

APPENDIX C

Transit Investment Framework



OC TRANSIT VISION

Transit Investment Framework

January 2018



Table of Contents

	Page
1 Introduction.....	1-3
2 Service Allocation Guidelines	2-1
Corridor Characteristics.....	2-1
Route Categories	2-13
Service Allocation Guidelines.....	2-15
3 Capital Investment Guidelines	3-1
Bus Investment Guidelines	3-1
High-Capacity Transit Investment Guidelines.....	3-5

Table of Figures

	Page
Figure 1-1 Relationship of OC Transit Vision Elements.....	1-3
Figure 1-2 OC Transit Vision Goals and Objectives (Page 1 of 2)	1-5
Figure 1-3 OC Transit Vision Goals and Objectives (Page 2 of 2)	1-6
Figure 2-1 Population Density	2-2
Figure 2-2 Employment Density	2-3
Figure 2-3 College and University Enrollment	2-4
Figure 2-4 Hospitals and Medical Centers	2-5
Figure 2-5 Retail Centers	2-6
Figure 2-6 Other Major Attractors.....	2-7
Figure 2-7 Traffic Volumes.....	2-8
Figure 2-8 Income Less Than 150% of the Poverty Level.....	2-9
Figure 2-9 Stations, Transit Centers, and Park-and-Rides.....	2-10
Figure 2-10 Transit Routes.....	2-11
Figure 2-11 Intersection Density	2-12
Figure 2-12 OCTA Bus Routes by Category.....	2-14
Figure 2-13 Service Allocation Guidelines.....	2-15
Figure 2-14 Service Allocation Guidelines: Demographics and Connections.....	2-18
Figure 2-15 Service Allocation Guidelines: Level of Service.....	2-19
Figure 3-1 OCTA Vehicle and Waiting Enhancements.....	3-2
Figure 3-2 Proposed Bus Capital Investment Guidelines.....	3-4
Figure 3-3 Thresholds for Consideration of High-Capacity Transit.....	3-6

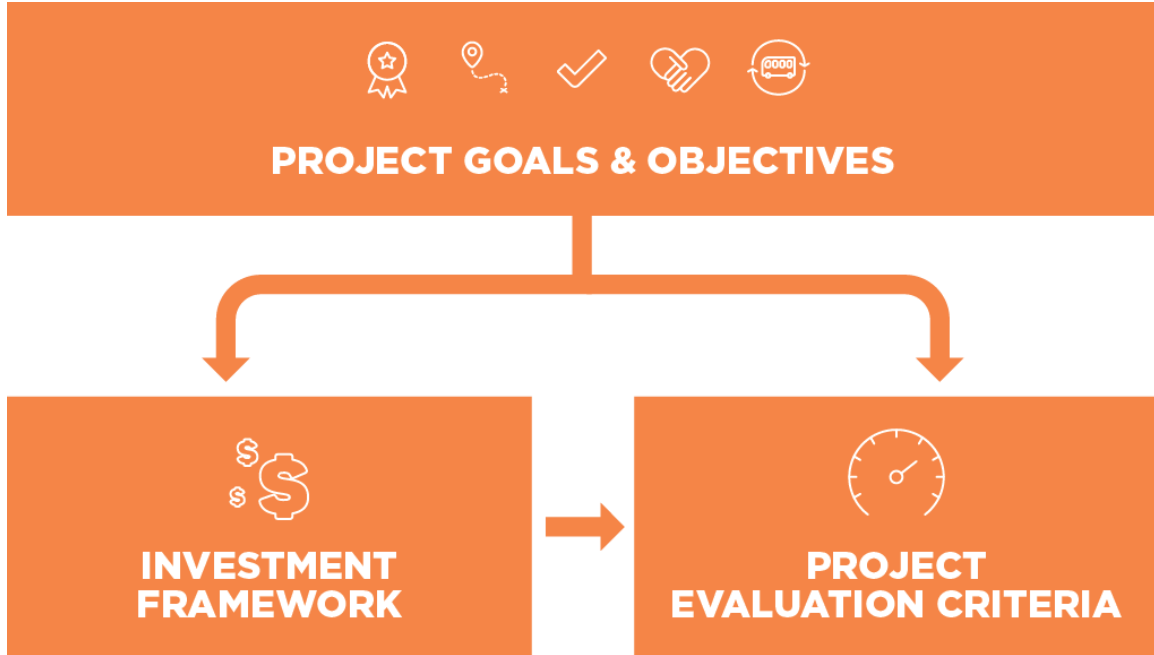
1 INTRODUCTION

This document describes the Transit Investment Framework developed for use by OCTA as part of the OC Transit Vision project. The primary purposes of the Transit Investment Framework are to provide guidance:

- **For OCTA** to use in its decision-making processes to allocate fixed-route bus operations and bus and rail capital resources; and
- **For Orange County cities and other agencies** to use in developing transit-supportive land use, street design, and other transportation policies (along with the *Transit-Supportive Design & Policies Handbook* also found in the appendices to this report).

The Transit Investment Framework is based on the OC Transit Vision goals and objectives, and provided a basis for the OC Transit Vision project evaluation criteria used to identify Transit Opportunity Corridors (see the *Transit Opportunity Corridors Report*, also in the appendices to this report).

Figure 1-1 Relationship of OC Transit Vision Elements



This document includes the following sections:

- **Guidelines for use in making decisions about future investments and allocating operating resources** for fixed-route bus service; and

- **Guidelines for use in evaluating future capital investments** in bus and rail service as well as access to service.

The OCTA Transit Investment Framework's principles and guidelines incorporate industry standards, state and federal discretionary grant program evaluation criteria, and research into existing policies adopted by OCTA and peer agencies, including the Los Angeles County Metropolitan Transportation Authority (Los Angeles Metro), the King County (Washington) Department of Transportation Metro Transit Division (King County Metro), and the South Coast British Columbia Transportation Authority (TransLink).

OC Transit Vision Goals and Objectives

Figure 1-2 and Figure 1-3 present the OC Transit Vision goals and objectives, on which the draft Transit Investment Framework is based.

Figure 1-2 OC Transit Vision Goals and Objectives (Page 1 of 2)

VISION, GOALS, AND OBJECTIVES



VISION

Provide compelling and competitive transit service that expands transportation choices for current riders, attracts new riders, and equitably supports immediate and long-term mobility in Orange County

GOALS



Enhance

Make it more desirable to take transit

Reliability and competitiveness

- Provide convenient service that appeals to a broad cross-section of Orange County residents
- Make transit travel times in key corridors competitive with the auto
- Improve the reliability of transit trips
- Provide longer hours of service and more weekend service (span, frequency, and routes)
- Develop a network of high-capacity or premium services such as bus rapid transit, light rail, and streetcar to provide attractive transit service and support local land use

Frequency

- Develop a Frequent Service Network that provides frequent (15-minutes or better), all-day service from early morning to late night in major corridors and to major destinations

Quality

- Improve service quality in the highest-demand transit markets
- Develop services tailored to the needs of specific markets

Affordability

- Provide affordable transit choices for Orange County residents

Facility Design and Passenger Comfort

- Provide a comfortable and safe environment for transit passengers
- Improve access to, and the quality of, transit stops and stations



Connect

Connect Orange County's people and places with effective transit

Local and Regional Connections

- Expand service to currently unserved areas of Orange County that have sufficient transit demand and to emerging areas to support new development
- Improve connections to major attractions and destinations
- Improve access to jobs and services to improve economic opportunities for Orange County residents
- Improve transit connections with surrounding counties to develop a stronger regional system

Integration

- Integrate transit services with other complementary modes
- Develop new partnerships and improved service models to better serve markets where fixed-route service is impractical

Multimodal Access and First/Last Mile Connections

- Create great places where modes connect to facilitate seamless integration of Orange County's pedestrian, bicycle, and transit networks
- Strengthen multimodal connections and make it safe and easy to access transit
- Enhance partnerships with shared mobility providers
- Participate in efforts to make streets more complete and transit-friendly

Figure 1-3 OC Transit Vision Goals and Objectives (Page 2 of 2)

GOALS AND OBJECTIVES



Simplify

Make transit easier to use and more convenient

Legibility

- Provide service that is easy for people to understand and use
- Make it easier for customers to plan door-to-door trips with a seamless menu of travel options among transit services, operators, and other transportation modes
- Take advantage of new technologies to simplify interactions with customers, including fare payment

Education and Information

- Educate Orange County residents, workers, and visitors about available transit services
- Continue to provide transit and mobility information that is readily available, attractive, and easy to understand
- Make real-time schedule information extensively available



Collaborate

Make Orange County a more attractive place to live, work, and visit by providing transit service that supports community priorities

