42	\$21
Traffic Signal Synchronization	46	\$54
Railroad Improvements	1	\$33
Rail Crossing Improvements/Grade Separations	18	\$109
Bicycle and Pedestrian Facilities	22	\$18
Train Station Improvements	6	\$51
Community Transit	17	\$33
Senior Mobility Programs	14	\$11
Environmental Mitigation Projects	21	\$9
Miscellaneous Improvements	32	\$15
Total		\$1,385

2.1.7 Travel Demand Changes Since 2019

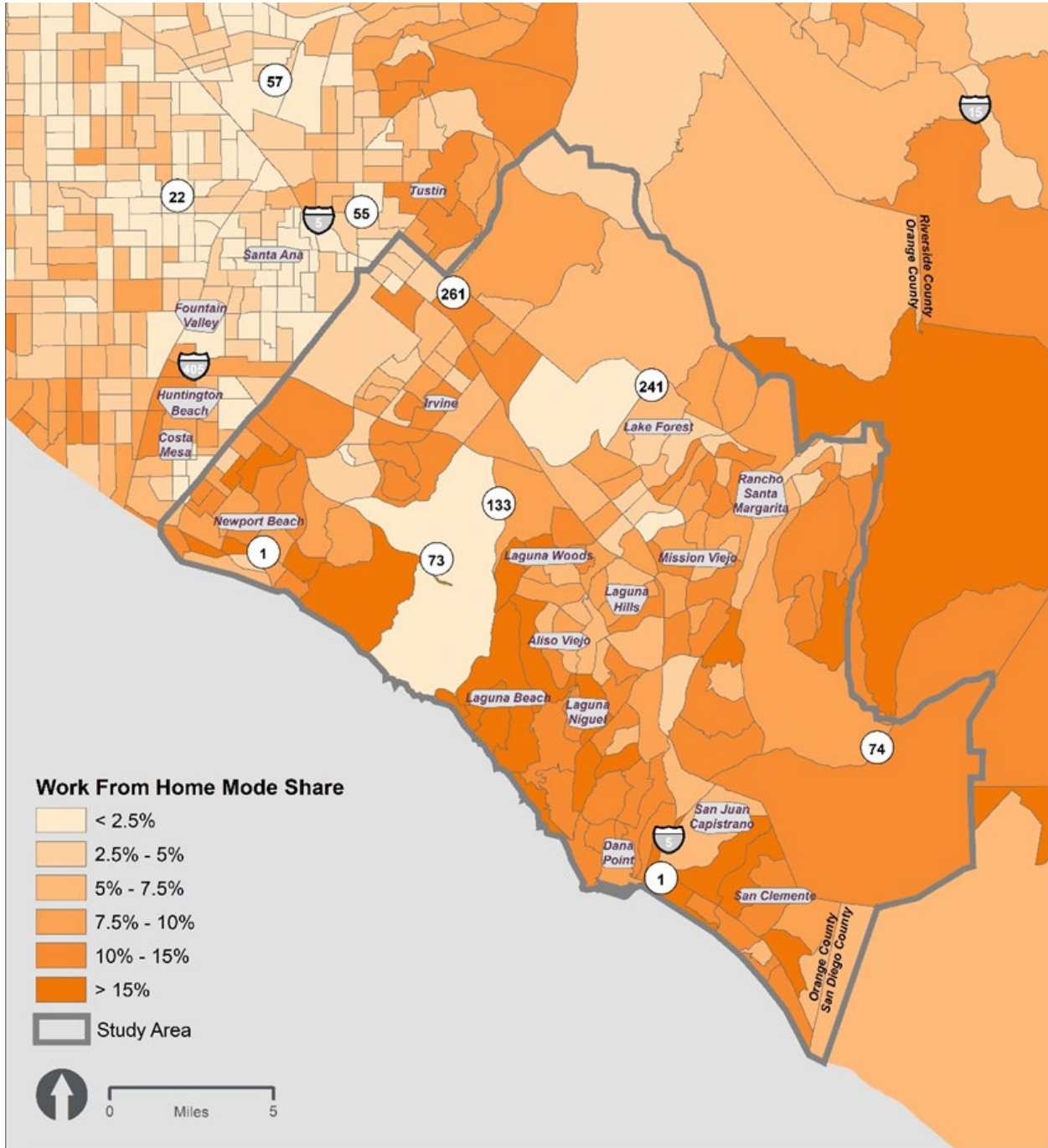
Working from Home

The Covid-19 pandemic has highlighted the prevalence of remote work, which allows businesses to maintain essential operations while employees stay safe. The study area had a comparatively high pre-pandemic work-from-home mode share, with coastal areas often exceeding 10 percent and inland areas mostly between 4 percent and 10 percent (see Figure 2-7). This compares to a 5.5 percent pre-pandemic average work-from-home mode share for the Los Angeles-Long Beach-Anaheim metropolitan statistical area. Work-from-home frequency likely increased as a result of the Covid-19 pandemic, but recent data for the study area are not yet available from the U.S. Census Bureau. Work-from-home trends will continue to be monitored, as they will affect future demand on the study area's transportation system.

The availability of broadband internet is a key requirement for study area residents to work from home. The study area is largely served with wired broadband internet. Internet speeds for households are largely between 100 and 500 megabits per second. This is slightly slower than northern parts of

Orange County or of Los Angeles County, where gigabit-speed internet is generally available. A map of broadband access is included in Appendix B.

Figure 2-7. Residents Work-from-Home Mode Share



Source: U.S. Census Bureau 2018 ACS 5-Year Estimate

2.2 Transportation Deficiencies

Since the intent of this study is to plan for improved multimodal travel choices for South Orange County, an analysis was conducted to identify issues that limit or inhibit effective travel by all modes, with particular focus on system deficiencies and other impediments to effective travel by modes other than driving alone. Through analysis of 2016 and 2045 No-Build conditions, opportunities for improvement were identified for each issue, as well as factors that could constrain achievement of the opportunities. Transportation network issues within the South Orange County study area include:

- Multiple segments of I-5 and I-405 experience congestion during weekday and weekend peak periods under 2019 conditions. Many east-west arterials (including Jamboree Road, Crown Valley Parkway, and Alicia Parkway) that connect to the freeways also experience peak period congestion and low travel time reliability. Increased travel demand from projected population and employment growth (10–20 percent increase by 2045) will exacerbate these conditions without transportation system improvements.
- Approximately 30 percent of the commutes originating in the study area have destinations at the northern end of the study area or beyond the northern boundary and occur during peak hours when the transportation system is most congested.
- Transit service (bus and regional rail) under existing conditions has limited accessibility (more than half of the study area’s OC Bus routes connect the northern part of the study area with north Orange County), low service frequencies (just over 20 percent of local and express buses operate with 20-minute or better weekday peak period service frequencies), and inconsistent reliability (on weekdays, OC Bus has an average on-time performance of 75 percent (2019) and Amtrak’s Pacific Surfliner has an average on-time performance of just under 80 percent (2018)).
- Low-density, single-family residential land use patterns inhibit greater transit use in South Orange County.
- Roadway congestion exacerbates the challenge for bus service to be more time-competitive with driving. Besides limiting the maximum speed at which buses are able to operate, roadway congestion intensifies delays at bus stops, as buses face interference from other vehicles when pulling into a bus stop and merging back into the traffic flow.
- Active transportation viability is hindered by bikeway network gaps, car-centric development patterns and designs, and challenging topography.

Table 2-5 reflects the full set of multimodal transportation issues, opportunities, and constraints that were identified through an analysis of 2016 and 2045 no-build conditions. These were considered in the development of the Purpose and Need statement in coordination with stakeholders.