Economy and Development

- Support economic development, including the development patterns envisioned in local, county, and regional plans
- Support the vitality of the county's downtowns, local centers, neighborhoods, and job centers

Equity

- Use transit to create a transportation system responsive to the needs of people for whom transit is a necessity (e.g., youth, older adults, people with disabilities, low income populations, people without autos)
- Improve the accessibility of transit for older adults and people with disabilities to support their ability to live independent lives
- Develop a sustainable model for paratransit service to provide mobility and independence

Environment

- Provide transit services that relieve congestion, improve air quality, and reduce greenhouse gas emissions
- Use transit as a way to enhance healthy, complete communities and compact, livable neighborhoods



Sustain

Create a system that is resilient over the long term

Ridership and Perception

- Get more people riding transit
- Retain existing customers and make it easier for them to take additional trips using transit
- Improve public perception of transit in Orange County

Performance Monitoring

- Continue to monitor performance measures and adjust service and implementation plans as necessary

Productivity

- Focus service in areas where it can be most effective
- Develop cost-effective and productive transit services and programs

Partnerships

- Develop services that achieve a high level of public support
- Strengthen existing partnerships, continue to build partnerships, and work closely with communities and businesses
- Develop new partnerships and service models to better serve markets where traditional fixed-route transit is impractical

Funding

- Develop reliable and predictable revenue streams that grow with Orange County's economy
- Invest public resources in a financially responsible manner
- Identify and pursue opportunities for new funding sources, including leveraging private funds

Flexibility

- Plan for investments in a way that allows OCTA to respond and adapt to changes in the environment for transit

2 SERVICE ALLOCATION GUIDELINES

The OCTA Transit Investment Framework consists of two categories: service allocation guidelines and capital investment guidelines. This section describes the service allocation guidelines.

Different service types and delivery models are needed to enhance mobility in Orange County. The guidelines described below should be used to help make decisions about where service types should be implemented or operated.

CORRIDOR CHARACTERISTICS

The service allocation guidelines for fixed-route bus operations are based on numerical targets and other factors associated with seven corridor characteristics, defined as extending one-half mile to either side of the route alignment (and including all units of analysis, such as census tracts, that are at least partly within that radius). The characteristics fall into three categories:

- **Land Use Factors**
 - Residential Density
 - Employment/College and University Student Density (combined)
 - Other Trip Generators (hospitals and medical centers, retail centers, and other major destinations)
 - Traffic Volumes
- **Equity Factors**
 - Density of Low-Income Residents
- **Access Factors**
 - Transit Connectivity (stations, transit centers and park-and-rides, and other routes)
 - Intersection Density

These seven characteristics were selected based on a peer review and assessment of their role in demand for transit service in Orange County. Notably, four of the six factors previously found by OCTA to be primary indicators of individual propensity toward transit use—per capita income, traffic volumes, intersection density, and employment density—are included. (The other factors from that analysis are alternative measures of income and employment: low-income households and total employment.)

Maps from the State of OC Transit Report that illustrate existing countywide patterns for each of the corridor characteristics are shown in Figure 2-1 through Figure 2-11 on the following pages.

Figure 2-1 Population Density

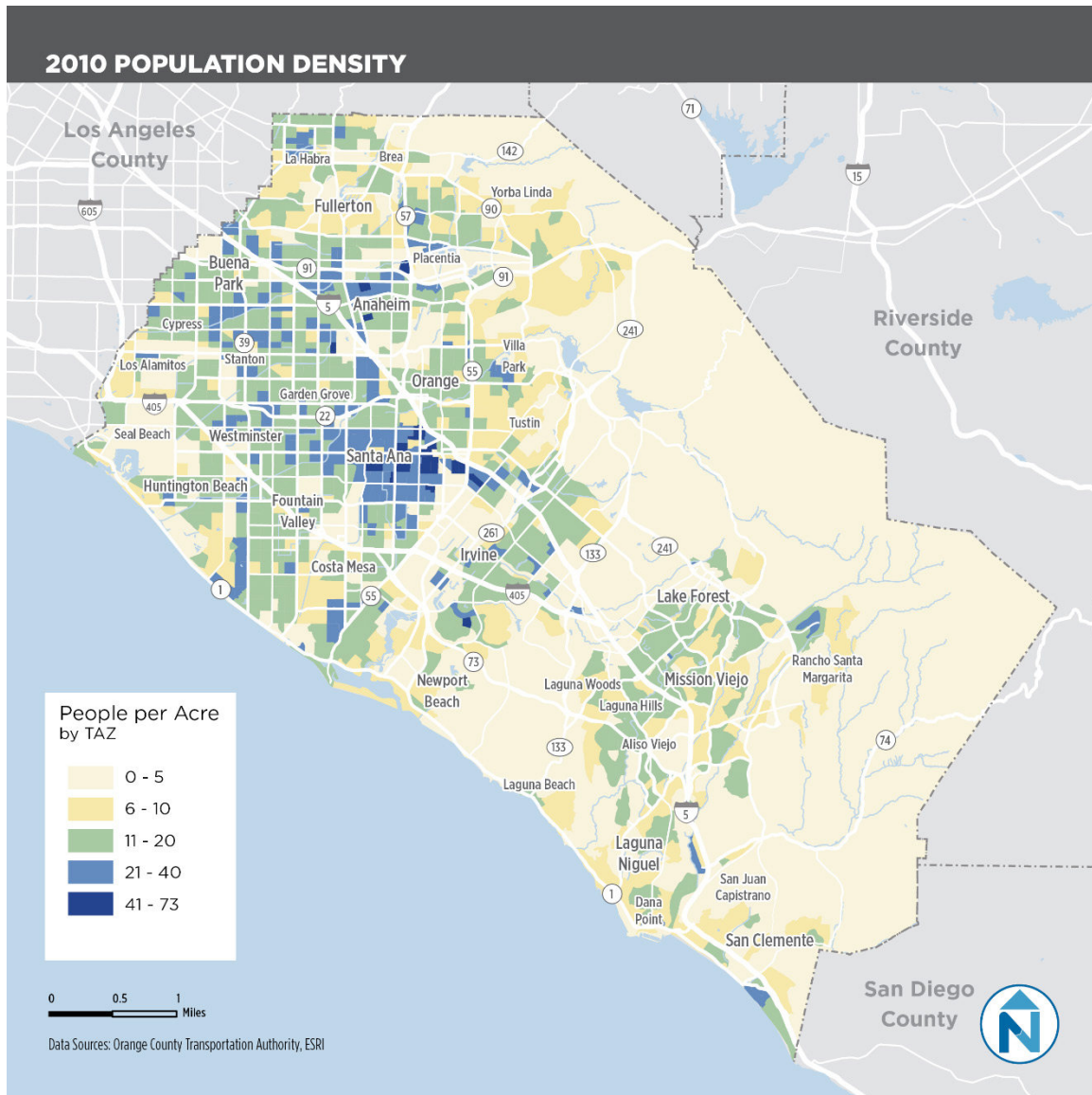


Figure 2-2 Employment Density

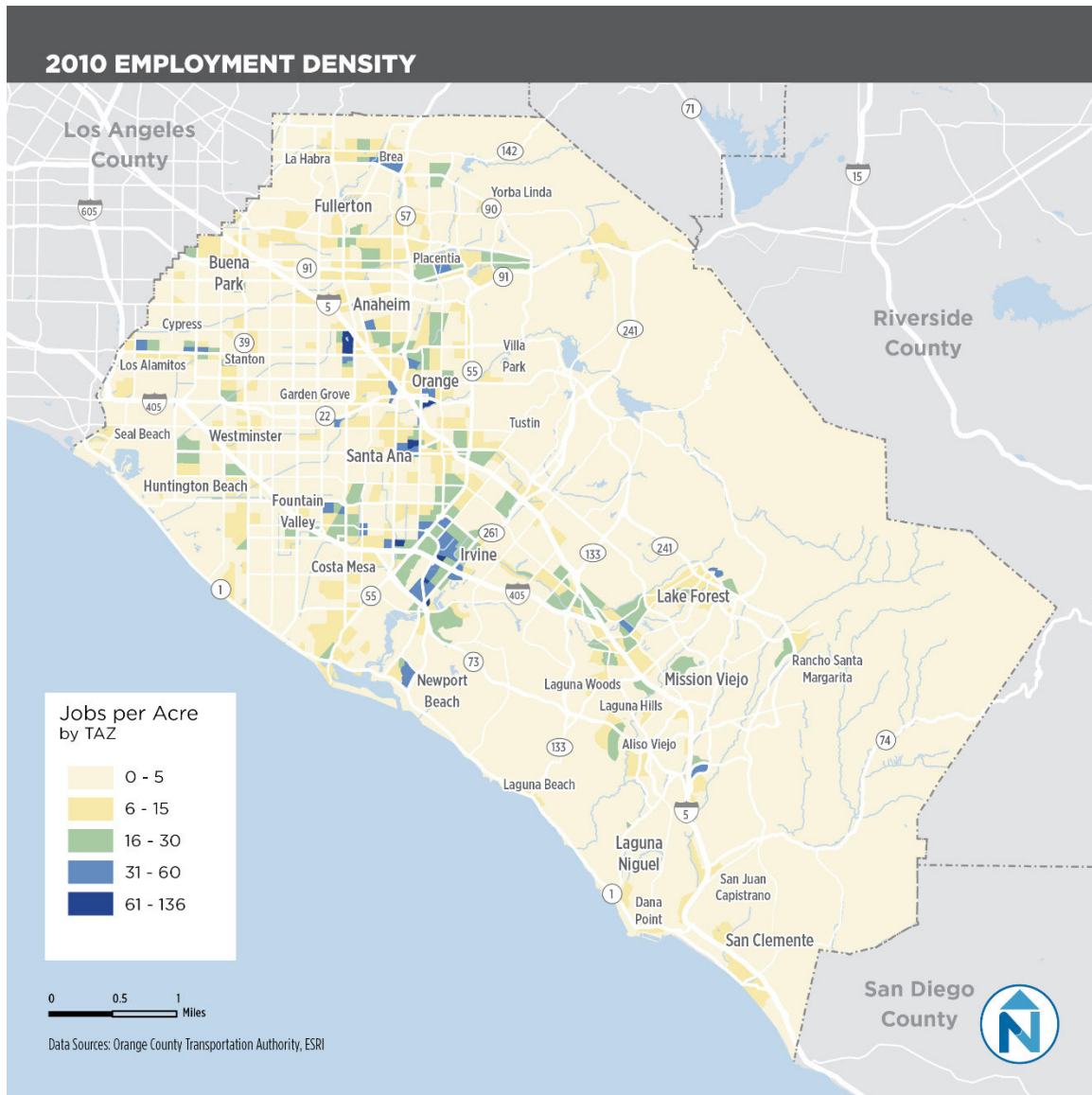


Figure 2-3 College and University Enrollment

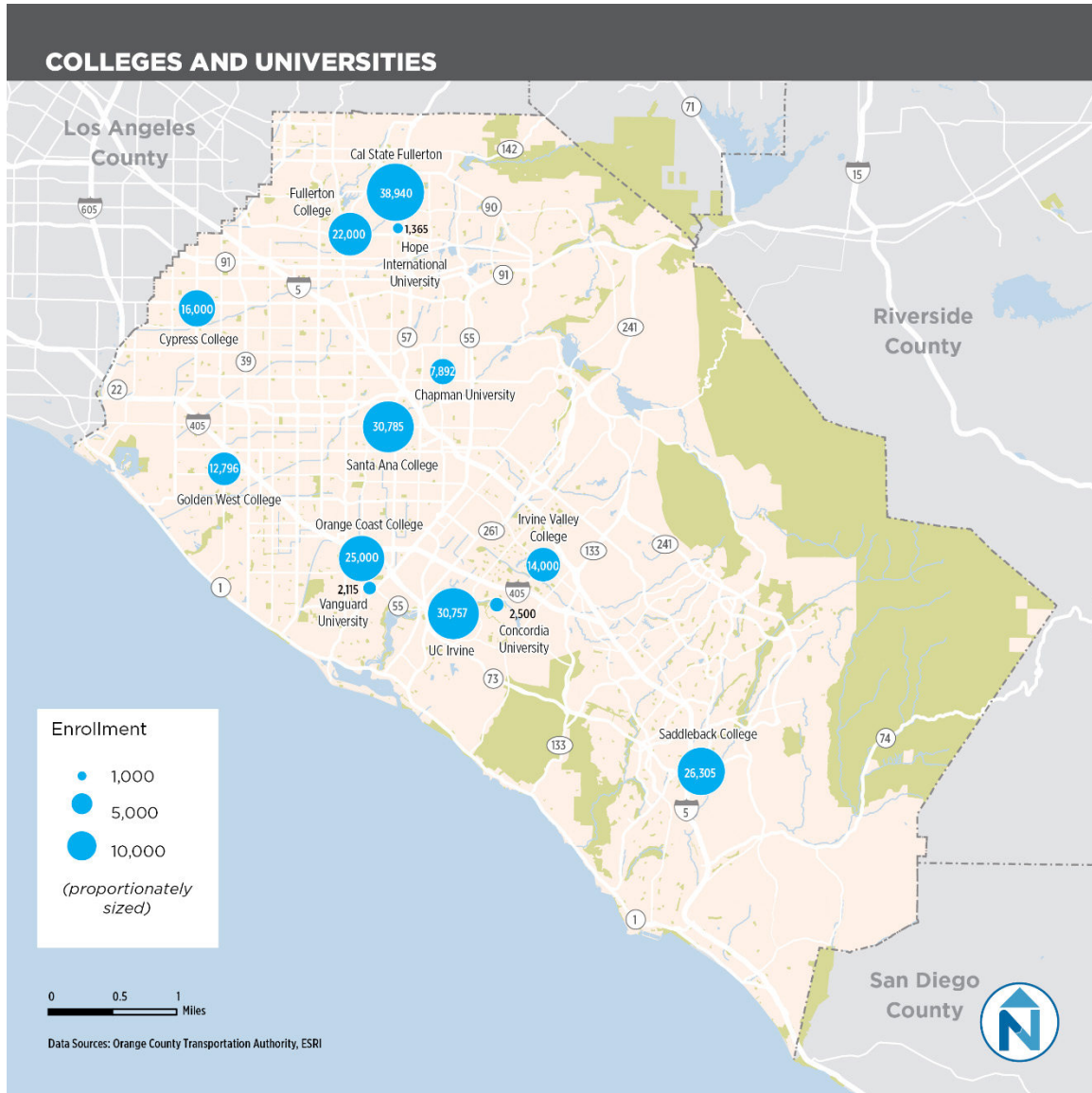