Table 2-5. Study Area Transportation Deficiencies & Opportunities

Mode	Issues (Deficiencies / Challenges / Problems)	Opportunities	Constraints
Highways & Toll Roads	MAINLINE LANES <ul style="list-style-type: none"> • Peak period congestion – Weekdays and weekends, primarily on I-5 and I-405 • Increasing travel demand - Projected to grow 10 to 20% by 2045 	<ul style="list-style-type: none"> • Capacity expansion - Feasible on I-5 and I-405, generally within existing right-of-way • Toll Road incentives - SR-73 and SR-241 have available capacity. • TDM strategies - Support alternatives to driving alone. • Freeway-running transit – Alternative to driving for longer trips • TSM strategies – Manage systems to increase throughput • Transit and rail service improvements – Alternative to driving for longer trips 	<ul style="list-style-type: none"> • Limited parallel facilities – Few comparable route options • Limited right-of-way – Acquiring additional right-of-way is cost-prohibitive • TCA obligations – Limited strategies to increase toll road use
	MANAGED LANES <ul style="list-style-type: none"> • Federal standards – Several segments currently do not meet federal performance standards • Increasing travel demand - Projected to grow 10 to 20% by 2045 	<ul style="list-style-type: none"> • Occupancy requirements – Increasing could improve performance by reducing the number of qualifying vehicles • Express Lanes – Optimizes throughput of managed lanes by selling excess capacity to lower occupancy vehicles • TDM strategies - Support use of HOVs and transit in managed lanes. 	<ul style="list-style-type: none"> • Public support – Often lacking for occupancy requirement increases and use of express lanes
	INTERCHANGES <ul style="list-style-type: none"> • Bottlenecks – Capacity restrictions and merge/weave issues at the following locations: <ul style="list-style-type: none"> o I-5 NB at SR-55 o I-5 NB at El Toro Road o I-5 SB at Alicia Parkway o I-405 NB at Jeffrey Road o I-405 SB at Culver Drive 	<ul style="list-style-type: none"> • Operational improvements – Often included with capacity expansion projects to address merge issues within the project limits 	<ul style="list-style-type: none"> • Limited right-of-way – Acquiring additional right-of-way is cost-prohibitive, especially at the I-5/SR-55 interchange
Arterials	TRAFFIC CIRCULATION <ul style="list-style-type: none"> • Dependence on east-west arterials - Can cause local traffic to back up near freeway ramps, especially on the following roadways: <ul style="list-style-type: none"> o Jamboree Road o Bake Parkway o Alicia Parkway o Oso Parkway o Crown Valley Parkway • Increasing travel demand - Projected to grow 30 to 40% by 2045 	<ul style="list-style-type: none"> • Capacity expansion – Building out to MPAH lane capacity could reduce congestion and improve speeds. • ITS, TSM, and access management strategies – Improve vehicle flows, and reduce delays. • Emerging vehicle technology - In the long term, may provide the opportunity for existing arterials to accommodate more vehicle throughput and complete streets elements. 	<ul style="list-style-type: none"> • Topography and development patterns - Lack of grid street network in South Orange County prevents traffic from being more evenly distributed • Challenges to implementation - Some of the planned MPAH improvements would be highly expensive, involve substantial impacts, and may lack the needed public support.
	TRANSIT SERVICES ON ARTERIALS <ul style="list-style-type: none"> • Reduced operating speeds - Arterial congestion makes it more difficult for bus transit to be time-competitive with driving. 	<ul style="list-style-type: none"> • Transit infrastructure improvements - Bus-only lanes, queue-jumpers, and bus signal priority could be applied on arterial streets to improve transit travel speeds. 	<ul style="list-style-type: none"> • Bus frequencies - Low in most of South Orange County, so bus-only lanes would be little used in most areas. • Limited right-of-way - Adding bus-only lanes would in most cases require elimination of a traffic lane

Table 2-5. Study Area Transportation Deficiencies & Opportunities

Mode	Issues (Deficiencies / Challenges / Problems)	Opportunities	Constraints
			<ul style="list-style-type: none"> • Signal synchronization complications - If not strategically deployed, bus signal priority may not be compatible with corridor traffic signal synchronization designed to improve overall traffic flows.
Transit	TRANSIT ACCESSIBILITY <ul style="list-style-type: none"> • Limited coverage - Service levels have been reduced or bus routes have been eliminated from areas with the lowest ridership. • Development patterns - Areas with predominantly lower density residential land use typically do not have convenient access to fixed-route transit services • Limited access to employment centers/destinations – Transit options that serve key employment centers and destinations in North Orange County (and beyond) are progressively less available further south into Orange County. • Limited station access options - Access to regional rail stations in South Orange County is primarily reliant on drive access 	<ul style="list-style-type: none"> • Microtransit service (OC Flex) - Improves transit geographic accessibility and serves short, local trips. • Diversify and intensify land use around rail stations - Could increase the number of residents and employees for which regional rail is an effective travel option. 	<ul style="list-style-type: none"> • Existing and planned residential and employment densities - OC Flex would have difficulty capturing substantial numbers of riders in lower-density areas. • Regional rail station locations - Low-density station areas limit potential trip-making by rail within South Orange County. • Parking - Limited ability to cost-effectively expand parking at regional rail stations without significant private investment in transit-oriented development. • Limited funding - For operational expansion of fixed route OC Bus service and corollary demand-response service.
	TRANSIT SERVICE FREQUENCY <ul style="list-style-type: none"> • Infrequent service - Only 20% of OC Bus routes operate with headways of 20-minutes or better during peak periods. • Limited off-peak rail service - Ineffective travel option for long-distance off-peak trips. 	<ul style="list-style-type: none"> • Planned (future) employment locations – Densification offers opportunities for improved transit service and employment-oriented TDM strategies • Metrolink’s Southern California Optimized Rail Expansion program (SCORE) – Planned 30-minute service in both directions throughout the day over most of the Metrolink system. • TDM programs - Effective at reducing demand in areas with high levels of transit access 	<ul style="list-style-type: none"> • Rail infrastructure limitations - Regular two-direction Metrolink service is not currently possible south of Laguna Niguel due to the single-track rail line from San Juan Capistrano through San Clemente. • Limited funding - For both capital and operations constrains potential transit improvements
	TRANSIT SERVICE RELIABILITY <ul style="list-style-type: none"> • Inconsistent service reliability - A majority of the regional rail and OCTA bus services have on-time performance of 80% or less on weekdays. • Congestion and travel time unreliability on arterials and freeways - Key contributors to the inconsistent reliability of transit services. 	<ul style="list-style-type: none"> • Arterial traffic signal synchronization projects - Can improve overall travel speeds and help improve reliability of transit. • Traffic signal pre-emption for transit buses - Could help improve transit travel speeds and reliability • Metrolink’s SCORE program - Includes recommendations for adding new track between Laguna Niguel and San Juan Capistrano to reduce delays and improve reliability. • Managed lane investments – Can enhance Express Bus services 	<ul style="list-style-type: none"> • Limits of signal synchronization- Does not necessarily benefit transit specifically. • Signal synchronization complications - If not strategically deployed, bus signal priority may not be compatible with corridor traffic signal synchronization designed to improve overall traffic flows. • Physical conditions surrounding the LOSSAN corridor - May limit the ability to increase rail capacity in some areas.
	TRANSIT SERVICE CONVENIENCE <ul style="list-style-type: none"> • Less convenient overall than driving - Riding transit involves less convenient access, more wait time, transfer time, and slower travel speed than driving. 	<ul style="list-style-type: none"> • Microtransit service (OC Flex) - Shrink fixed routes and expand on-demand microtransit services to serve short, local trips. • Reduced fares during off-peak times - Could help spread out commuting times and help achieve better social distancing on transit. 	<ul style="list-style-type: none"> • Declining ridership - Bus transit ridership has been decreasing over the past several years, consistent with larger trends. • Existing and planned residential and employment densities – OC Flex would have difficulty capturing large numbers of riders in lower-density areas. • Covid-19 - Many people were unwilling to ride transit during the pandemic and, though transit ridership is growing again, it is still below pre-pandemic levels.
Active Transportation	ACTIVE TRANSPORTATION NETWORK <ul style="list-style-type: none"> • Network gaps - 40 miles of gaps in the South Orange County bikeway network (e.g., drops in bike lanes or a physical barriers) 	<ul style="list-style-type: none"> • Adopted agency plans - Includes gap closures in the bikeway network • Electric bicycles - To help users overcome distance/topography issues. 	<ul style="list-style-type: none"> • Physical limitations - Barriers sometimes make gap closures difficult or expensive to construct.