Figure 2-4 Hospitals and Medical Centers



Figure 2-5 Retail Centers

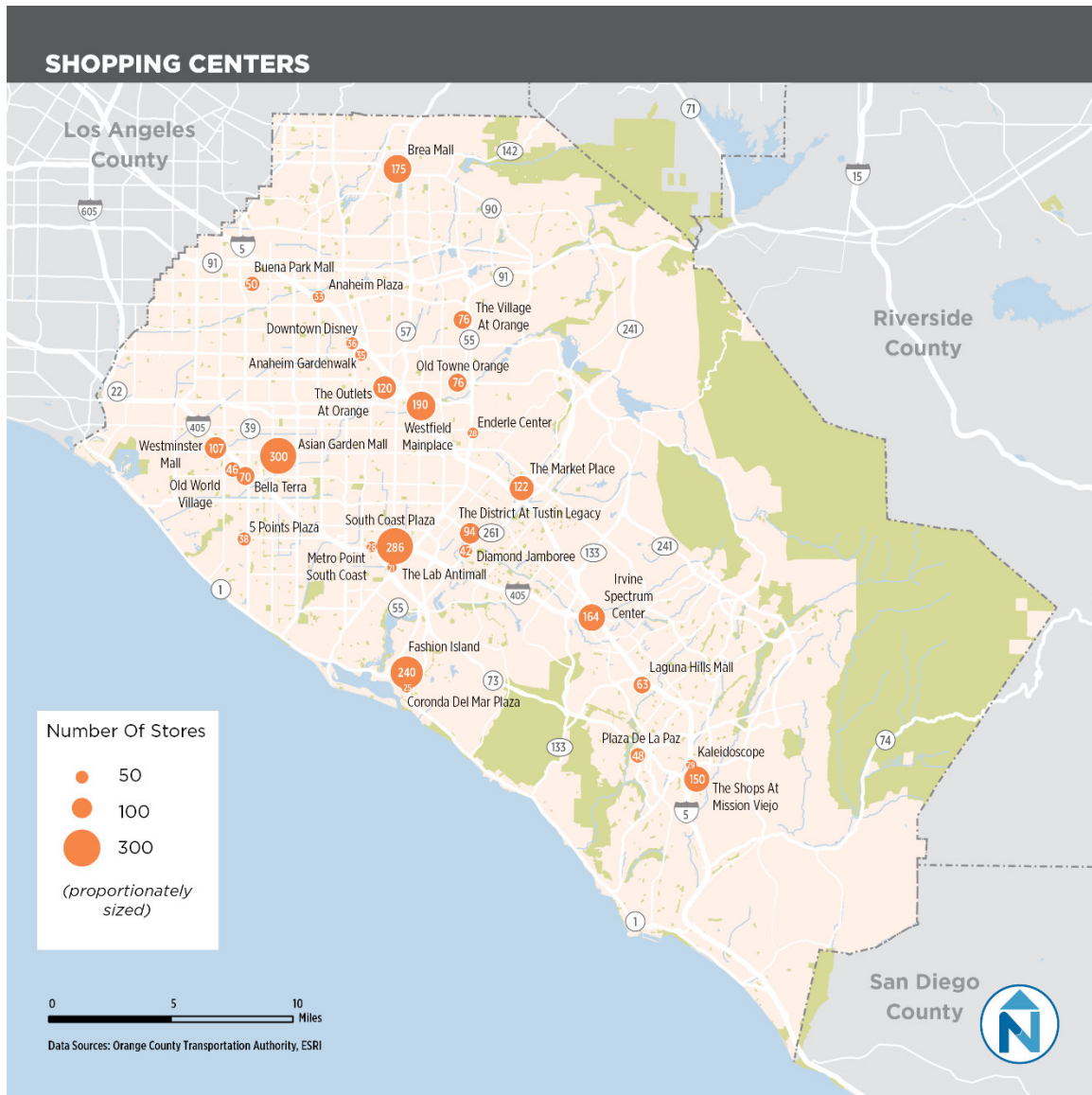


Figure 2-6 Other Major Attractors



Figure 2-7 Traffic Volumes

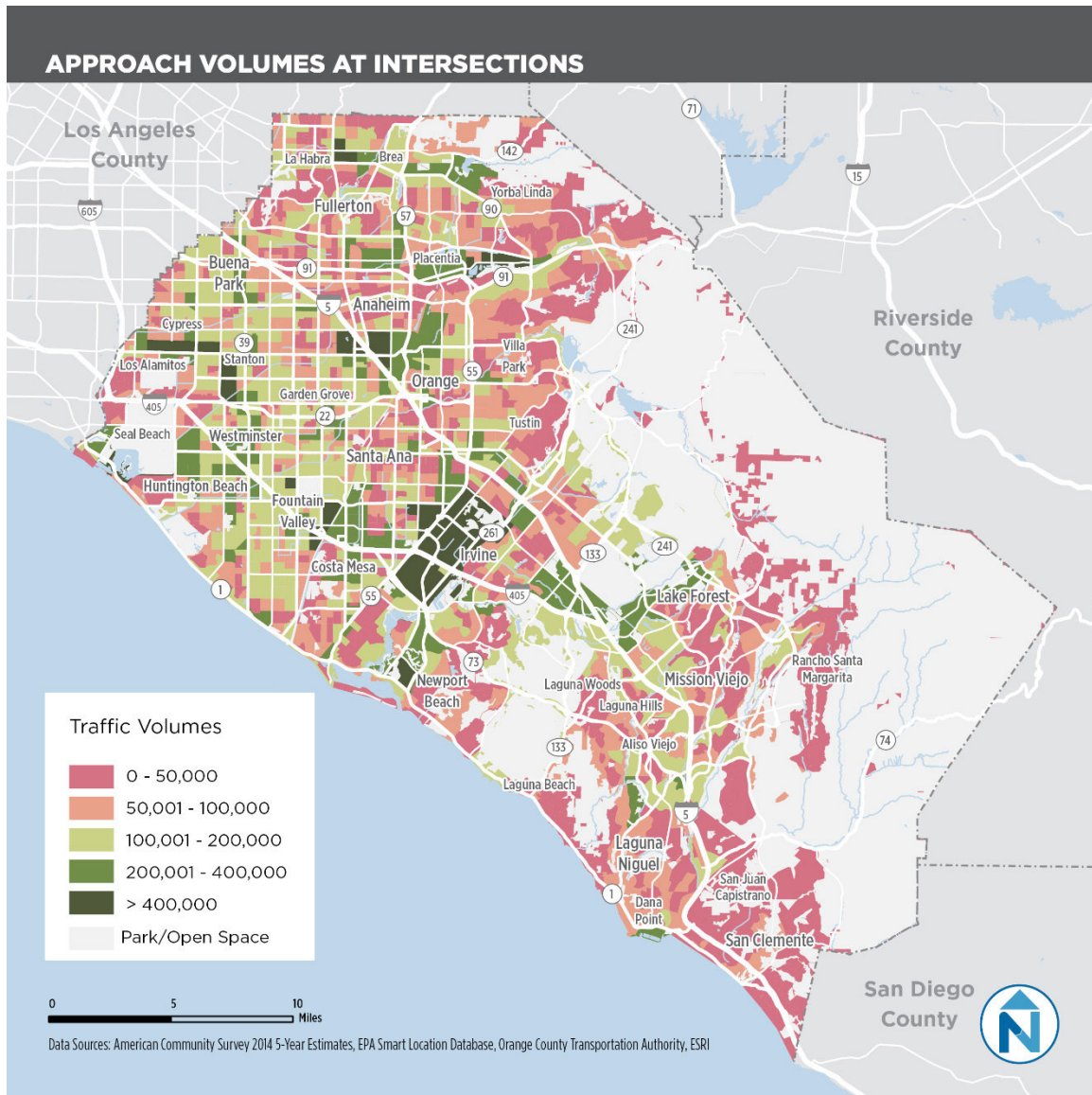


Figure 2-8 Income Less Than 150% of the Poverty Level

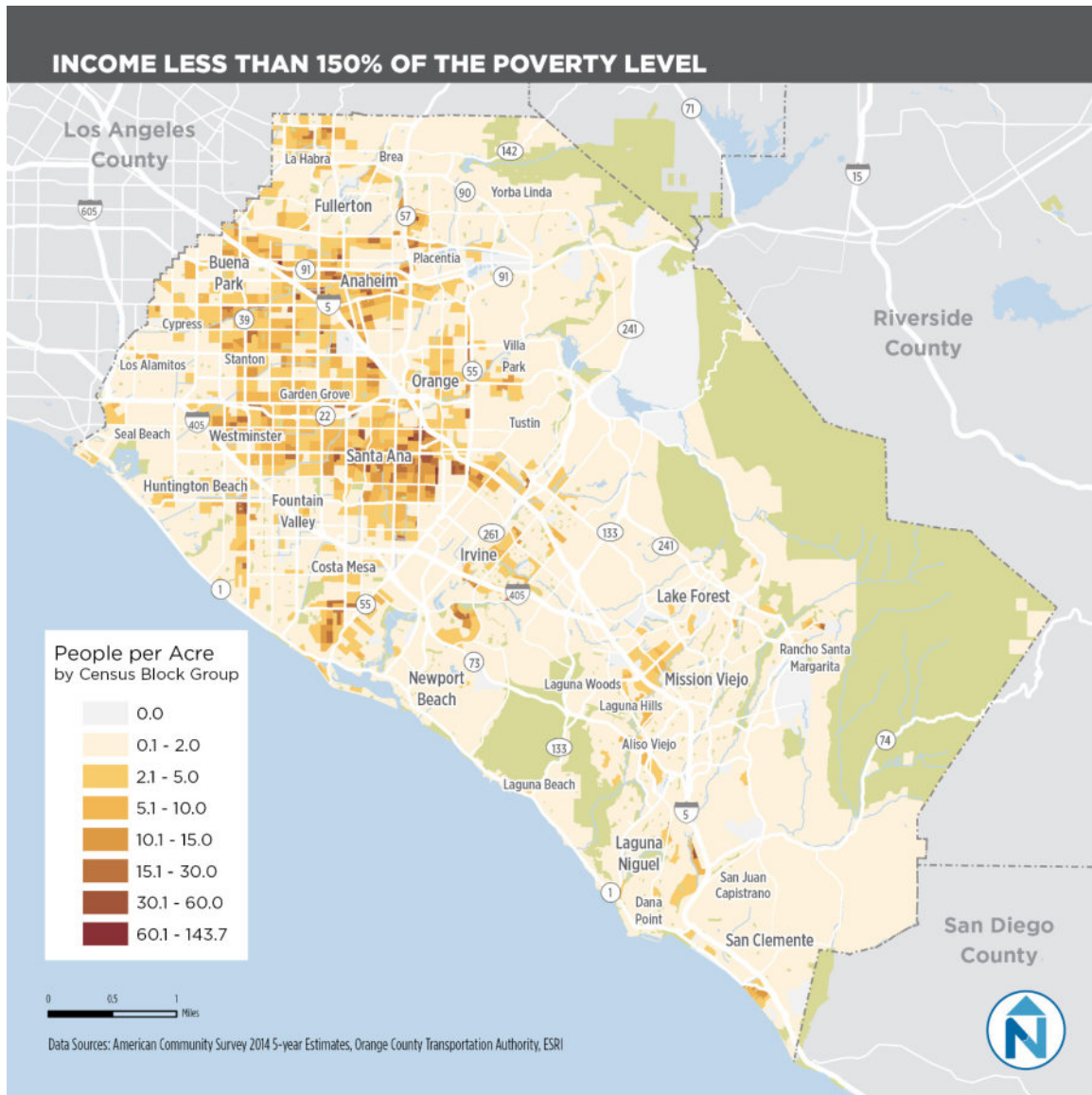


Figure 2-9 Stations, Transit Centers, and Park-and-Rides

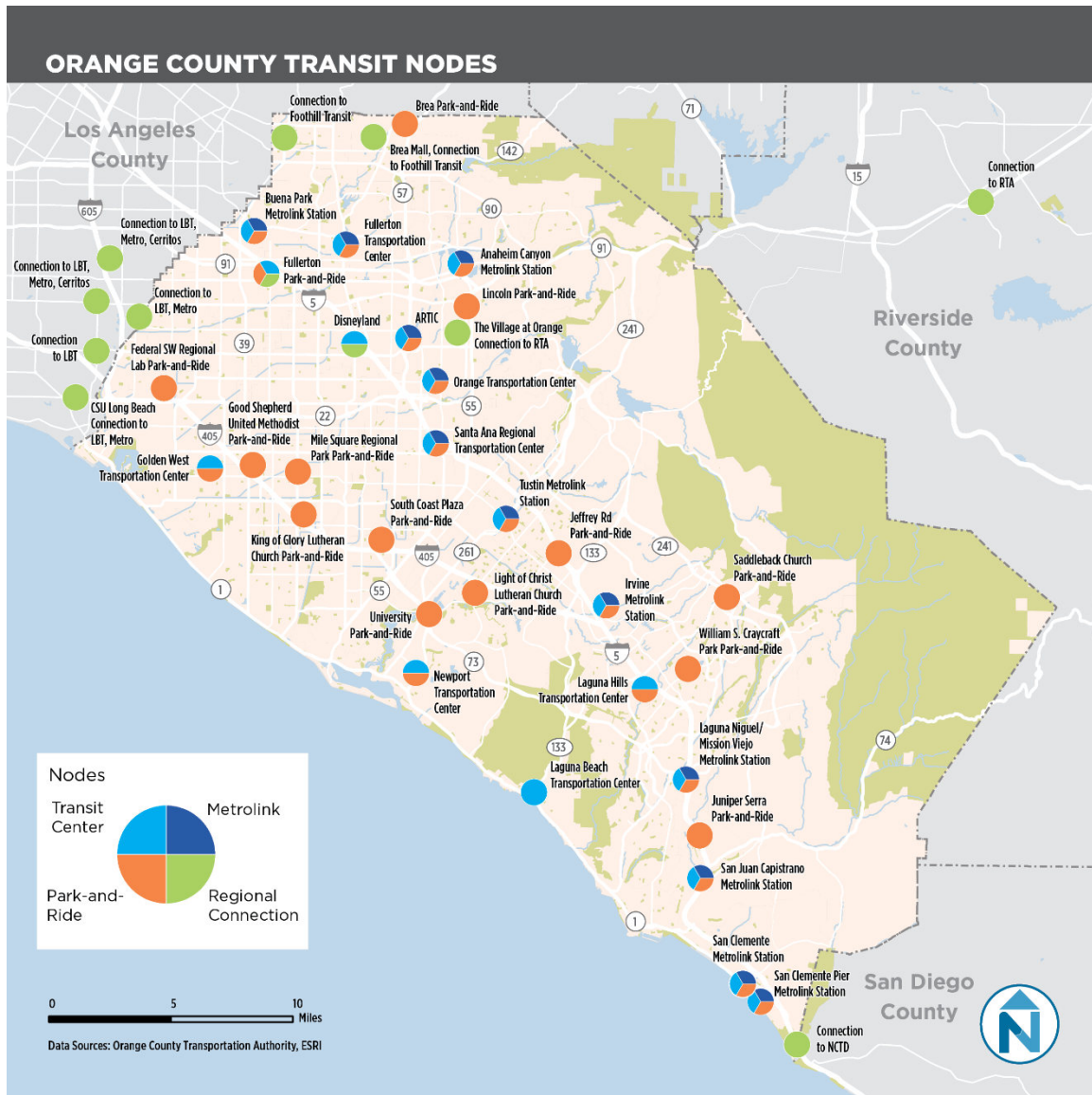
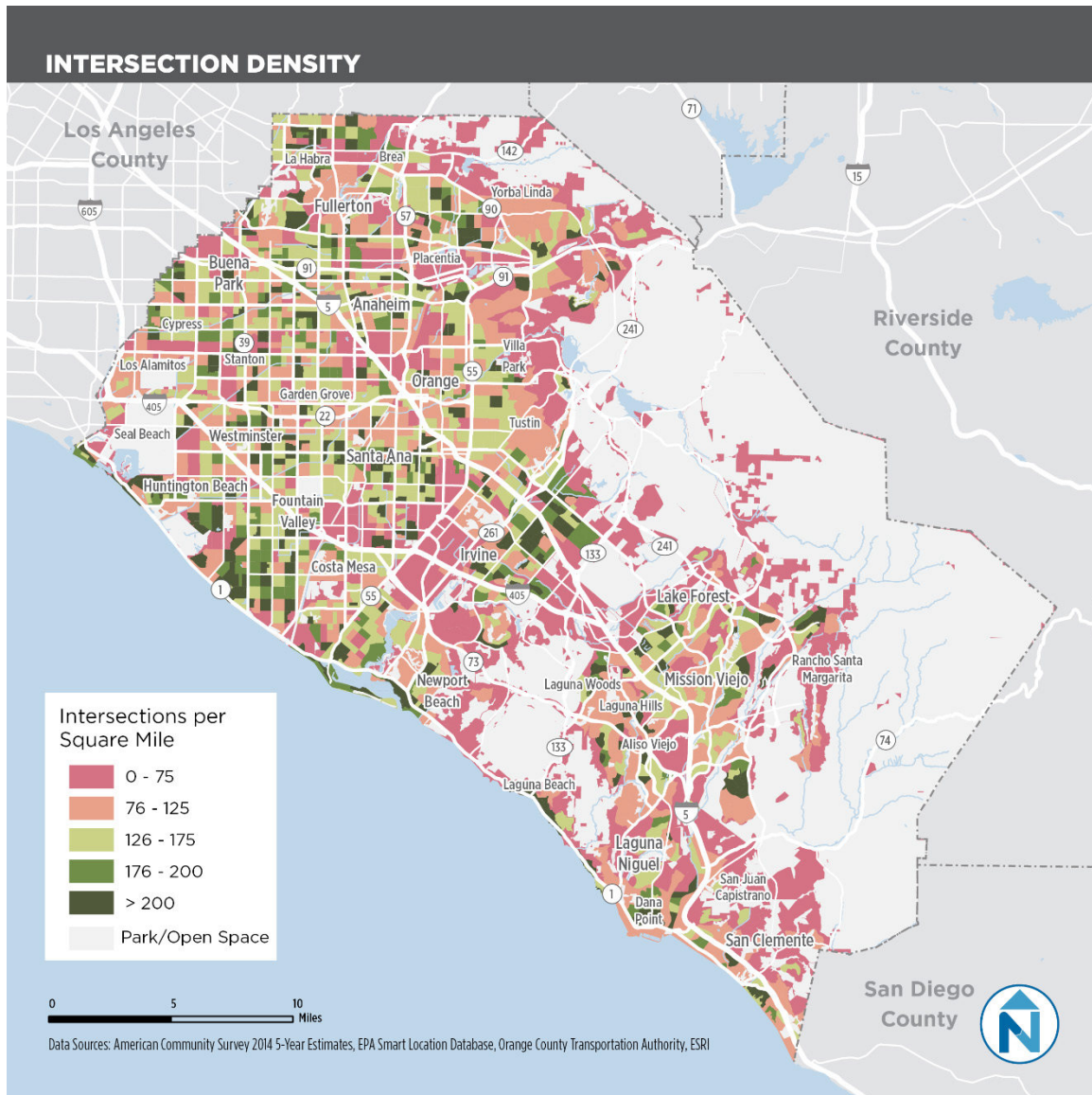