Table 2-5. Study Area Transportation Deficiencies & Opportunities

Mode	Issues (Deficiencies / Challenges / Problems)	Opportunities	Constraints
	<ul style="list-style-type: none"> • Low usage - Of active transportation in the study area due to: <ul style="list-style-type: none"> o Distances between trip origins and destinations o Circuitous road network o Challenging topography 	<ul style="list-style-type: none"> • Education programs - To promote active transportation and healthy lifestyles. • Mobility centers - To link active transportation short trips as first/last mile connections to transit (both bus and rail) • Planned (future) development - May result in more and shorter-distance trips which could be served by active transportation modes 	<ul style="list-style-type: none"> • Limited funding - Limits opportunities to close gaps, improve the existing bikeway network, and promote active transportation • Development patterns - Opportunities for shorter-distance trips will be in areas where new residential developments are closer to non-residential uses.
	<p>SAFETY</p> <ul style="list-style-type: none"> • Lack of physical separation from motor vehicles - Safety concerns for bicyclists • Lack of pedestrian accommodations – Safety concerns for pedestrians crossing wide roads 	<ul style="list-style-type: none"> • Bikeway improvements - Implement Class I and Class IV bikeways • Street improvements - Implement road diets and similar design treatments • Education programs - Promote safe driving and awareness of pedestrians 	<ul style="list-style-type: none"> • Constrained street geometrics - Limits opportunities for adding protected Class IV bikeways • Traffic needs - Eliminating traffic lanes could increase congestion.
Travel Demand Management	<ul style="list-style-type: none"> • Long-distance commute trips – Work-related trips outside the study area occur during peak hours when the transportation system is busiest. • Low transit mode share - Challenging to leverage transit as part of a TDM program. 	<ul style="list-style-type: none"> • Work-from-home - Increases in work-from-home during the Covid-19 pandemic may illustrate an opportunity for more over the long run. • Commuter programs and vanpooling/ridesharing strategies - Improve or promote (via funding or education programs) in areas with a high employment density. 	<ul style="list-style-type: none"> • Broadband internet speeds - As of early 2020, the highest broadband internet speeds were not as widely available in South Orange County as in North Orange County. • Employer resistance to telecommuting - Many employers resist enabling substantial levels of telecommuting on a regular basis.

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2.3 Stakeholder and Public Input

Phase One of the stakeholder and public engagement process took place in fall of 2020 and focused on gathering input to define the study's Purpose and Need. This phase included an online public webinar, a key stakeholder virtual roundtable and a virtual meeting with South Orange County elected officials. A multilingual qualitative survey (online and hard copy) was conducted to assess public perception of transportation challenges and improvement strategies in South Orange County. A total of 360 surveys were collected between September 25 and October 30, 2020.

The key themes that emerged during the initial engagement phase included:

- Reducing traffic congestion
- Increasing frequency and accessibility of multimodal transportation
- Increasing safety and efficiency for all modes of travel

These key themes along with other stakeholder input were incorporated into the study's Purpose and Need statement. Additional detail on public and stakeholder engagement for the study is provided in Appendix A.

2.4 Purpose and Need

The Purpose and Need statement was developed based on the transportation issues and opportunities (deficiencies) identified within the study area. The Purpose and Need statement reflects the input received from stakeholders and the public and was used as the basis for identifying improvement options, developing multimodal alternatives, and defining the Locally Preferred Strategy.

2.4.1 Study Need

Long-term improvement projects and strategies are needed to address the following transportation issues and deficiencies in the study area:

- **Historical land development patterns and transportation network that favor driving:** The existing transportation network was largely developed to serve the auto-oriented access and circulation needs associated with the lower-density, single-family residential land use patterns that comprise a substantial portion of South Orange County. As a result, travel by modes other than automobile is constrained. Traditional fixed-route transit is unable to provide convenient access to lower-density development areas. Despite a fairly significant bikeway and sidewalk network, circulation by active transportation modes is challenging because of the circuitous road network and challenging topography within South Orange County, coupled with lengthy distances between trip origins and destinations (due to separation between different types of land uses). Bicyclists and pedestrians also face safety concerns due to the lack of physical separation from motor vehicles often traveling at high speeds and wide intersections with limited crossing times. In short, the auto-oriented land use patterns and street network in South Orange County present challenges for providing effective transit service, meeting the travel needs of non-auto owning people in the study area, and supporting safe travel conditions for all users.
- **Growing travel demand on a system faced with issues of inefficiency and unreliability:** Many mainline segments of I-5 and I-405 through South Orange County consistently experience

congestion on weekdays and weekends, which results in low travel time reliability, with extra travel time needing to be budgeted to ensure on-time arrival during peak travel periods. On the arterial street system, there is heavy dependence on east-west roads (including but not limited to Jamboree Road, Bake Parkway, El Toro Road, Alicia Parkway, Oso Parkway, and Crown Valley Parkway) for both circulation and freeway access, which results in reduced travel speeds and traffic congestion near freeway interchanges. This arterial congestion also inhibits bus service from being more time-competitive with driving, since it further exacerbates the challenges that buses have operating in mixed traffic. Projected population and employment growth (10 to 20 percent increase by 2045) is expected to continue the growth in travel demand, which could worsen roadway congestion and further increase travel times and reduce travel speeds and reliability, particularly in areas where planned future development is concentrated.

- **Environmental and economic sustainability challenges:** Vehicular travel is a significant contributor to criteria pollutant emissions and greenhouses gas emissions, which negatively affect air quality and contribute to climate change. These environmental impacts are anticipated to worsen as VMT is projected to increase by 16 percent between 2016 and 2045 if current trends continue. Risks like rising sea level and increased frequency and intensity of wildfires threaten the resiliency of the transportation network and its ability to serve the circulation needs of South Orange County in emergency situations. Traditional capacity-expansion projects may impose unacceptable impacts on environmental resources like air and water quality, encroach upon biological or open space resources, or displace homes and businesses. Traditional capacity-expansion projects can also be very expensive to build, operate, and maintain, resulting in a major threat to the long-term financial viability of the system.
- **Evolving travel behaviors in a rapidly changing world facing major uncertainties:** There are significant uncertainties related to how emerging technology innovations and work conditions in a post-Covid environment may affect transportation and mobility in South Orange County. Advancements in technologies such as autonomous/connected vehicle technology, high-speed charging, trip planning apps, and shared/micro-mobility could change travel behaviors and how traffic operates in South Orange County. Depending on the adoption rate, autonomous/connected vehicles could alter the amount of roadway capacity needed to sufficiently meet demand, as vehicles would be capable of traveling safely at higher speeds with shorter following distances. Improvements in trip planning apps and shared/micro-mobility could enable South Orange County residents and visitors to make more informed choices about when, where, and how they travel. Increased levels of telework and telemedicine and lingering Covid threats could decrease travel overall, particularly via transit if people reject shared travel modes in favor of private vehicle options. These uncertainties in emerging technologies and travel behavior will need to be recognized and accounted for in planning the future South Orange County transportation system.

2.4.2 Study Purpose

The purpose of SOCMTS is to identify long-term multimodal transportation improvements and strategies that will address the study area transportation issues and challenges summarized in the Study Need section. The multimodal transportation improvements and strategies identified for SOCMTS should:

- Improve mobility and accessibility for non-single-occupant-vehicle (SOV) travel, especially for underserved and disadvantaged populations, by increasing the availability and improving the convenience of using non-SOV modes, providing convenient connections between different

modes, providing travel options that are competitive to driving, and supporting travel alternatives that reduce the need for trip-making in coordination with land use changes;

- Manage increasing travel demand by reducing overall trips both daily and during peak periods, enhancing the efficiency and safety of the existing transportation system and employing targeted, cost-effective capital and operational improvements to enhance and better utilize available highway, managed lane, and arterial capacity;
- Address environmental and economic sustainability challenges by accelerating adoption of zero-emission vehicles in South Orange County and improving access to clean and affordable alternatives to private automobiles, planning for the needed support infrastructure, focusing investments on transportation system elements that are especially susceptible to destructive natural forces and events, and recommending improvements that can be developed in a way that minimizes adverse impacts to the environment and supports economic development and community enhancement; and
- Respond to uncertainties in travel behaviors and conditions by adopting flexible recommendations that can be adapted to evolving circumstances and conditions, pursuing improvements that take advantage of proven technologies, and promoting policies that support innovation.