Figure 2-10 Transit Routes



Figure 2-11 Intersection Density



ROUTE CATEGORIES

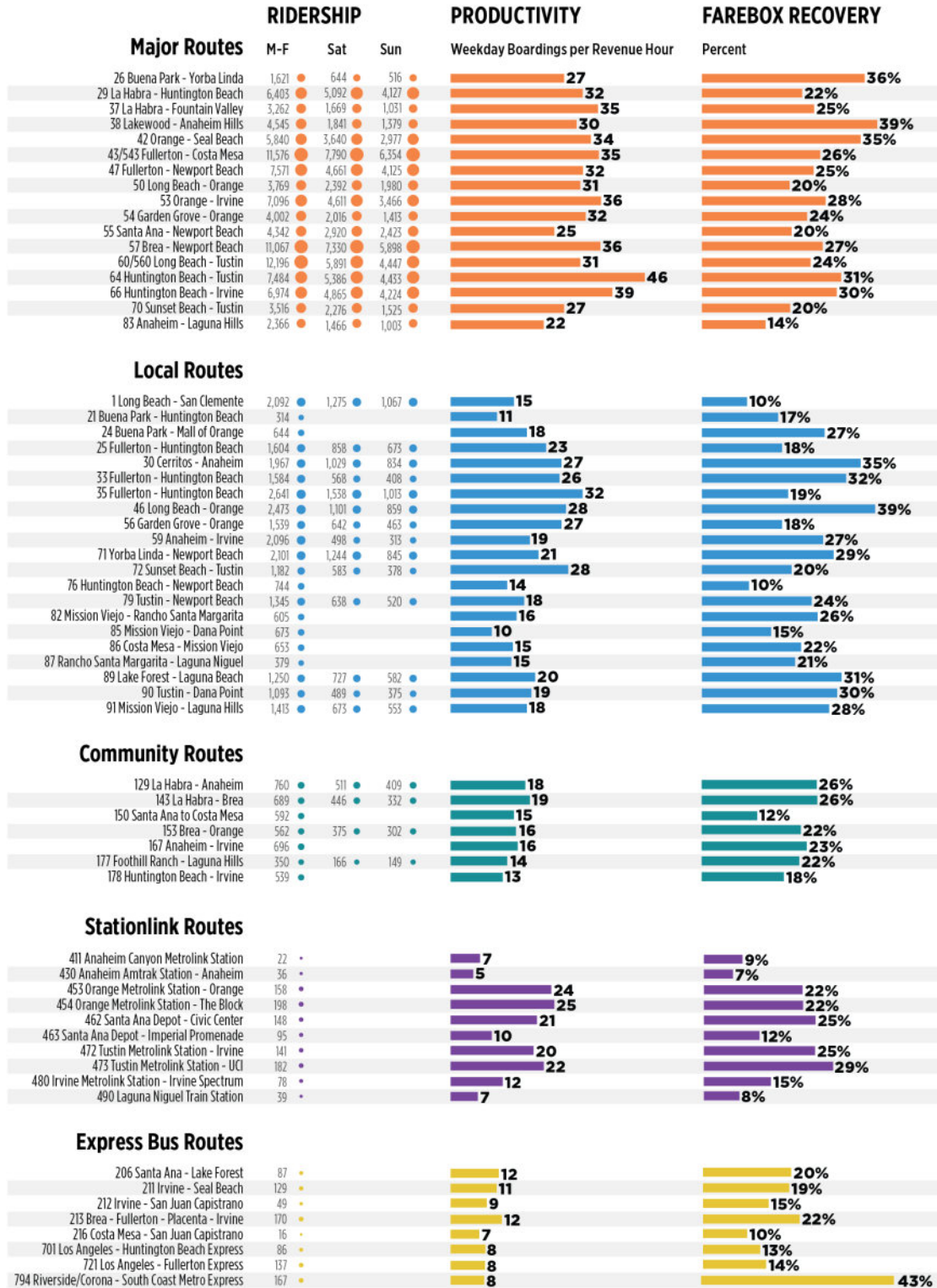
Best practice in the development of service allocation guidelines is to define categories or types of transit service to reflect the functions of different routes and varied needs of transit riders.

Following are the route categories developed for this Transit Investment Framework (which were based on OCTA's previously existing route categories, with minor modifications):

- **Major:** These routes operate every 15 minutes or better during peak times, with the exception of Routes 42 and 83. Major routes operate seven days a week throughout the day. Together, the Major routes form a grid on arterial streets throughout the highest transit propensity portions of the OC Bus service area, primarily in northern parts of the county. Bravol limited-stop services are included in this category. These routes carry more than 75 percent of the system's riders.
- **Local:** Local routes operate on arterials within the grid created by the Major routes, but at lower frequencies. Local routes also operate in parts of Orange County with lower transit demand. Most Local routes operate seven days per week, however some operate on weekdays only. Local routes carry about 20 percent of the system ridership and are less productive than Major routes, averaging about 20 boardings per revenue hour.
- **Community:** Community routes provide service to connect pockets of transit demand with major destinations and offer local circulation. Routes tend to be less direct than Local routes due to service design focused on serving neighborhoods and destinations off the arterial grid. Half of Community routes operate seven days per week while half operate on weekdays only. Community routes carry less than three percent of OC Bus ridership, averaging 15 boardings per revenue hour. They have the second-highest farebox recovery of any route category (23 percent). City-operated shuttles funded by Measure M Project V in La Habra, Westminster, and Mission Viejo fall into this category.
- **Stationlink:** Stationlink routes are rail feeder services designed to connect Metrolink stations to nearby employment destinations. One or more Stationlink routes serves all Metrolink stations in Orange County except Buena Park, Fullerton, San Juan Capistrano, and San Clemente. These routes have relatively short alignments, with schedules tied to Metrolink arrivals and departures. They operate during weekday peak hours only, in the peak direction, from the station to destinations in the morning and the reverse in the evening. These routes carry less than one percent of OC Bus ridership and have similar productivity to Community routes, averaging 16 boardings per revenue hour. Some routes operated by the City of Irvine and Anaheim Transportation Network fall into this category as well.
- **Express:** Express bus service operates on weekdays only at peak times and connects riders over long distances to destinations within and outside of Orange County, often using freeways to access destinations. Express routes carry less than one percent of OC Bus ridership and average nine boardings per revenue hour, the least of any route category. Express routes have 20 percent farebox recovery.

Figure 2-12 shows Fiscal Year 2016 performance in major categories of routes in each OCTA service category.

Figure 2-12 OCTA Bus Routes by Category



SERVICE ALLOCATION GUIDELINES

Figure 2-13 through Figure 2-15 below describe the fixed-route bus service allocation guidelines—in terms of service category, peak and base (midday weekday) frequencies, and span—based on the corridor characteristics and service types.

Figure 2-13 focuses on the Major Corridors, Local (Non-Major), and Community service types. Stationlink and Express routes provide specialized niche services during peak periods only, and separate guidelines for these services follow Figure 2-13.

The framework also includes “other” and “no transit” categories in which alternatives to traditional OCTA fixed-route bus service, such as locally-administered Program V shuttles or general-public demand-response services, may be appropriate or where publicly funded transit service may not be appropriate due to very low demand.

These allocation guidelines are not absolute requirements. Few corridors will have characteristics consistent with just one category, and OCTA must make service allocation decisions on the basis of other factors, including productivity, equity, and funding.

Figure 2-13 Service Allocation Guidelines

Category	Service Characteristics	Corridor Characteristics
Major	<ul style="list-style-type: none"> ▪ <i>Frequency:</i> 15 mins or greater peak, 30 mins or greater base ▪ <i>Span:</i> 5:00am-12:00am M-F, 6am-12am weekend 	<ul style="list-style-type: none"> ▪ <i>Residential Density:</i> 10 or more persons per acre ▪ <i>Employment/Enrollment Density:</i> 8 or more jobs/college or university students per acre ▪ <i>Other Trip Generators:</i> Serves 5 or more hospitals or medical centers with 50 or more beds, retail centers with 50 or more stores, or other major destinations ▪ <i>Traffic Volumes:</i> Average combined ADT at all major intersections of more than 100,000 per corridor mile ▪ <i>Density of Low-Income Residents (Household Income Below 150% of Poverty Level):</i> 2 or more per acre ▪ <i>Transit Connectivity:</i> Connects to 2 or more Metrolink stations, transit centers, or park-and-rides, and to 5 or more Major routes ▪ <i>Intersection Density:</i> 100 or more per square mile