The recommended long-range strategy will include improvements and policies that enhance travel choices, manage growing travel demand, address sustainability issues, and consider the implications of Covid and possibilities of emerging technologies on mobility in the study area. The investments and policies will support convenient, competitive, and effective travel options beyond driving alone, will address the travel needs of disadvantaged communities and transit-dependent populations, and will be appropriate for implementation in South Orange County.

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3 2045 Core Elements

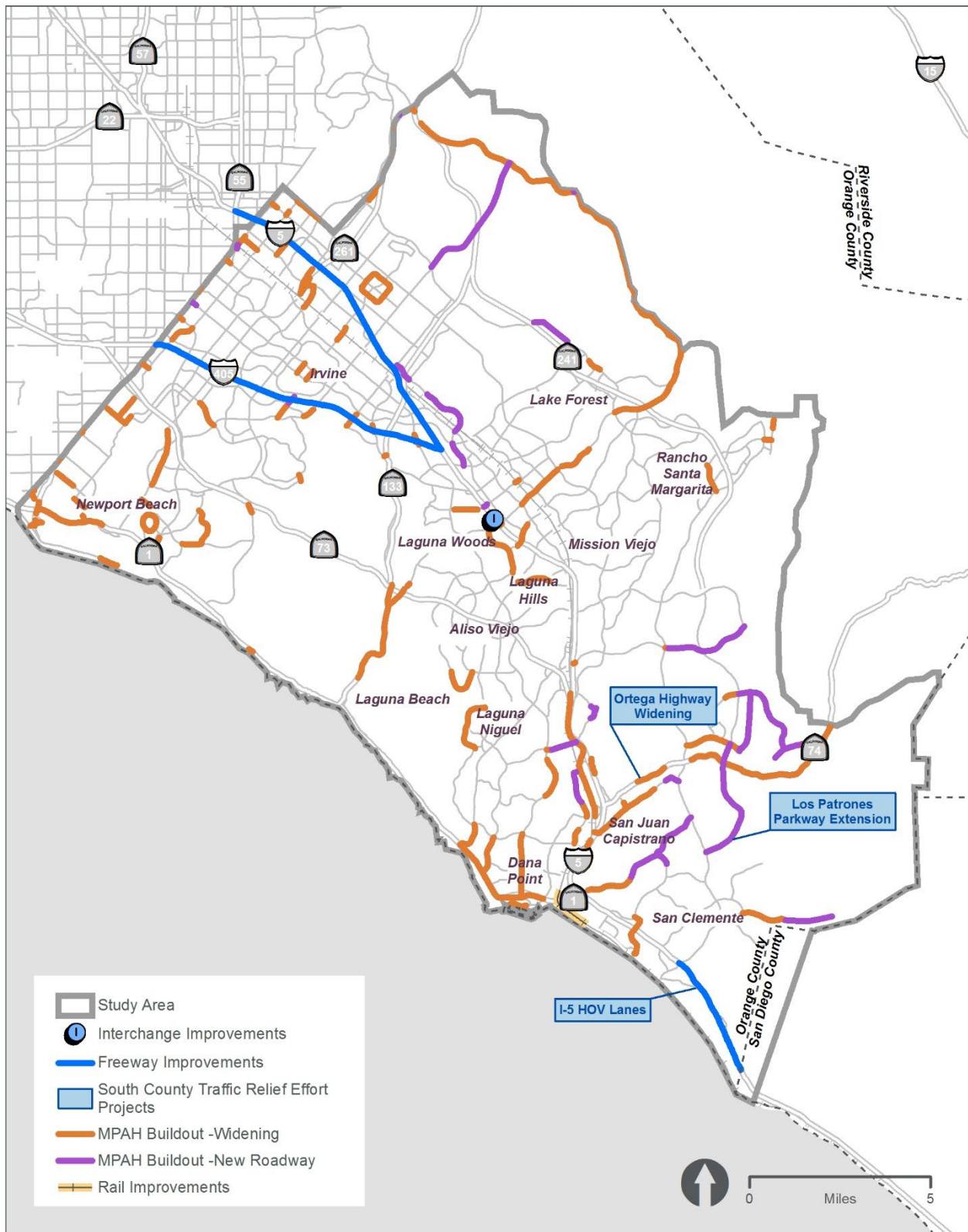
3.1 2045 Core Elements

The 2045 Core Elements are South Orange County projects that have not yet started construction in 2022 but are funded or committed to be implemented by 2045. As these projects are in the pipeline for delivery, the 2022 transportation network along with the 2045 Core Elements form the 2045 Baseline scenario for future conditions analysis. The No-Build condition referenced in Section 2 does not include the 2045 Core Elements.

The 2045 Core Elements include projects funded by Measure M2 (OC Go) as well as others identified at the conclusion of the South County Traffic Relief Effort in 2020, improvements planned in the Orange County Master Plan of Arterial Highways (MPAH), and the Metrolink SCORE program. The 2045 Core Elements are shown in Table 3-1 and Figure 3-1.

Table 3-1. 2045 Core Elements	
Project	Source
I-5 Improvements between I-405 and SR-55	Measure M2
I-405 Improvements between I-5 and SR-55	Measure M2
El Toro Road/I-5 Interchange Improvement	Measure M2
I-5 HOV Lane from Avenida Pico to San Diego County Line	South County Traffic Relief Effort
Los Patrones Parkway Extension from Cow Camp Road to Avenida La Pata	South County Traffic Relief Effort
Ortega Highway Widening between Calle Entradero and Reata Road	South County Traffic Relief Effort
Planned MPAH Improvements	Orange County Master Plan of Arterial Highways
Serra Siding Double-Tracking Project	Metrolink SCORE Program

Figure 3-1. 2045 Core Elements



3.2 Performance Measures and Targets

Five performance measures were identified with which to evaluate the 2045 No-Build and 2045 Baseline scenarios. These performance measures relate back to the study’s Purpose and Need, discussed in Section 2.4.

- **Percentage of trips made by non-single occupant vehicle (SOV) modes:** This metric considers the extent to which the scenarios provide travel options that are competitive with solo driving. (Purpose 1 – Improve Mobility and Accessibility for Non-SOV Travel.)
- **VMT per capita:** This metric considers the extent to which the scenarios support a reduction in VMT. (Purpose 2 – Manage Increasing Travel Demand.)
- **Greenhouse gas emissions:** This metric considers environmental and sustainability elements by measuring future emissions. (Purpose 3 – Address Environmental and Economic Sustainability Challenges.)
- **Delay (person hours and vehicle hours):** This metric considers system efficiency and the extent to which travel time is impacted, both for individuals and vehicles. (Purpose 2 – Manage Increasing Travel Demand.)

Table 3-2 shows the targets established for each performance measure, which were identified by referencing the California Transportation Plan (CTP) 2050, SCAG’s Connect SoCal 2020 (2020 RTP/SCS), and OCTA’s LRTP. The 2045 No-Build and 2045 Baseline scenarios were evaluated based on their project performance relative to the targets.

Table 3-2. Performance Measures and Targets	
Performance Measure	Target
Non-SOV mode share	60.5%
VMT per capita	8% reduction from 2016
GHG emissions	13% reduction from 2016
PHD per capita	14% reduction from 2016
VHD per capita	14% reduction from 2016

3.3 Performance Evaluation

Each scenario was modeled using OCTA’s travel demand model, OCTAM, which uses 2016 as its base year to represent “existing” conditions. Table 3-3 shows the results of the 2045 No-Build and 2045 Baseline scenarios compared to the targets for each performance measure. Both scenarios fail to meet most performance targets, with the exception of GHG emissions, which fall significantly in all scenarios due to increasingly stringent fuel economy standards for passenger vehicles. The 2045 No-Build scenario shows a reduction in delay compared with 2016 conditions because per-capita trip-making is projected to decline somewhat by 2045, while the 2045 Baseline scenario is projected to induce additional demand with additional roadway capacity, increasing passenger and vehicle delay.

As the 2045 Baseline scenario does not meet most of the established targets, and for several measures shows conditions degrading relative to 2016 despite the investment in the 2045 Core Elements, additional strategies are needed to address the study’s Purpose and Need.

Table 3-3. Performance of 2045 No-Build and Baseline Scenarios				
Performance Metrics	Target	Existing (2016)	2045 No-Build	2045 Baseline
Non-SOV mode share	60.5%	51.7%	51.1%	51.1%
Percent Change in VMT per capita	-8%	0.0%	-2.7%	-0.6%
GHG reduction per capita (metric tons of CO _{2e} per year)	-13% from 2016 levels	0%	-34%	-32%
Person hours of delay (PHD) per capita	-14%	0%	-7%	3%
Vehicle hours of delay (VHD) per capita	-14%	0%	-6%	3%
Legend:	Meets Target	Improves relative to 2016	Degrades relative to 2016	

3.4 Stakeholder and Public Input

The second phase of the stakeholder and public engagement process took place in summer 2021 and helped to identify the types of multimodal strategies most suitable for South Orange County to address the study’s Purpose and Need. This phase included a virtual stakeholders roundtable, elected official’s roundtable, a public Telephone Townhall and a virtual meeting room. A second multilingual qualitative survey (online and hard copy) was also conducted with the goal of assessing the public’s priorities on draft strategies and transportation solutions. Over 1,700 surveys were collected between June 7 and July 12, 2021.

The key themes that emerged during the second engagement phase included:

- Increasing availability of and improvements to public transit/rail
- Providing more alternatives to driving and enhance accessibility (light rail, trolleys, biking, walking, mass transit, etc.)
- Offering flexible roadway pricing based on demand
- Focusing on current roads to expand, improve and better connect paths for active transportation (pedestrian, bicycle, etc.)
- Ineffectiveness of toll roads in reducing traffic congestion

The input from the engagement process was incorporated into the development of multimodal improvement strategies discussed in Section 3.5. Additional detail on public and stakeholder engagement for the study is provided in Appendix A.

3.5 Need for Multimodal Strategies

The modeling and performance analysis process shows the need for additional strategies beyond the 2045 Core Elements to address the study’s Purpose and Need and move South Orange County toward a more sustainable future. Highways and arterial streets are reaching their practical limit in terms of available right-of-way, and roadway improvements alone are unlikely to address the region’s long-term goals. Multimodal strategies are needed that address overall transportation demand, system efficiency, transit accessibility, capacity, reliability, and equity.

Multimodal strategies applicable to South Orange County were identified through assessment of local and national best practices, current transportation policies and programs, and public and stakeholder input. These strategies are shown in Table 3-4.

Table 3-4. SOCMTS Multimodal Strategies	
Strategy Element	Objective
Roadway Infrastructure & Operations Improvements	Improve the operational efficiency of the South Orange County roadway network
High-Frequency Transit	Provide enhanced bus and rail services on major corridors, enabling more travelers to utilize transit
Local Circulators/Shuttles	Continue the Project V community circulator program, providing tailored local connectivity and first/last mile service
Mobility Hubs	Provide convenient, centralized locations where various transportation services connect
Microtransit/OC Flex	Establish on-demand local transportation zones that address gaps in the OC Bus network and improve access to high-frequency transit
Active Transportation	Improve connectivity and safety for the bicycle and pedestrian network, including connections to transit and mobility hubs
Transportation Demand Management	Enhance system performance by encouraging travel when/where capacity exists, including reducing peak-hour trips and promoting transit and active transportation modes

Recommendations were developed for each of these multimodal strategies with the aim of developing a coordinated, synergistic plan where various elements work together to improve mobility. These recommendations laid the groundwork for the SOCMTS Locally Preferred Strategy discussed in Section 4. For several of the strategy areas, OCTA is currently conducting or plans to conduct targeted studies to develop specific projects, programs and policies that fit within the broader SOCMTS framework.



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4 Locally Preferred Strategy

4.1 What is the LPS?

The SOCMTS Locally Preferred Strategy (LPS) includes a mix of projects, programs, and policy strategies designed to meet the study’s Purpose and Need and arrive at an equitable action plan for implementation. The LPS builds on the foundation of completing the 2045 Core Elements. It will establish a vision for the post-2045 transportation system to improve mobility for non-auto travel modes, increase the efficiency of the transportation system, and reduce single-occupant vehicle travel and greenhouse gas emissions while addressing equity and climate change issues.

As a long-term strategy, the LPS provides an overall framework and direction that OCTA will use to shape its transportation decision-making processes including and beyond the 2045 Core Elements. Once the vision is established, recommendations for specific projects and programs can be considered for inclusion in OCTA’s LRTP, SCAG’s RTP/SCS, and subsequent project development phases. Table 4-1 shows potential projects identified during the SOCMTS analysis to illustrate each strategy element. These projects were used to evaluate the effectiveness of the LPS in achieving performance targets in Section 4.5. Detailed project recommendations will continue to be refined over time.

Table 4-1. SOCMTS Locally Preferred Strategy

Strategy Element	Potential Projects
Complete 2045 Core Elements (see Figure 3-1)	<ul style="list-style-type: none"> • I-5 improvements between I-405 and SR-55 • I-405 improvements between I-5 and SR-55 • El Toro Road/I-5 interchange improvement • I-5 HOV lanes (Avenida Pico to San Diego County Line) • Los Patrones Parkway extension from Cow Camp Road to Avenida La Pata • Widen Ortega Highway between Calle Entradero and Reata Road • Improvements planned in the Orange County Master Plan of Arterial Highways • Serra Siding double-tracking project
Roadway Infrastructure & Operations Improvements	<ul style="list-style-type: none"> • Chokepoint Improvements <ul style="list-style-type: none"> ○ Northbound 1-5 truck climbing lane in San Clemente ○ SB SR-133/SB I-5 ramp weave ○ Other chokepoint improvements identified in ongoing Freeway Chokepoint Improvement Study • Operations Improvements <ul style="list-style-type: none"> ○ Signal synchronization ○ Advanced Traffic Management Systems (ATMS) ○ Transportation Systems Management and Operations (TSMO) ○ Intelligent Transportation Systems (ITS) ○ Integrated Corridor Management (ICM)
High-Frequency Transit	<ul style="list-style-type: none"> • Increased Metrolink train frequency • Bus Rapid Transit (BRT) on I-5 and SR-55 (consistent with the Freeway BRT Concept Study)
Local Circulators/Shuttles	<ul style="list-style-type: none"> • Dana Point Trolley • Laguna Beach Trolley • San Clemente Trolley • MV Shuttle

Table 4-1. SOCMTS Locally Preferred Strategy

Strategy Element	Potential Projects
	<ul style="list-style-type: none"> • iShuttle • Balboa Peninsula Trolley • San Juan Capistrano Trolley • New circulators/shuttles in other communities that qualify for Project V
Mobility Hubs	<ul style="list-style-type: none"> • New South Orange County Rail Station • Laguna Hills Transportation Center • Network of regional, local, and neighborhood hubs based on the ongoing Orange County Mobility Hubs Study (see Figure 4-1)
Microtransit/OC Flex Zones (see Figure 4-2)	<ul style="list-style-type: none"> • Aliso Viejo/Laguna Niguel/Mission Viejo • San Clemente • Tustin/Irvine • Irvine Spectrum • Laguna Beach • UC Irvine/Newport Center • Laguna Hills/Lake Forest • Costa Mesa/Newport Beach • Dana Point/San Juan Capistrano
Active Transportation	<ul style="list-style-type: none"> • Complete OC Connect, OC Central Loop, OC South Loop, and Regional Bikeways (see Figure 4-3) • Provide protected bike facilities or improved bikeways on arterial streets connecting residential and employment concentrations and mobility hubs • Provide local bike feeder routes to mobility hubs, regional bikeways, and the regional transit network • Create safe, walkable routes for circulation in high activity areas
Transportation Demand Management	<ul style="list-style-type: none"> • Specific TDM elements to be identified in upcoming OCTA TDM Strategy Study, possibly including: <ul style="list-style-type: none"> ○ Transit subsidies for students ○ Support for carpools, vanpools, schoolpools ○ Incentives for active transportation use ○ Support for telework

The LPS should be considered as a group of interlinked components that work together to provide South Orange County residents, workers, and visitors with more varied, cost-effective, convenient, and safe travel options. For example, high-frequency transit improvements on major corridors work together with mobility hubs and local circulator/shuttle services to allow travelers to seamlessly make connections and complete their trips.