Category	Service Characteristics	Corridor Characteristics
Local	<ul style="list-style-type: none"> ▪ <i>Frequency:</i> 30 mins or greater peak and base ▪ <i>Span:</i> 5:30am-8:30pm M-F, 7am-7pm weekend 	<ul style="list-style-type: none"> ▪ <i>Residential Density:</i> 5-10 persons per acre ▪ <i>Employment/Enrollment Density:</i> 4-8 jobs/college or university students per acre ▪ <i>Other Trip Generators:</i> Serves 2-5 hospitals or medical centers with 50 or more beds, retail centers with 50 or more stores, or other major destinations ▪ <i>Traffic Volumes:</i> Average combined ADT at all major intersections of less than 100,000 per corridor mile ▪ <i>Density of Low-Income Residents (Household Income Below 150% of Poverty Level):</i> 1-2 per acre ▪ <i>Transit Connectivity:</i> Connects to 1 or fewer Metrolink stations, transit centers, or park-and-rides, and 1-4 Major routes ▪ <i>Intersection Density:</i> Any
Community	<ul style="list-style-type: none"> ▪ <i>Frequency:</i> 60 mins or greater peak and base ▪ <i>Span:</i> 5:30am-8:30pm M-F, 7am-7pm weekend 	<ul style="list-style-type: none"> ▪ <i>Residential Density:</i> Fewer than 10 persons per acre ▪ <i>Employment/Enrollment Density:</i> Fewer than 8 jobs/college or university students per acre ▪ <i>Other Trip Generators:</i> Serves 1 or more hospitals or medical centers with 50 or more beds, retail centers with 50 or more stores, or other major destinations ▪ <i>Traffic Volumes:</i> Average combined ADT at all major intersections of less than 100,000 per corridor mile ▪ <i>Density of Low-Income Residents (Household Income Below 150% of Poverty Level):</i> Any ▪ <i>Transit Connectivity:</i> Connects to 1 or fewer Metrolink stations, transit centers, or park-and-rides, and 1-4 Major routes ▪ <i>Intersection Density:</i> Any
Other	<ul style="list-style-type: none"> ▪ <i>Frequency and Span:</i> n/a (explore alternatives to OCTA fixed-route bus service) 	<ul style="list-style-type: none"> ▪ <i>Residential Density:</i> Fewer than 5 persons per acre ▪ <i>Employment/Enrollment Density:</i> Fewer than 4 jobs/college or university students per acre ▪ <i>Other Trip Generators:</i> Any ▪ <i>Traffic Volumes:</i> Any ▪ <i>Density of Low-Income Residents (Household Income Below 150% of Poverty Level):</i> Any ▪ <i>Transit Connectivity:</i> Any ▪ <i>Intersection Density:</i> Fewer than 100 per square mile

Category	Service Characteristics	Corridor Characteristics
No Transit	<ul style="list-style-type: none"> ▪ <i>Frequency and Span:</i> n/a (publicly funded service should not be provided) 	<ul style="list-style-type: none"> ▪ <i>Residential Density:</i> Fewer than 3 persons per acre ▪ <i>Employment/Enrollment Density:</i> Fewer than 2 jobs/college or university students per acre ▪ <i>Other Trip Generators:</i> Does not connect to hospitals or medical centers with 50 or more beds, retail centers with 50 or more stores, or other major destinations ▪ <i>Traffic Volumes:</i> Any ▪ <i>Density of Low-Income Residents (Household Income Below 150% of Poverty Level):</i> Fewer than 2 per acre ▪ <i>Transit Connectivity:</i> Does not connect to Metrolink stations, transit centers, or park-and-rides, or to Major routes ▪ <i>Intersection Density:</i> Fewer than 100 per square mile

Following are guidelines for Stationlink and Express services.

- **Stationlink:** Stationlink routes provide connections solely between Metrolink stations and nearby destinations such as job centers. They should operate only during peak periods, in the peak direction (from the station in the morning, and to the station in the afternoon).
- **Express:** Express routes serve long trips during peak periods, primarily commute trips to job centers. As they mainly serve “white-collar” commuters who own automobiles, access to these routes is primarily by auto; thus, Express routes rely on proximity to park-and-ride lots as a primary criterion for service.

Figure 2-14 Service Allocation Guidelines: Demographics and Connections

Service Category	Population Density <small>People per acre</small>	Employment and Enrollment Density <small>Jobs or postsecondary students per acre</small>	Other Trip Generators <small>Hospitals Served OR Major Retail Served</small>	Traffic Volumes <small>Average combined ADT at all major intersections</small>	Density of Low-Income Residents <small>Low-income people per acre</small>	Transit Connectivity	Intersection Density <small>Intersections per square mile</small>
MAJOR	10 or more 	8 or more 	5 or more Hospitals OR 5 or more Retail 	100,000 +	2 or more 	2 or more AND 5 or more 	100 +
LOCAL	5 to 10 	4 to 8 	2 to 5 Hospitals OR 2 to 5 Retail 	Less than 100,000	1 to 2 	1 or fewer AND 1 to 4 	Any
COMMUNITY	Fewer than 10 	Fewer than 8 	1 or more Hospitals OR 1 or more Retail 	Less than 100,000	Any	1 or fewer AND 1 to 4 	Any
OTHER <small>Explore alternatives to OCTA fixed-route bus service</small>	Fewer than 5 	Fewer than 4 	Any	Any	Any	Any	100
NO TRANSIT <small>Publicly-funded service should likely not be provided</small>	Fewer than 3 	Fewer than 2 	None	Any	Fewer than 2 	None	Fewer than 100

Hospital With 50 or more beds

Retail Center with 50 or more stores

Connection with Metrolink station, transit center, or park-and-ride

Connection with Major OCTA route

Figure 2-15 Service Allocation Guidelines: Level of Service

Service Category	Peak Frequency <small>Buses per hour</small>	Base Frequency <small>Buses per hour</small>	Weekday Span	Weekend Span
MAJOR			5 AM to 12 AM 	6 AM TO 12 AM
LOCAL			5:30 AM to 8:30 PM 	7 AM to 7 PM
COMMUNITY			5:30 AM to 8:30 PM 	7 AM to 7 PM
OTHER <small>Explore alternatives to OCTA fixed-route bus service</small>	N/A	N/A	N/A 	N/A
NO TRANSIT <small>Publicly-funded service should likely not be provided</small>	N/A	N/A	N/A 	N/A

3 CAPITAL INVESTMENT GUIDELINES

This section describes capital investment guidelines in two categories: investments in infrastructure supportive of existing bus operations, and investments in new fixed-guideway lines and stations (e.g., streetcars or bus rapid transit). These standards build on the service allocation guidelines to identify both existing corridors and potential future corridors where capital investments—in addition to potential investments in service—may be justified.

In addition to these investment guidelines, evaluation criteria for investments in transit opportunity corridors were developed as part of the OC Transit Vision process. These can be found in the *Transit Opportunity Corridors Report* elsewhere in the appendices to this report.

BUS INVESTMENT GUIDELINES

Capital investments in existing bus service fall into three categories: 1) vehicles; 2) transit-priority improvements to the right-of-way; and 3) major improvements to stops and stations, including operational improvements as well as enhanced passenger amenities. Some of these can be implemented by OCTA; others, such as transit-priority and operational improvements at intersections, are the responsibility of Orange County cities or Caltrans and would require partnerships with those jurisdictions/agencies.

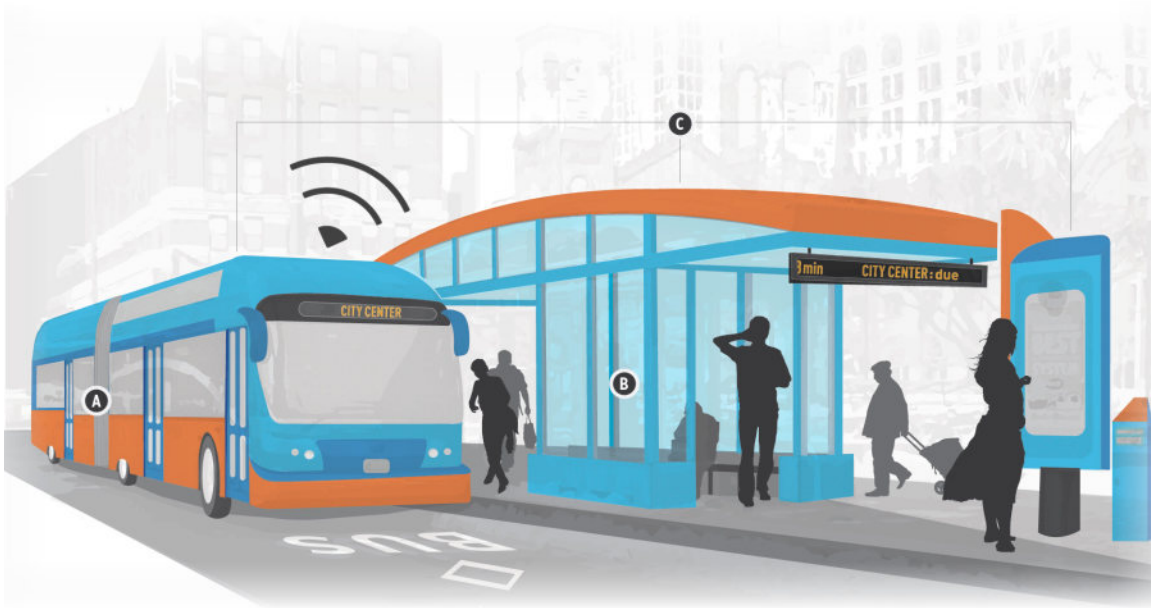
Vehicles

New vehicles may improve upon the current fleet in terms of capacity, emissions, reliability, maneuverability, comfort, and brand identity, among other factors.