4.2 Completing Project Commitments

The foundation of the LPS involves continuation and completion of the 2045 Core Elements (see Figure 3-1) that include projects in OCTA’s current capital improvement programs and Measure M2, as well as improvements envisioned in the MPAH. The Core Elements include three near-term projects identified at the conclusion of the South Orange County Traffic Relief Effort: the extension of Los Patrones Parkway as a non-tolled facility from Cow Camp Road to Avenida La Pata, widening and restriping of Ortega Highway between Calle Entradero and Reata Road, and the southern extension of carpool lanes on Interstate 5 from Avenida Pico to the San Diego County line.

Figure 4-1. Conceptual Mobility Hubs

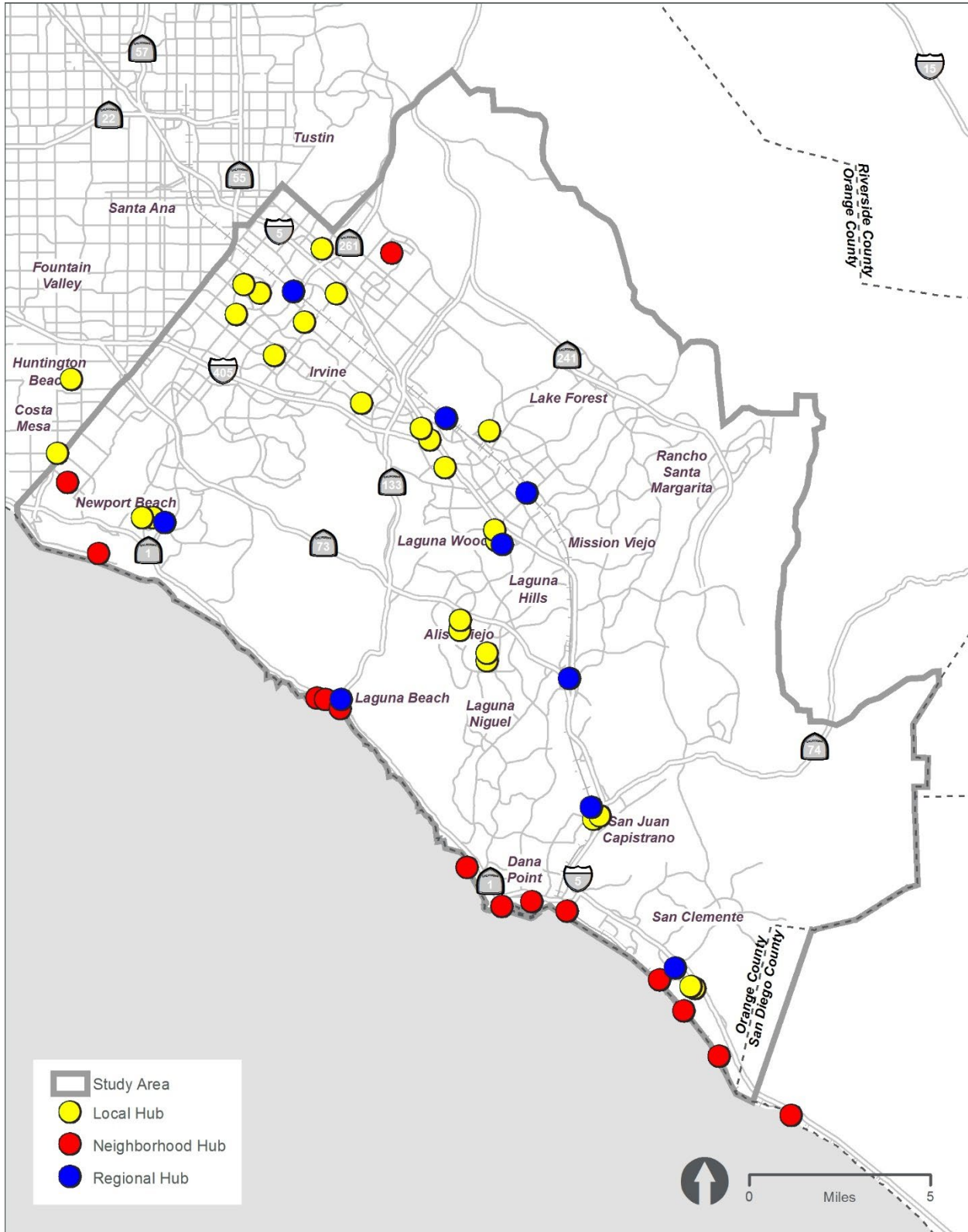


Figure 4-2. Potential Microtransit Zones

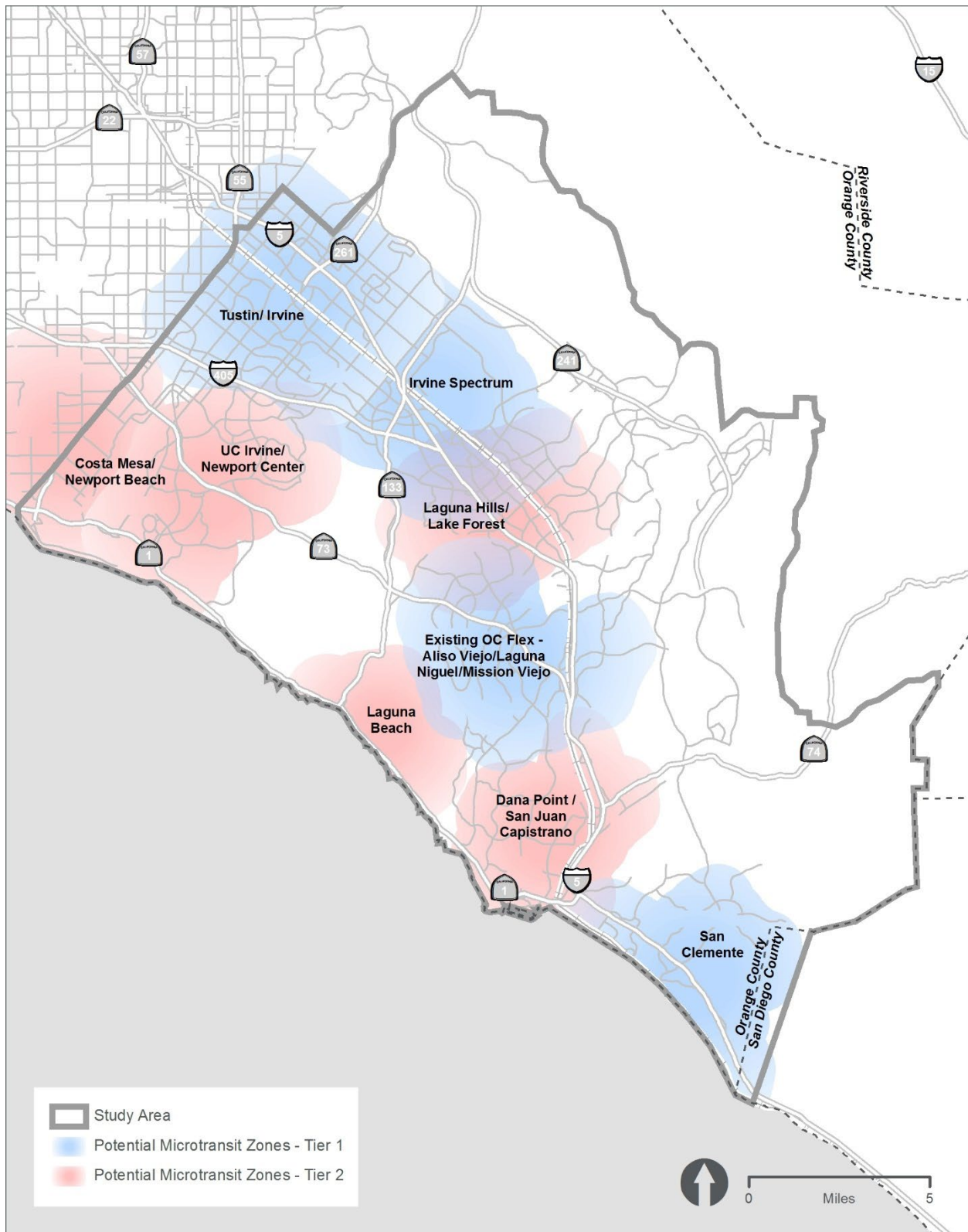
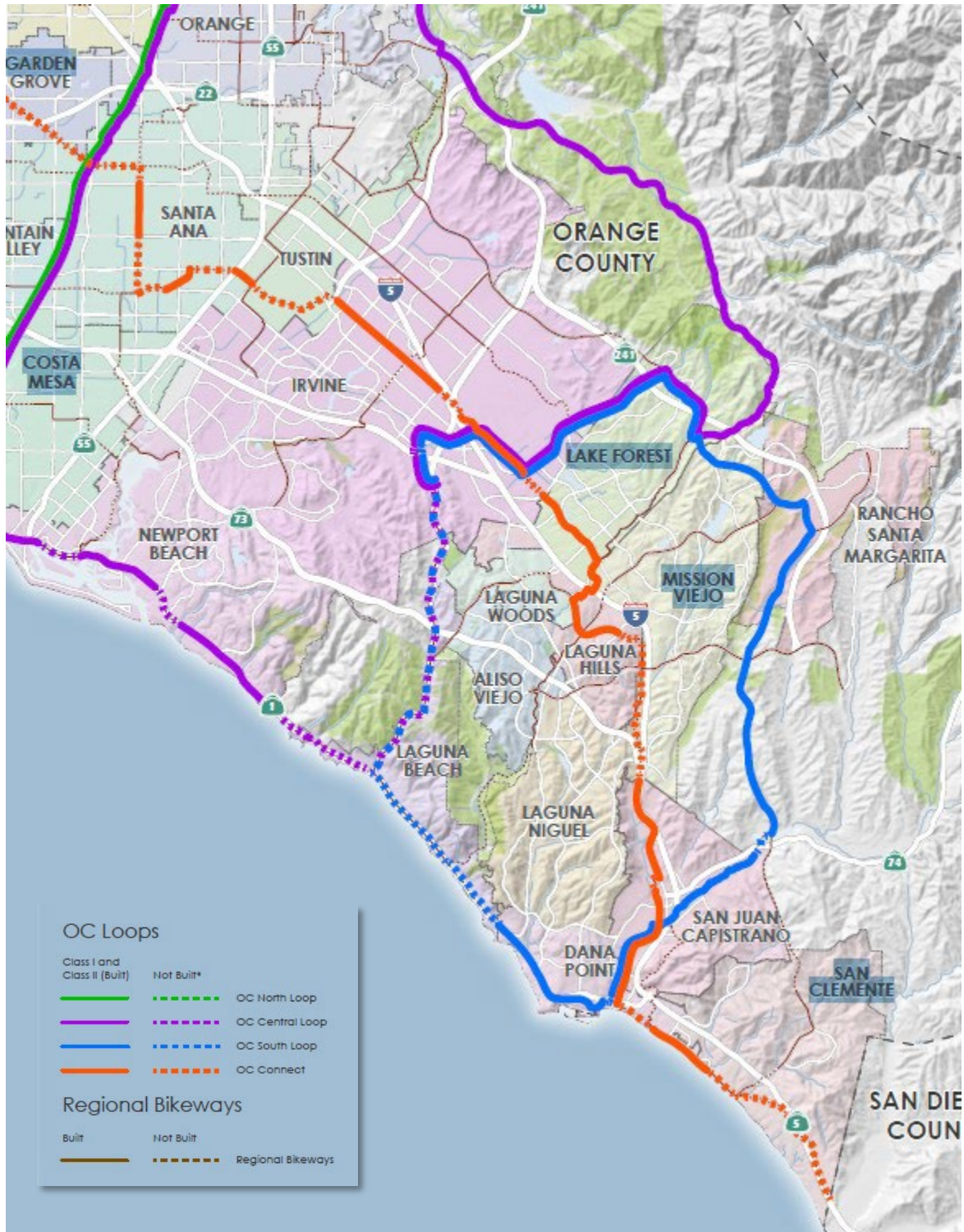


Figure 4-3. Regional Bikeways Plan in South Orange County



4.3 Stakeholder and Public Input

The third and final phase of public involvement took place in winter/spring 2022 and helped to define the Locally Preferred Strategy. This phase included a virtual stakeholder roundtable, virtual elected official's roundtable, a virtual community meeting, and a virtual meeting room. A final multilingual qualitative survey (online and hard copy) was conducted to determine participants' priorities on proposed multimodal alternatives that improve streets, transit, freeways, and bikeways in South Orange County. Over 310 surveys were collected between March 14 and April 15, 2022. Key themes from this phase included:

- Improving bike and pedestrian pathways
- Increasing frequency and accessibility of bus and train services

The input from the engagement process was incorporated into LPS recommendations as well as the Action Plan discussed in Section 4.4. Additional detail on public and stakeholder engagement for the study is provided in Appendix A.

4.4 Equity in the LPS

Equity will continue to be a foundational component in the identification, prioritization, and implementation of transportation improvements in South Orange County. Recognizing that the existing transportation system may be inequitable due to past decisions, SOCMTS has identified areas with socioeconomic or environmental disadvantages to better understand the impacts of transportation decisions on those communities. Specific equity recommendations are included in the SOCMTS Action Plan to ensure that equity is considered and prioritized throughout the implementation of mobility improvements. The following actions are recommended so that equity can be incorporated as a guiding factor within the implementation of all the recommended strategy areas.

- Assess travel patterns and mobility needs of the Equity Focus Communities identified in South Orange County.
- Develop grassroots engagement in the transportation decision-making process with Equity Focus Community members.

Additional detail on the SOCMTS equity analyses is included in Appendix E.

4.5 LPS Performance

The LPS scenario was evaluated against the performance measures and targets used to evaluate the 2045 No-Build and Baseline scenarios (Section 3.2). An additional performance measure was included to evaluate climate change resiliency, which evaluated the effectiveness of the LPS in protecting coastal rail infrastructure and the ability for transit services to provide mobility during disaster events.

Table 4-2 shows the results of the performance evaluation. With further investments in multimodal alternatives and transportation demand management, the LPS meets or exceeds target values for most indicators. The LPS is recommended as a path forward that addresses the study's Purpose and Need and moves the region toward improved mobility and sustainability.

Table 4-2. Performance of Each Multimodal Vision Alternative

Performance Metrics	Target	Existing (2016)	2045 No-Build	2045 Baseline	LPS
Non-SOV mode share	60.5%	51.7%	51.1%	51.1%	55.9%
Percent Change in VMT per capita	-8%	0.0%	-2.7%	-0.6%	-9.6%
GHG reduction per capita (metric tons of CO ₂ e per year)	-13% from 2016 levels	0%	-34%	-32%	-37%
Person hours of delay (PHD) per capita	-14%	0%	-7%	3%	-52%
Vehicle hours of delay (VHD) per capita	-14%	0%	-6%	3%	-52%
Qualitative measure of climate change resiliency	N/A	Low	Low	Low	Medium
Legend:	Meets Target	Improves relative to 2016	Degrades relative to 2016		

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4.6 LPS Recommended Actions

The creation of the SOCMTS LPS establishes a foundational basis for future transportation plans, programs, projects, and policies in South Orange County. SOCMTS also recommends actions to implement the LPS in partnership with other local and state agencies and transportation providers. The actions recommended for each strategic element are outlined below.

4.6.1 Roadway Infrastructure and Operations Improvements

OCTA is currently conducting the Freeway Chokepoint Improvement Study to evaluate future freeway conditions, assuming the M2 Freeway program is fully implemented. The results of this study will identify future chokepoint locations throughout the county and recommend improvement projects.

A countywide Transportation System Management and Operations (TSMO) plan could be developed to coordinate roadway operations. This plan would require coordination with Caltrans and local agencies along major corridors to elevate operational capabilities, including signal synchronization, Advanced Traffic Management Systems, adaptive signal systems, signal performance measures, and integrated corridor management.

Currently, a portion of M2 is allocated for regional traffic signal synchronization projects. OCTA could consider expanding this program to support a broader TSMO program. Looking beyond the sunset of M2 in 2041, a new source of funding will be needed to support a regional roadway operations program. Emerging technologies, such as connected and autonomous vehicles should also continue to be monitored to identify potential applications or policies within the purview of OCTA and local agencies, which have the potential to enhance traffic efficiency and safety.

- **Recommended Actions:**
 - **Pursue project-level development for priority chokepoints in South Orange County.**
 - **Develop countywide TSMO plan.**
 - **Develop a post-2041 funding strategy for roadway operations projects**
 - **Explore potential emerging technology strategies.**

4.6.2 High-Frequency Transit

The OC Transit Vision (2018) provides the long-term vision for transit service throughout Orange County. The OC Bus improvements included in the LPS, such as freeway Bus Rapid Transit services and improved frequency on select corridors are consistent with the OC Transit Vision. Near-term improvements to OC Bus will be driven by the Making Better Connections Study currently underway, which acknowledges pandemic-related shifts in travel demand and supports the travel needs of essential workers. Any elements of the Making Better Connections Study that may relate to or impact the OC Transit Vision will be addressed through an update to the OC Transit Vision that is anticipated to begin in 2023.

Relative to regional and intercity passenger rail, OCTA will actively participate in planning and implementation of Metrolink's Southern California Optimized Rail Expansion (SCORE) program of improvements and the increased service levels they will enable. This will require monitoring of ridership demand to adjust Metrolink service levels appropriately. In addition, to support service

integration with any justified passenger rail service frequency increases, OCTA will also need to assess and improve as appropriate OC Bus and other mobility connections to Metrolink stations.

- **Recommended Actions:**
 - **Develop corridor-level plans and recommendations for improvements identified in the OC Transit Vision.**
 - **Refine the OC Transit Vision to align with the Making Better Connections Study and updated data on long-term transit ridership trends.**
 - **Participate in planning and developing recommendations related to the Metrolink SCORE program and future service levels.**
 - **Periodically assess and recommend modifications to multimodal connections at rail stations.**

4.6.3 Local Circulators/Shuttles

Local circulators are currently funded through M2 (Project V), which allows local agencies to compete for funding to operate local circulator services. Being a financially unconstrained plan, SOCMTS assumes the continuation of M2-funded programs. However, SOCMTS also recognizes that a new source of funding will be needed for these programs to continue operating beyond 2041.

As OCTA begins planning beyond the 2041 sunset of M2, it is important to consider the long-term vision for local circulators. These have proven to be effective for responding to and addressing community-level travel needs, particularly in southern Orange County's coastal communities. Local circulator programs could potentially be implemented in new areas and applied to address a variety of local travel needs. For example, local circulators could provide connections to schools where school districts may not have adequate transportation resources to address the needs of their students.

- **Recommended Actions:**
 - **Develop a post-2041 funding strategy for local circulators.**
 - **Consider opportunities to expand local circulator service.**
 - **Encourage consideration of all potential users in local planning for circulator services.**

4.6.4 Mobility Hubs

OCTA is currently developing a countywide mobility hubs strategy, which will provide direction for OCTA regarding mobility hub implementation in the coming years. This strategy will provide valuable data for considering a potential mobility hub pilot project in the short term. A pilot project will help provide the experience necessary to successfully advance a larger network of mobility hubs.

Mobility hub improvements could be considered for funding by existing M2 or any potential future funding source, including provisions for OCTA to provide administrative services or design/construction oversight where needed to support local capacity. Additionally, OCTA may consider funding programs for local communities to partner with vendors to deploy shared mobility options, like e-bikes and e-scooters, at mobility hubs.

- **Recommended Actions:**
 - ***Pursue project-level studies and a potential mobility hub pilot project to advance mobility hubs in South Orange County consistent with the countywide mobility hubs strategy.***
 - ***Identify funding opportunities for mobility hubs.***

4.6.5 Microtransit

OCTA currently operates an on-demand shared-ride service known as OC Flex. This service provides curb-to-curb rides in an area covering parts of Aliso Viejo, Mission Viejo, and Laguna Niguel, with unlimited rides all day for a single fare.

The experience gained from this service can be used to evaluate service operating guidelines and performance thresholds for considering implementing expanded microtransit services in additional areas. Studies could result in services similar to the current OC Flex, or they could recommend a different form of microtransit. For example, there is another microtransit model currently in operation in the City of San Clemente known as SC Rides. This service is a partnership with Transportation Network Companies and offers a subsidy to users traveling within a defined area.

Detailed market analysis of potential microtransit expansion zones will help OCTA determine which operating concept will be applied in each zone, how operations will work, and what sources of funding exist for capital and operations. The analysis of potential zones could include a prioritization component to establish which zones are slated for implementation in the short, mid, and longer-term timeframes. Logistical concerns could be addressed to improve operations and passenger experiences. Following deployment of any new services, OCTA would also need to implement procedures to monitor microtransit performance on a regular basis and adjust the program as needed to respond to changing conditions.

- **Recommended Actions:**
 - ***Develop guidelines for implementing additional microtransit service areas.***
 - ***Conduct market analysis and identify priority areas for microtransit.***
 - ***Develop a monitoring program for any new services to support the achievement of key performance indicators.***

4.6.6 Active Transportation

While active transportation improvements are generally within the purview of local agencies to implement, OCTA has led efforts to coordinate and prioritize the implementation of a regional bikeway system. This regional system supports the local networks and improves connectivity to transit and regional destinations. In addition to planning and implementing regional and local active transportation networks, supporting the design of streets that are “low-stress” could result in a safer and more attractive environment for active travelers.

Most of the low-stress street improvements will be the responsibility of the local agencies with the jurisdiction of the streets. However, OCTA can support these efforts through collaborative planning and by providing incentives to implement prioritized improvements. This could include developing a program to help fund the studies and implementation costs.

OCTA may also consider incentives for travelers to utilize the active transportation network, such as an e-bike voucher program. E-bikes can help overcome challenges due to terrain and distance. Regional wayfinding improvements, including signage and publicity about the low-stress street network, could also help encourage more active transportation trips by increasing the public's awareness of and familiarity with the facilities.

- **Recommended Actions:**
 - **Continue coordinated planning and implementation of the regional bikeway system.**
 - **Consider programs to support the implementation of low-stress streets.**
 - **Consider programs to support active transportation use.**

4.6.7 Transportation Demand Management

OCTA has secured a Sustainable Transportation Planning Grant through Caltrans to develop a countywide TDM strategy. This study will begin in early 2023 and will recommend TDM practices and the next steps to take in the coming years. SOCMTS goals related to trip reduction and mobility will be considered as part of the study. The recommended TDM practices will be identified and applied in locations where they can effectively target markets (types of travelers, trip purposes, travel modes, and corridors). Implementation of the recommendations will require coordination with partners; therefore, the study will also define recommended roles and responsibilities for the various partners. Finally, the study will outline key performance indicators for consideration as part of a monitoring program.

The TDM strategy will likely consider programs that provide residents in areas adjacent to transit and planned mobility hubs with free ride passes or provide residents and workers likely to use carpool facilities with information and carpool matching. Additionally, the recent popularity of remote work presents opportunities for growth that could be supported through programs to encourage employers and employees to take advantage of flexible and remote work arrangements when feasible.

- **Recommended Action:**
 - **Pursue implementation of TDM programs and actions identified in the upcoming countywide TDM Strategy.**

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