The proposed guidelines for OCTA include (items A through C correspond to labels in Figure 4-1 on the next page):

- A. Vehicle capacity, and the related issue of overcrowding
- B. Comfort, both aboard vehicles and while waiting at stops
- C. Branding of vehicles, to enhance awareness of specialized and premium services such as bus rapid transit

Figure 3-1 OCTA Vehicle and Waiting Enhancements



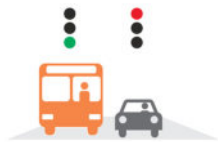
Transit-Priority Improvements

Transit-priority improvements to the right-of-way include:

- Business Access and Transit (BAT) lanes, which prohibit general-purpose traffic through travel but permit right turns and access to businesses and curbside parking; may be 24-hour lanes or peak-only lanes that revert to general-purpose use out of peak periods
- “Queue jumps” or short bus lanes at intersections (often right-turn lanes) allow buses to proceed in advance of general-purpose traffic using a transit-only advance signal phase
- Transit-priority signals
- Changes to signal timing to benefit transit operations



Business Access and Transit (BAT) Lanes



Queue Jumps



Transit-Priority Signals



Signal Timing

Stop and Station Improvements

Major improvements to stops and stations include:

- Operational improvements:
 - “Bulb-out” or curb extension stops allowing buses to stop in the travel lane, eliminating the need to merge back into traffic
 - Relocation of stops to improve operations, for example from the near to the far side of an intersection
 - Removal of parking spaces at or near stops to allow buses to access the curb or create more space to maneuver into and out of stops
 - Off-vehicle fare collection and all-door boarding



Bulb-Out Stop



Stop Relocation



Curb Management



Streamlined Fare and Boarding

- Enhanced passenger amenities such as:
 - Shelters at additional stops, and additional and/or larger shelters at the busiest stops
 - Seating at additional stops, and more seating at the busiest stops
 - Trash cans at additional stops
 - Real-time arrival information displays at stops
 - Maps, schedules, and other information at additional stops



Shelters



Seating



Waste Bins



Real-Time Information



Maps and Schedules

The guidelines for capital investment in existing bus operations are linked to the service types described in the Service Allocation Guidelines. For each service type, a “high,” “medium,” or “low” levels of investment—defined in terms of service type—is recommended as shown in Figure 3-2.

Figure 3-2 Proposed Bus Capital Investment Guidelines

Service Type	Investment Level	Investment Types
Major	High	<ul style="list-style-type: none"> ▪ Higher-capacity vehicles ▪ Vehicle branding (Bravo! routes only) ▪ All types of transit-priority treatments, including transit lanes ▪ Operational improvements to and enhanced amenities at stops ▪ Off-vehicle fare collection and all-door boarding
Local	Medium	<ul style="list-style-type: none"> ▪ Signal timing improvements ▪ Enhanced passenger amenities at busier stops
Community	Low	<ul style="list-style-type: none"> ▪ Standard bus stop
Express	Medium	<ul style="list-style-type: none"> ▪ Comfortable vehicles designed for longer trips ▪ High-occupancy vehicle facilities on freeways and direct access ramps ▪ Enhanced passenger amenities at park-and-ride lots
Stationlink	Low	<ul style="list-style-type: none"> ▪ Standard bus stop
Other	Low	<ul style="list-style-type: none"> ▪ Vehicle branding (shuttles only) ▪ Technology integration

HIGH-CAPACITY TRANSIT INVESTMENT GUIDELINES

A number of potential investments in high-capacity modes of transit—including different types of rail as well as bus rapid transit—were evaluated in the *Transit Opportunity Corridors Report* using criteria based in part on this Transit Investment Framework. This section includes additional guidance to be used in the future identification and assessment of potential rapid transit corridors.

In considering investments in high-capacity transit, it is important to first understand the following:

- Rail and (to a lesser extent) bus rapid transit infrastructure requires a sizeable capital investment. High ridership is required to justify these investments, and corridors must have transit-supportive characteristics.
- Research into population and employment density thresholds for investment in high-capacity transit modes has resulted in a range of findings. However, thresholds scale with levels of investment (i.e., capital cost). This means that fully grade-separated rail modes (particularly subways) require higher thresholds than at-grade light rail or streetcars, which in turn require higher thresholds than bus rapid transit.
- High-capacity transit, also, as its name suggests, uses larger vehicles, and investment in high-capacity transit may be called for if ridership in a corridor is so high that it cannot comfortably be accommodated using standard buses, even at relatively frequent headways.
- One of the primary advantages of high-capacity transit is that a single operator can provide service to more passengers, reducing operating costs. While a 40-foot bus can only carry around 50 passengers¹, a 60-foot bus can carry 80 or more, and a 66-foot streetcar may hold more than 120 people. Light rail trains consisting of multiple railcars can carry hundreds of passengers at a time. Since labor costs are the single largest factor in transit operating costs, this can greatly reduce overall operating costs².
- Capital costs for U.S. bus rapid transit projects have varied widely, but transit-priority investments in bus routes like those described above are essential elements of BRT projects. Any Major corridor should be considered a candidate for some form of rapid bus or BRT.
- Urban rail projects like the OC Streetcar typically serve both major job centers (e.g., Downtown Santa Ana) as well as relatively dense residential areas, such as neighborhoods in the corridor to the west of downtown.
- Commuter rail lines such as Metrolink may serve a variety of contexts, but typically have major employment centers such as Downtown Los Angeles as a terminus.

Along with the above, analysis of the corridor characteristics identified in the service investment guidelines suggests that, at least for the time being, it would be difficult to make a business case for the highest levels of investment in high-capacity transit (i.e., subways) in Orange County. However, the county has characteristics comparable with peer regions that operate some form of urban rail, including light rail and streetcars, as well as bus rapid transit with exclusive lanes. In Southern California, the Los Angeles Metro system includes light rail and BRT lines in moderate-density areas such as the San Gabriel Valley (the Metro Gold Line) and San Fernando Valley (the

¹ This can vary depending on seating configuration and definitions of “standing room.” OCTA defines a “full” 40-foot bus as carrying between 46 and 49 passengers.

² Higher-capacity vehicles may be more expensive to operate in other ways, such as required maintenance of rail tracks, which may offset some of the savings from improving the operator-to-passenger ratio.

Metro Orange Line BRT), while the San Diego Trolley system primarily serves moderately dense suburban areas. Each of these has proven popular, and light rail systems now exist in nearly every large metropolitan area in the U.S. Southwest, including Phoenix, Salt Lake City, and Denver.

In Orange County today, the busiest OC bus routes feature both high loads and, in some cases, on-time performance that could be improved by investments in high-capacity transit, including transit-priority elements. Under current OCTA standards, average peak period loads should not be greater than 130 percent of seated capacity—or 83 passengers on a 60-foot bus—and 85 percent of departures from scheduled timepoints should be no more than five minutes later than scheduled. While improving frequencies can add capacity, this can be expensive. Alternately, larger vehicles can be used to accommodate more passengers at roughly the same cost, and improving the speed of service can allow the same number of vehicles to operate more frequently. Investments in high-capacity transit, then, may pay off over the long term as service is provided more cost-effectively.

By identifying Transit Opportunity Corridors, the OC Transit Vision has begun to answer the question of where light rail, streetcar, BRT, or other high-capacity transit lines might make sense in Orange County. Corridors with the following characteristics should be viewed as future candidates for consideration of high-capacity transit capital investments:

- Corridors with population densities greater than 15 persons per acre (9,600 residents per square mile) and/or employment densities greater than 15 employees or students per acre (9,600 jobs/students per square mile)
- Corridors in which existing service has peak loads greater than 1.0 and peak headways of 12 minutes or less

Figure 3-3 Thresholds for Consideration of High-Capacity Transit



Consider high-capacity transit when transit corridors have:

