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January 14, 2021

Regional Housing Needs Assessment Appeals Board
Southern California Association of Governments
900 Wilshire Boulevard, Suite 1700
Los Angeles, California 90017

Subject: Appeal of the Draft Regional Housing Needs Assessment Appeals Board Allocation for the City of Irvine AGENDA ITEM 1.2

Honorable RHNA Appeal Board Members:

On October 26, 2020, the City of Irvine (City) filed an appeal of its 6th Cycle Draft Regional Housing Needs Assessment (RHNA) allocation issued by the Southern California Association of Governments (SCAG) (Appeal) . The basis for the Appeal is detailed in the appeal letter submitted on October 26, 2020 (page 208).

The City has reviewed the SCAG staff report for the January 15, 2021, RHNA Appeals Board hearing recommending denial of the Appeal. This letter identifies and explains several significant and prejudicial inaccuracies in the information presented by and relied upon by SCAG staff. Those inaccuracies form the basis of an unduly inflated RHNA allocation to the City. They are (i) based on hypothetical transit infrastructure that was developed by the Orange County Transit Authority (OCTA) not as a development project(s) but merely a "vision," without the input from the City, and based on traffic analysis zone data that is less precise and less accurate than the data previously furnished by the City to SCAG staff, and (ii) based inaccurate building stock and development opportunity assumptions identified in the Appeal and the Planning Factors Survey. However, prior to addressing these two (ii) inaccuracies with the SCAG staff report, the City is informed and believes that a serious violation of procedural due process, as decided by the California Supreme Court, may be occurring during this appeal process. As elucidated by the state's high court in *Morongo Band of Mission Indians v. State Water Resources Control Board* (2009) 45 Cal.4th 731:

> When, as here, an administrative agency conducts adjudicative proceedings, the constitutional guarantee of due process of law requires a fair tribunal. [citation] A fair tribunal is one in which the judge or other decision maker is free of bias for or against a party. [citations] Violation of this due process guarantee can be demonstrated not only by proof of actual bias, but also by showing a situation "in

> which experience teaches that the probability of actual bias on the part of the judge or decision maker is too high to be constitutionally tolerable." [citation]

(*Id.,* at p. 737.) Significantly, state law (applying both federal and state administrative procedures act provisions) *requires* that an employee or agent (such as a contract attorney) engaged in the performance of investigative or prosecuting functions for an agency's staff in a case *may not*, in that or a factually related case, participate or advise in the decision, recommended decision, or agency review body (such as an administrative appeal board). (*Id.,* at pp. 737-741.

Here, it is the City's understanding on information and belief that SCAG's contract agency counsel not only engaged in the prosecuting functions relating to the RHNA process by advising SCAG staff, but is concurrently advising the RHNA appeals board during the administrative appeals. This appears to be in contradiction to California Supreme Court Precedent.

With that background and full reservation of rights that procedural due process may be violated, the specific defects in the SCAG staff report are outlined below. **Importantly, none of this information or data is new; it was all provided in detail in the Appeal documentation filed on October 26, 2020**.

I. ***Appeal One (1a) – Unrealistic Transit Infrastructure Assumptions****: Application of the adopted Final RHNA Methodology for the 6th Cycle RHNA (2021-2029) [Government Code section 65584.05 (b)(2)] – High Quality Transit Area (HQTA) location and population.*

   a. ***SCAG Staff Report:*** *On page 176 of the staff report, SCAG staff states "SCAG appreciates the City of Irvine's input into SCAG's HQTA definition which was provided through SCAG's Technical Working Group (TWG) in October 2019. This input resulted in the removal of freeway-running transit corridors with no bus stops on the freeway alignment from consideration as high-quality transit corridors (HQTC). The modification to the definition explicitly retained the areas surrounding the station-stop areas as those are proximate to high-quality transit service consistent with the HQTC definition in CA Pub. Res. Code 21155(b) … Irvine's appeal now argues that the three freeway running BRT station areas within its boundaries (Alton Parkway, Jeffrey Road, and Spectrum Center) should be excluded from the SCAG definition because they are not included in the Connect SoCal project list, because OCTA did not first consult with the City of Irvine before providing information regarding these transit service improvements to SCAG, and due to various land-use constraints in the 0.5 mile radius areas surrounding these stops."*

City of Irvine Response: The City submitted written and verbal public comments on the inclusion of the entire corridor of a hypothetical bus rapid transit (BRT) route along Interstate 5 at the October 7, 2019 RHNA Subcommittee meeting. Those comments explained that Orange County Transportation Authority (OCTA) had not identified station stops and that the entire corridor should be removed from consideration in calculating the HQTA portion of the RHNA methodology. Contrary to SCAG staff's statements, this is not a new issue that the City is just now introducing. The City has stated on record and in conversations with SCAG staff repeatedly since October 2019 that it is opposed to the use of hypothetical station stops along two hypothetical BRT routes (State Route 55 and Interstate 5) to be used in the calculation of the City's RHNA allocation.

b. ***SCAG Staff Report:*** *On page 177, SCAG staff states "Both I-5 and SR-55 BRT projects are included in RTP Project ID 21600008."*

City of Irvine Comment: RTP Project ID 21600008 is the "OC Transit Vision". The "OC Transit Vision" (Attachment A) is "a 20-year plan for enhancing and expanding public transit service in Orange County. The Vision identifies hypothetical near-term and long-term proposals that can make transit a more compelling travel option for Orange County residents and visitors." According to the document, "The plan establishes a vision and goals and defines a framework for future transit investments." The "OC Transit Vision" was completed in 2018 and while the Interstate 5 (I-5) and State Route 55 (SR-55) BRT routes are *mentioned* in the "OC Transit Vision", *they remain hypothetical ideas*. Mention of the I-5 and SR-55 BRT routes are found in Chapter 5: Transit Opportunity Corridors. The two BRT routes are included as "candidates for capital investment" along with eight other corridors on arterial streets. Legally significant, moreover, ***the I-5 and SR-55 BRTs are not listed as capital improvement projects in the adopted Connect SoCal (RTP/SCS) document***. (Gov. Code, §§ 65584.05(e)(3) [each council of governments ***shall include*** the following factor to develop the methodology: "[t]he distribution of household growth assumed for purposes of a comparable period ***of regional transportation plans*** and opportunities to maximize the use of public transportation and existing transportation infrastructure." [emph. added]; see also, Gov. Code, §§ 65584.04, subds. (a) & (b)(1) [requirements for methodology].)

As noted on page 5-11 of the "OC Transit Vision" document, the I-5 and SR-55 BRT station stops have some of the lowest BRT stop scores among the routes considered by OCTA. Page 5-12 of the "OC Transit Vision" document states "Freeway BRT. Buses would operate in high-occupancy vehicle (HOV) or managed lanes on freeways. They could stop either at existing transit hubs

near freeways (assumed for this analysis), or at new stations in the freeway right-of-way." OCTA's study further notes that the "capital costs would vary substantially depending on Orange County's ultimate definition of Freeway BRT, but a cost of approximately $11.5 million per mile was assumed based on a peer review." It should be noted that these cost estimates were completed in 2018. The hypothetical I-5 BRT would require 19 miles of improvements by Caltrans (i.e., $218.5 million based on 2018 estimates) and the SR-55 route would require 8.9 miles of improvements to be completed by Caltrans (i.e., $102.35 million based on 2018 estimates). The SR-55 route would also require the funding and construction of an off-ramp at Alton Parkway (which does not exist) and the construction of a bridge over SR-55 by the City of Santa Ana.

RTP Project ID 21600008 for the "OC Transit Vision" identifies $57.7 million associated with the project. That amount (associated with a "20 year vision") is less than 18 percent of the estimated cost of the two routes, and there is absolutely no plan in place to identify the additional $263.35 million estimated to be necessary (in 2018 dollars) for implementation of the projects.

Further, and separate from cost increases over time, there is good reason to believe that the cost estimates are unrealistically low. For example, the OC Streetcar project, which many of the projects in the "OC Transit Vision" are associated with, and will tier-off from, is 4.15 miles long and original estimates put the cost at just under $300 million. Now, the OC Streetcar has a current cost of construction of $408 million, over $100 million *more* than the original visioning cost.

As previously noted in the City's written and verbal comments with SCAG staff, at the time of the adoption of the methodology, the City was unaware of both (*i*) OCTA's plans for a hypothetical BRT on I-5 and (*ii*) the proposed station stops within Irvine that OCTA provided to SCAG staff. As for the SR-55 BRT, the City had been contacted regarding the possibility of a line on the SR-55 but a future station stop and future off-ramp at Alton Parkway was not discussed with City staff. OCTA is a transportation agency; it is ***not*** responsible for land use policy in Orange County and its staff has stated that they do not intend to have influence over land use policy in Orange County. Yet SCAG staff has done precisely that with the information provided by OCTA staff – SCAG staff has used an (unrealistic) hypothetical developed by OCTA solely as a "visioning" document to directly influence residential land use policy for the City. Had OCTA been advised that its information would be used in that manner, its staff would have (or at least should have) conferred with the City to understand the impact that information that would have to the City's General Plan and Zoning Ordinance.

The City maintains that the BRT assumptions for I-5 and SR-55 are speculative and unrealistic; there is little or no chance that those routes can be funded and constructed before 2045. Therefore, the three station stops (Alton Parkway, Jeffrey Road, and Spectrum Center) should be removed from the HQTA calculation for the RHNA allocation.

c. ***SCAG Staff Report:*** *On page 178, SCAG staff states "Irvine totals all of the TAZs which lie completely or partially with HQTA boundaries and indicates a total population of 43,719 which is slightly lower than the HQTA population of 43,855 used by SCAG (note that Irvine's appeal incorrectly states that this figure is 43,892.)"*

City of Irvine Response: The "43,892" population figure the City cites and is used in the Appeal is SCAG's own data point and was taken directly from page 18 of SCAG's "Final RHNA Methodology Data Appendix Population in 2045 HQTA". This is SCAG's official document (dated 03/05/2020) posted by SCAG on the RHNA webpage. If this document includes inaccurate data, it should be corrected. (Attachment B)

d. ***SCAG Staff Report:*** *On page 178, SCAG staff states: "While the transportation analysis zone (TAZ) geography is more commonly used, SCAG's forecast contains a higher degree of accuracy and is associated with local general plans down to the parcel level…Thus SCAG relies on forecasted population from Connect SoCal in Scenario Planning Zones (SPZs) to associate with HQTA boundaries using area-weighted interpolation. As SPZs are approximately 1/10th the size of TAZs, this is the most accurate method that could be devised to estimate future populations in bespoke areas across a large region using locally reviewed input data. The attached map of Irvine's HQTA areas by population and overlays this information with the HQTAs in the City."*

City of Irvine Response: The map included on page 309 of the agenda packet is incorrect and does not accurately reflect the population data provided to SCAG as part of Appeal. What SCAG has identified as "City Tier 2 TAZ Boundary" are actually the traffic analysis zones identified by the Orange County Transportation Agency (OCTA) known as the OCTAM TAZ data. What SCAG staff fails to share with the RHNA Appeals Board is that the *City of Irvine is one of a handful of jurisdictions in Orange County with their own traffic model and a highly sophisticated electronic database with parcel level data*. This information has been provided to SCAG staff numerous times during the development of the Scenario Planning Model and was included with the City's Appeal documentation submitted on October 26, 2020, (pages

230-233). The City has small scale demographic data that can be identified at the Irvine Transportation Analysis Model (ITAM) TAZ level. The ITAM TAZ data (which SCAG staff did not use) far more precise than the OCTAM TAZ data (which SCAG did use). There are 170 OCTAM TAZs in the City of Irvine and there are 726 ITAM TAZs in the City of Irvine. ITAM TAZs range in size from 0.01 – 2 acres, while the OCTAM TAZs, as noted by SCAG staff, are much larger ranging in size from 0.06 acres to 8.11 acres.

In addition to being more precise, the ITAM TAZ data is based on better information. The ITAM TAZ data accounts for the City's General Plan, Zoning Ordinance, and Development Agreements, which allows accurate and realistic projections of current and future development within the ITAM TAZs. As shown in the attached maps (Attachment C), the population for the ITAM TAZs (not the City Tier 2 TAZs show on the map on page 309) have not been prorated. This results in a larger population data input being used to determine the City's share of the RHNA associated with the 2045 HQTA Population. The City has contacted SCAG staff, specifically Mr. Kane numerous times via email and voicemail since early November 2020 to attempt to discuss issues such as this, but City staff never received a return phone call from Mr. Kane to have any further opportunity to discuss these issues.

The City believes the population should be prorated, based on the information provided throughout the local input process and in the Appeal material to accurately reflect the realistic 2045 population within the one HQTA located at the Irvine Transportation Center.

II. Appeal Two: Local planning factors.

a. ***SCAG Staff Report:*** *On page184, SCAG staff states "the City can and must consider other opportunities for development besides vacant land. This includes the availability of underutilized land, opportunities for infill development and increased residential densities, or alternative zoning and density."*

City of Irvine Response: The City has not stated at any point in time that it is "built out," or that it should be exempted from consideration of underutilized land, opportunities for infill development, and increased residential densities, or alternative zoning and density. Rather, the City has stated – and states again here – that the viability of those options depends on critical considerations such as the age of the City's building stock. Thus, the City has stated that given the age of its residential and non-residential development, opportunities for the redevelopment of underutilized land and

for infill development are limited. As stated in the Appeal, of the more than 114,000 units constructed or under construction in the City, over 59,000 are twenty years old or less, with over 37,000 units constructed since 2007. The majority of these residential development were approved using increased residential densities. The City has approved and constructed nearly 15,000 medium to high density multi-family residential units in the Irvine Business Complex; most of which were on parcels that formerly held non-residential uses. Additionally, the City has over 109 million square feet of non-residential square footage, with over 65 million square feet constructed since 2000. While there is some opportunity for infill and rezoning of non-residential parcels, that opportunity is not nearly sufficient to accommodate each income level of the RHNA allocation proposed by SCAG staff.

According to HCD's Housing Element Sites Inventory Guidebook that was issued in June 2020, jurisdictions must identify adequate sites to accommodate the total RHNA allocation ***and*** the RHNA allocation for each income level. This is a new requirement impacting the 6th Cycle RHNA, which requires the City to identify adequate sites for each income level. As detailed at length in the Appeal, to comply with this new requirement while using the City's 15 percent inclusionary housing program, the City will need to find adequate sites for over 127,000 units to simply meet the very low income allocation of more than 6,300 units. This is a reality that SCAG staff stubbornly refuses to acknowledge.

Additionally, directives in HCD's Housing Element Sites Inventory Guidebook mandate that jurisdictions both:

- Demonstrate realistic capacity of sites;
- Equitably distribute affordable units throughout the jurisdiction. They cannot be concentrated in one project or planning area. This will further hinder a jurisdiction's ability to identify adequate non-vacant sites for rezoning or a residential overlay.

These directives will make identifying adequate sites even more challenging in the 6th Cycle RHNA.

The Housing Element Sites Inventory also requires that jurisdictions (such as the City) that must rely on non-vacant sites to accommodate 50 percent or more of its RHNA to provide findings and substantial evidence regarding the status of the existing land use on these non-vacant sites. This is a new component to Housing Element law. Thus, the City must procure information from the land owner that the existing use will be discontinued in the current

planning period to include that particular site in the City's Housing Element. This documentation includes, but is not limited to:

- The lease for the existing use expires early within the planning period;
- The building is dilapidated, and the structure is likely to be removed, or a demolition permit has been issued for the existing uses;
- There is a development agreement that exists to develop the site within the planning period;
- The entity operating the existing use has agreed to move to another locality early enough within the planning period to allow residential development within the planning period;
- The property owner provides a letter stating its intention to develop the property with residences during the planning period.

All of these statements, included in HCD's Housing Site Inventory Guidebook are in contradiction with the statement made by SCAG staff in the report that "the City can and must consider other opportunities for development besides vacant land" and "the City is not responsible for obtaining land or developing housing, it is only required to plan and zone for its determined housing need." Contrary to statements by SCAG staff, the City will need to procure this substantial evidence of support to even consider including a site in the City's Housing Element.

b. ***SCAG Staff Report:*** *On page 184 of the staff report, SCAG staff states "On June 10, 2020, HCD released extensive guidelines for housing element site inventories. A wide range of adequate sites area detailed including accessory dwelling units (ADUs) and junior accessory dwelling units (JADUs)."*

City of Irvine Response: SCAG staff continues notes that a jurisdiction can count ADUs and JADUs toward their RHNA allocation, but they fail to share (much less account for) HCD's specific and significant limitations on ADU and JADU assumptions in the RHNA process. HCD's Housing Element Sites Inventory Guidebook mandates that the City "use the trends in ADU construction since January 2018 to estimate new production. This is a conservative option to only account for the effect of the new laws without local promotional efforts or incentives. Where no other data is available, assume an average increase of *five times the previous planning period construction trends prior to 2018*." The City has approved on average a maximum of five ADUs or JADUs per year since 2018, which means the City can count 25 ADUs or JADUs per year toward meeting the City's total RHNA Allocation. This results in a total of 200 ADUs or JADUs that can be used in the City's Housing Element Site Inventory toward meeting the City's RHNA allocation. Additionally, a jurisdiction cannot require the homeowner to identify the ADU

or JADU be rented at an affordable rate and it cannot require a homeowner to provide that information at the time building permits for the ADU or JADU are issued.

Conclusion: Since the 4th Cycle RHNA process, the City has been an active participant in the development process of numerous Regional Transportation Plan/Sustainable Community Strategy Documents and Regional Housing Needs Assessment. The City continues to be dedicated to building housing at both market rate and affordable levels. Outlined below is data associated with the 4th Cycle RHNA, the 5th Cycle RHNA, and the draft 6th Cycle RHNA.

4th Cycle RHNA (2007)

Jurisdiction	Final RHNA	Population	RHNA Allocation as Percentage of Population
City of Los Angeles	112,876	3,784,000	2.9%
Unincorporated Los Angeles County	57,176		
Unincorporated Riverside County	56,368		
City of Irvine	35,660	198,634	17.9%

5th Cycle RHNA (2012)

Jurisdiction	Final RHNA	Population	RHNA Allocation as Percentage of Population
City of Los Angeles	82,002	3,800,000	2.2%
Unincorporated Riverside County	33,478		
Unincorporated Los Angeles County	30,145		
City of Irvine	12,149	229,083	5.3%

6th Cycle RHNA (2020)

Jurisdiction	Draft RHNA	Population	RHNA Allocation as Percentage of Population
City of Los Angeles	455,577	4,040,000	11.2%
Unincorporated Los Angeles County	89,842	1,050,000	8.5%
Unincorporated Riverside County	40,768	394,200	10.3%
City of Long Beach	26,440	475,013	5.5%
City of Irvine	23,554	280,202	8.4%

Since 2007, the City has constructed 37,489[1] residential units, of which 4,853 were affordable and many were designated for the very low income category. Another 690 affordable units are either under construction or approved. This total remains the ***most affordable units constructed by any jurisdiction in Orange County***. The City has a proven track record of doing its fair share.

For the upcoming cycle, the RHNA process, and this Appeal, are supposed to identify what is "fair" housing allocation for the City. Because the materials relied upon by SCAG staff are based on unrealistic and inaccurate assumptions and data, manifestly unfair obligations have been foisted upon the City. For these reasons, the City respectfully requests that the Appeal be granted, the errors be corrected, and the City's allocation be recalculated.

Sincerely,

Pete Carmichael
Director of Community Development

Attachments
1: OC Transit Vision
2: SCAG Final RHNA Methodology Data Appendix (Updated 3/5/2020)
3: City of Irvine ITAM TAZ Maps and 2045 Population

cc: City Council
Marianna Marysheva, Interim City Manager
Jeff Melching, City Attorney
Timothy Gehrich, Deputy Director of Community Development Department
Kerwin Lau, Manager of Planning Services
Bill Ihrke, Rutan & Tucker, LLP

[1] Department of Finance Housing Inventory System (HIS) data from January 1, 2007 through June 30, 2020

OC | TRANSIT VISION

OCTA

OC TransitVision

January 2018

City of Irvine Attachment 1

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City of Irvine Attachment A

1 THE OC TRANSIT VISION

THE OC TRANSIT VISION is a 20-year plan for enhancing and expanding public transit service in Orange County. While OCTA has previously developed long-range plans for transit as part of its regularly updated Long-Range Transportation Plan, this is a transit-specific, long-term plan.

Why develop a vision for transit in Orange County? Because transit plays an essential role in the transportation system. A growing metropolitan area like Orange County needs a frequent and reliable transit network to provide additional mobility options to the most congested parts of the county, to provide access to jobs, schools and healthcare for non-driving populations, and to ensure efficient use of the overall transportation network, leading to more efficient land use development decisions.

Moreover, major changes have been taking place in the transportation landscape—and more are on the horizon. OCTA, in turn, has had to look at the transit services it provides from the ground up to be relevant for these changing times. Emerging technologies, cultural changes and policy shifts have all forced transit providers like OCTA to evolve. This OC Transit Vision is an effort by OCTA to be both more responsive and proactive in addressing the changing transit market.

The Transit Vision features a number of elements to help improve transit service today and in the coming decades:

- It establishes a vision, establishes goals, and defines a framework for future transit investments;
- It identifies the most promising corridors for major future investments in high-quality transit;
- It issues transit-related recommendations in areas ranging from existing fixed-route bus services to paratransit service and new types of service, such as on-demand "microtransit" service;
- It offers transit policy guidance to cities, developers, and other partners who support transit service and are important stakeholders in creating an effective and efficient transit system;
- And it concludes with an action plan laying out the next steps for OCTA.

OC TRANSIT VISION STATEMENT, GOALS, AND OBJECTIVES

The OC Transit Vision was built on a foundation of goals and objectives, which in turn were based on a vision statement (Figure 1-1). These were developed collaboratively by staff from a broad cross-section of OCTA departments and were later reviewed by the OCTA Board of Directors. The vision statement, goals, and objectives also take into account early results of public engagement described in Chapter 3, as well as the findings from the State of OC Transit Report described in Chapter 2. The full text of the vision, goals, and objectives is available in Appendix A.

Figure 1-1 Vision and Goals

SUMMARY OF RECOMMENDATIONS

The OC Transit Vision offers recommendations for improving transit throughout Orange County, both in the higher transit demand areas of North/Central County and in lower transit demand areas. The analysis to inform these recommendations considered both current and future conditions, recognizing that changes to the transportation network and built environment needed to support transit will evolve as Orange County continues to grow and change.

The recommendations also acknowledge that different types of services are needed in different parts of the county. Higher capacity, fixed-route transit (like rapid streetcar and bus rapid transit [BRT]) has great potential for success in Orange County's denser, more walkable areas. At the same time, service in the lower density, more suburban areas of the county should focus on key connections to jobs, including OC Flex service connected to Metrolink stations and Freeway BRT to move people along the county's growing high occupancy vehicle network.

The OC Transit Vision offers something for everyone, whether improvements to existing OC Bus routes, enhancements to accessible transit service, new high-capacity transit corridors, expanded seasonal and special event services, pilot "microtransit" (or on-demand) service, more trips on Metrolink, or future connections to Los Angeles County. The recommendations shown in Figure 1-2 and described below capture the key investments identified through the OC Transit Vision. Additional information about each of these can be found in the following chapters.

Figure 1-2 OC Transit Vision Recommendations

Increase fixed-route bus service levels based on OCTA's Service Allocation Guidelines.

As part of the OC Transit Vision, the OCTA Board of Directors was presented a Transit Investment Framework, which included new Service Allocation Guidelines and Capital Investment Guidelines. The service guidelines define categories of service based on corridor characteristics, and establish minimum service frequencies (headways) and service hours (span of service) for each category. OCTA has already begun increasing service on some routes to meet the new standards, and additional routes should be upgraded as the OC Transit Vision is implemented. More information on the Transit Investment Framework can be found in Chapters 4 and 6 of this report.

Proceed with study of rapid transit projects in the North Harbor/Santa Ana and Bristol corridors.

One of the primary reasons to develop a transit vision for Orange County was to identify Transit Opportunity Corridors (TOCs)—high-demand corridors meriting major investment in higher-quality service such as rapid streetcar or bus rapid transit (BRT). Ten such corridors were identified, and two of these were found to be prime candidates for near- to medium-term investment. Studies are already underway in the Harbor corridor and should begin on Bristol in the next five years. More information on TOCs can be found in Chapter 5.

Upgrade existing and new Bravo! routes.

To extend higher-quality transit to each of the 10 TOCs, OCTA should develop a strategy for upgrading existing and planned Bravo! "rapid bus" routes (including service to be implemented on Beach Boulevard in the near term). OCTA could implement such upgrades incrementally based on a phased expansion strategy. In the near term, the agency can work with the cities in each corridor to implement improvements on a pilot basis, and use Measure M Project W funding, where eligible, to support other improvements. More information on this recommendation can be found in Chapter 6.

Expand seasonal and special event services.

Seasonal and event-based transit services—routes that only operate during the summer or for special events—have proven popular in Orange County. OCTA already operates or funds many such services through partnerships, and will work with cities to support additional opportunities under the Measure M Project V program. More information on this recommendation can be found in Chapter 6.

Proceed with planned improvements to Metrolink and Amtrak rail lines.

A number of agencies with a stake in Orange County's existing railroads have developed plans to greatly improve service—including both faster and more frequent service—in the existing Amtrak and Metrolink rights-of-way. OCTA also has existing plans to improve station access and to reduce at-grade street crossings. In addition to advancing its own plans, OCTA can work with partner agencies to provide support for their planned improvements. More information on this recommendation can be found in Chapter 6.

Consider expanding OC Flex on-demand service, pending a successful pilot.

OCTA will soon pilot microtransit service, available to and from any point within specific service zones in Huntington Beach and Laguna Niguel/Aliso Viejo. If the year-long pilot proves successful, such service could be expanded to additional locations throughout the county, including areas in Anaheim Canyon, Yorba Linda, Brea, Placentia, North Irvine, Ladera Ranch, Las Flores, and Mission Viejo. More information on this recommendation can be found in Chapter 7.

Seek opportunities to expand the OC Vanpool program.

OCTA's program of subsidies and technical assistance for employee vanpools is popular, with more than 500 existing vanpools. With additional resources, the program could grow in concert with expansion of the county's network of managed high-occupancy vehicle freeway lanes. More information on this recommendation can be found in Chapter 7.

Continue efforts to manage paratransit demand.

Due to rapid growth in costs for paratransit service, OCTA is taking steps to manage demand including continued support of senior mobility programs, expanding cooperative agreements, expanding the same-day taxi program, and multiple fare increases. Moving forward, OCTA could explore using OC Flex service to provide paratransit service in areas of the county with low transit demand. More information on this recommendation can be found in Chapter 7.

Expand regional coordination, particularly with Los Angeles County Metro.

OCTA recognizes that successful transit service is about connecting people to destinations, and those destinations are often outside of Orange County. Additionally, new housing in Los Angeles County will need to be connected to the growing job market in Orange County. To support its own service improvements, OCTA will increase its engagement across county lines, especially in Los Angeles County, where planned Metro Rail expansions could connect to OCTA services. As part of this effort, OCTA will also coordinate with officials in Los Angeles County on transportation plans for the 2028 Summer Olympics. More information on this recommendation can be found in Chapter 7.

Conduct a study of freeway-based BRT corridors.

Two of the TOCs are Interstate 5 and State Route 55. BRT could serve these corridors, but it would look and function differently than BRT running on city streets. OCTA should conduct a study to determine routing and to decide how freeway-based BRT should function (for example, whether to serve existing park-and-rides or to build new stations in freeway medians). More information on this recommendation can be found in Chapter 7.

Continue engagement with OC jurisdictions.

As the transportation provider for a county of 34 cities, OCTA relies on cooperation. The OC Transit Vision includes a *Transit-Supportive Design & Policy Handbook* to provide guidance for those OCTA partners with a role in improving access to transit and making the county's land uses more transit-friendly. A summary of the handbook can be found in Chapter 8, and the complete handbook is included with this report as Appendix E.

GUIDE TO THIS REPORT

The contents of the OC Transit Vision, which help to further explain these recommendations and focus on moving OCTA from planning to implementation, include the following:

- ***Chapter 2, Context for the Transit Vision.*** The OC Transit Vision is closely linked to current efforts to update OCTA's Long-Range Transportation Plan (LRTP), which will ultimately house many of the OC Transit Vision recommendations. This chapter briefly introduces the LRTP process but focuses on a summary of the key findings from *The State of OC Transit,* a report prepared early in the OC Transit Vision process to understand the landscape of transit in the county today and shape the direction of analysis and recommendations.
- ***Chapter 3, Public Engagement Summary.*** This chapter begins with a review of the various public outreach efforts that informed the OC Transit Vision. These included outreach to a range of individual and institutional stakeholders representing diverse interests within the community; four digital surveys that collected thousands of responses; and a series of meetings with the OCTA Citizens Advisory Committee, elected officials, and planning directors representing all areas of the county.

- ***Chapter 4, Transit Investment Framework.*** The Transit Investment Framework was reviewed by the OCTA Board of Directors in April 2017 and serves as a guide for future capital and service investments. It helps to shape the recommendations presented in Chapters 5 and 6 of the OC Transit Vision.
- ***Chapter 5, Transit Opportunity Corridors.*** Analysis conducted for the OC Transit Vision identified 10 TOCs where future investments in rapid transit might be most beneficial. This chapter summarizes the analysis and makes recommendations on how to proceed with additional planning and design for these corridors.
- ***Chapter 6, Fixed-Route Recommendations.*** In addition to the TOCs, the OC Transit Vision includes recommendations for a range of existing and planned fixed-route services, including upgrades to existing services to meet Transit Investment Framework standards; a strategy for upgrading Bravo! service to BRT; new and expanded seasonal and special event services; and upgrades to Metrolink and Amtrak Pacific Surfliner rail services in Orange County.
- ***Chapter 7, Recommendations for Other Services and Additional Studies.*** The OC Transit Vision also includes recommendations for other types of transit service, including OC Flex on-demand service, expansion of the OC Vanpool program, and enhancements to paratransit service. A number of future studies are also recommended.
- ***Chapter 8, Transit-Supportive Design and Policies.*** This chapter summarizes guidance from the *Transit-Supportive Design & Policies Handbook*. The handbook is intended to assist cities, developers, and other potential OCTA partners as they implement land use changes, access improvements, and other programs and policies that support effective transit service.
- ***Chapter 9, Action Plan.*** Finally, the OC Transit Vision concludes with a strategy for implementing its recommendations, identifying a phasing plan that OCTA and its partners can follow to fully realize the potential of the vision and begin moving from planning to action. The recommendations are organized into near-, mid-, and long-term phases to align with expected OCTA funding levels, projected costs, and potential funding sources are described.

2 CONTEXT FOR THE TRANSIT VISION

Transit planning in Orange County does not happen in a vacuum. The OC Transit Vision informs—and is informed by—many other efforts, including the current update to OCTA's Long-Range Transportation Plan. Additionally, the analysis and recommendations described in the OC Transit Vision build on work completed in the early stages of this planning process, specifically the *State of OC Transit* report. The following sections introduce the background and planning context for the OC Transit Vision.

OCTA'S LONG-RANGE TRANSPORTATION PLAN

At the time of publication of the OC Transit Vision, OCTA was in the process of updating its Long-Range Transportation Plan (LRTP). OCTA updates its LRTP every four years; the current update is scheduled for completion in late 2018. The OC Transit Vision is an input into the 2018 LRTP, identifying the transit projects to be included in the constrained fiscal scenario.

As its name indicates, the LRTP is a long-range plan to 2040, covering 25 years. The 2018 LRTP will assess Orange County's transportation needs over that time, forecast its financial ability to meet those needs, and prioritize the multimodal projects and programs that would be most effective in meeting them. In addition to its "constrained" plan, the LRTP will also include an "unconstrained" plan identifying additional projects that could be implemented with added funding.

For a variety of reasons, including limited space for freeway and arterial widening, transit is becoming an increasingly important part of the multimodal transportation system in Orange County—making completion of this OC Transit Vision an important step toward an updated LRTP. The recommendations found here will be reflected in the transit sections of the 2018 LRTP.

THE STATE OF OC TRANSIT

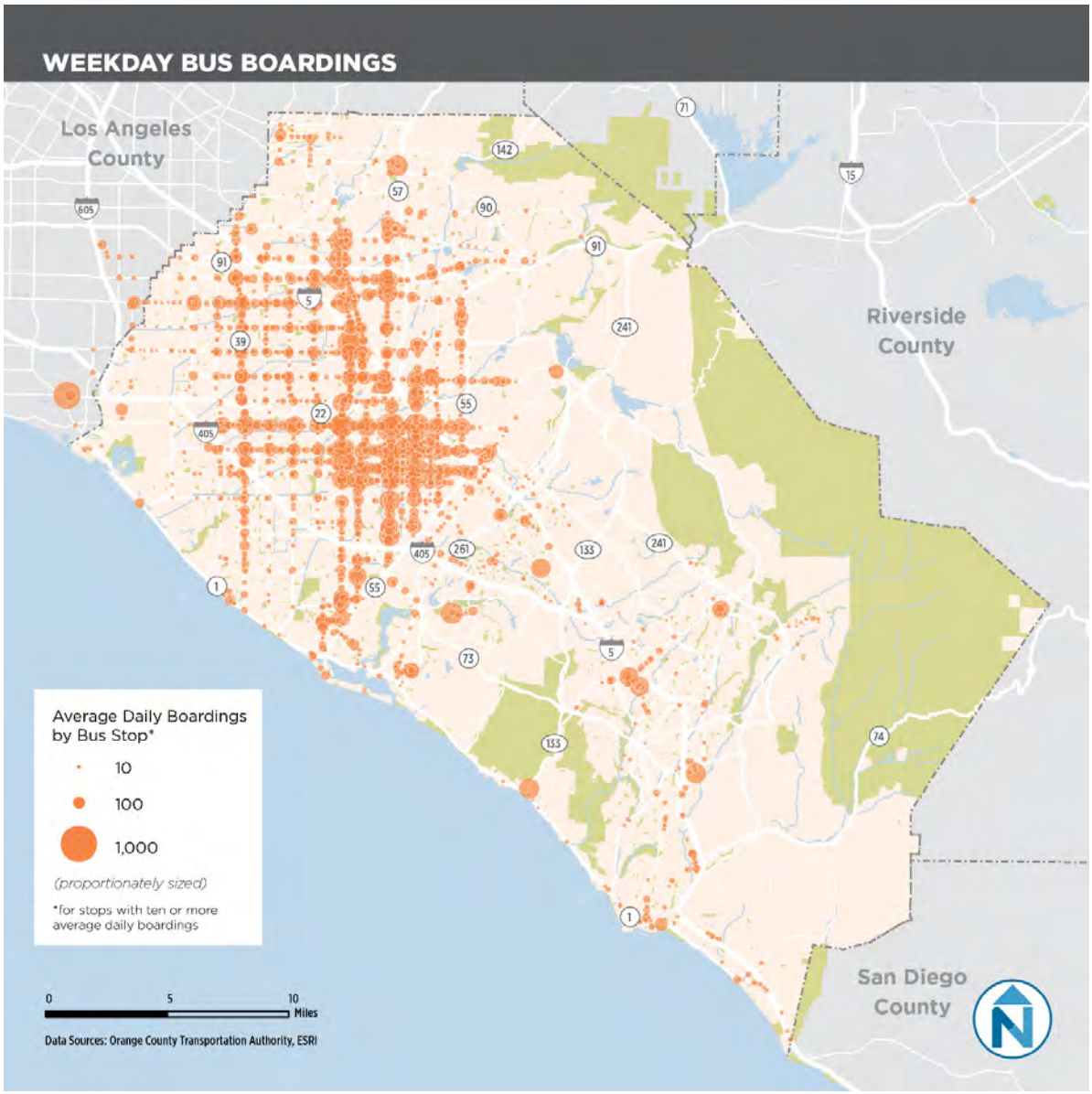
The first step in developing a transit vision was to conduct in-depth analysis of the current state of transit in Orange County. Complete analysis can be found in the State of OC Transit, published in January 2017. This section briefly reviews that report's key findings.

The majority of existing OC Bus ridership is concentrated in a few key corridors.

- OCTA operates 65 OC Bus routes, but just 19 of them carry 75 percent of riders. This single fact explains much of the rationale for the Transit Vision—transit improvements in a handful of corridors would improve service for the vast majority of riders. This concentration of ridership also led to the development of the OC Bus 360° route reconfiguration that sought to improve ridership and cost-effectiveness by shifting resources from lower-demand to higher-demand corridors.

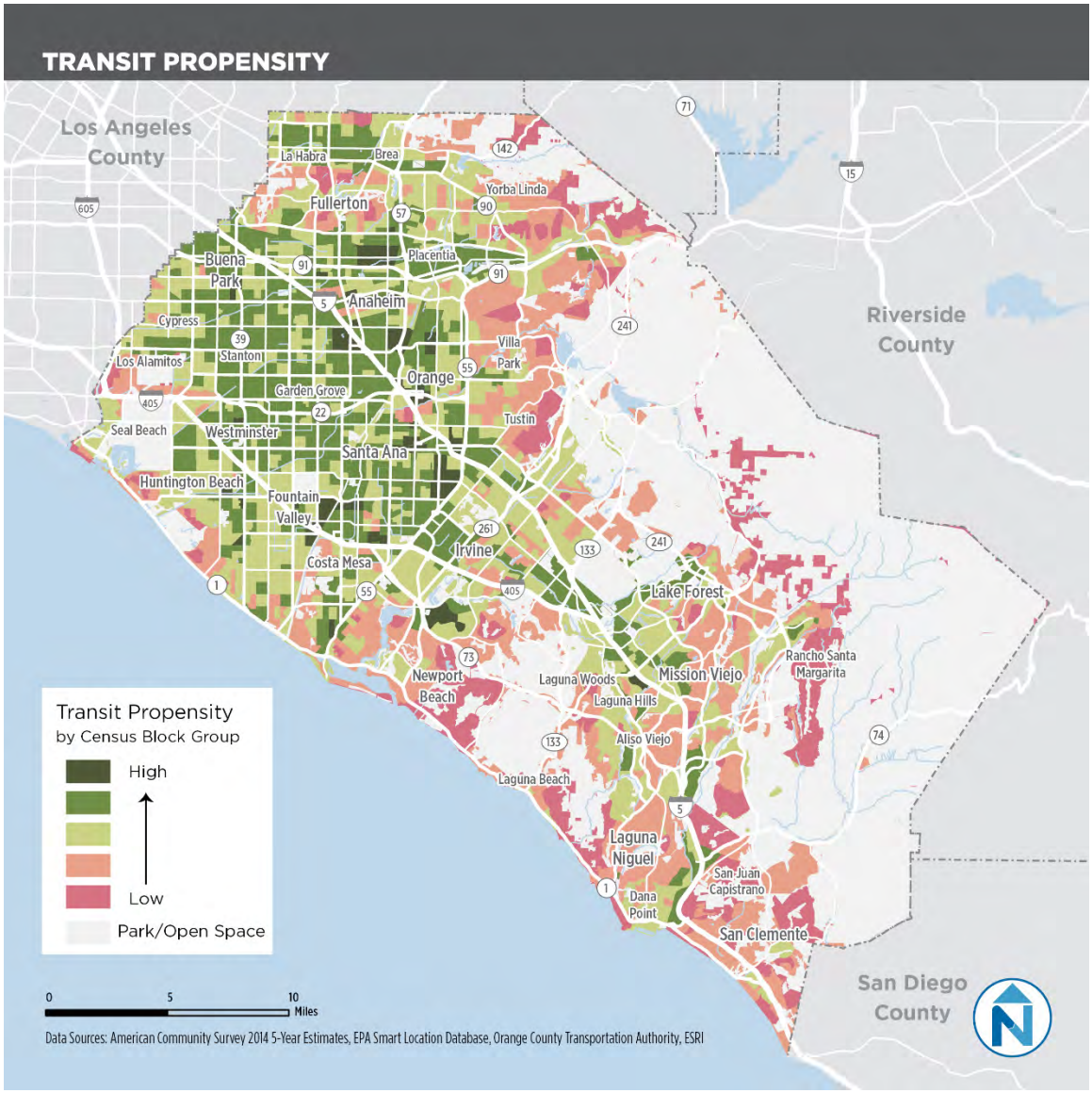
- Figure 2-1 shows average number of weekday boardings by OCTA bus stop in March 2016.

Figure 2-1 Weekday Bus Boardings



- Most OC Bus service is in the northern part of the county, primarily north of the 55 Freeway, where many of the county's lower-income residents live. Major job centers in South County are predominately auto-oriented and have lower transit usage than employment centers in north and central Orange County. Figure 2-2 shows an analysis of transit propensity in Orange County (based on the methodology described in the State of OC Transit) overlaid with afternoon rush hour frequencies on OC Bus routes.

Figure 2-2 Transit Propensity



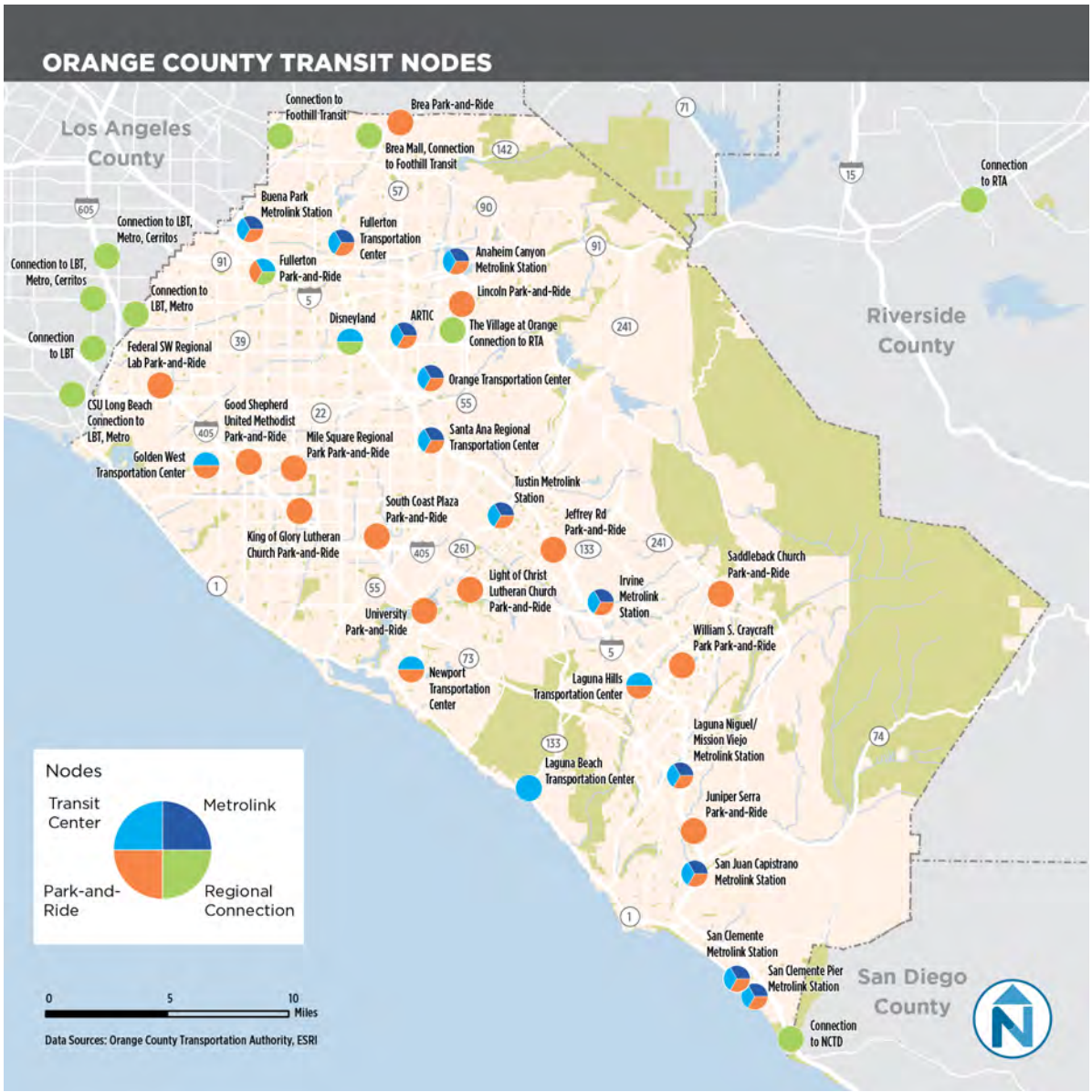
OC Bus service is focused on the weekday commuter market.

- The periods of highest demand in virtually any transit system are weekday peak commute periods, or rush hours, followed by late mornings and early afternoons on weekdays. Orange County is uncommon, however, as destinations such as beaches and theme parks generate high weekend demand. Many employees also work weekends (as well as early and late on weekdays). OCTA currently provides greatly reduced service on weekends.
- OCTA also provides greatly reduced evening service, with deep service reductions immediately following the evening peak period. This limits travel options for evening workers, as well as for those who may wish to live a car-free lifestyle.
- OCTA provides limited special event and holiday service. These services are typically used by people who don't regularly ride transit and—if provided effectively—can serve as a gateway to more regular transit use.

OC Bus service focuses on a select number of hubs.

- OCTA, Caltrans and Orange County cities operate more than 30 intermodal transfer facilities, ranging from Metrolink stations to park-and-rides. While these facilities serve as transfer points between multiple transportation modes (such as bus-to-train, car-to-bus, and bus-to-bus), riders also arrive on foot and bike, making multimodal access to these facilities an area for attention. Figure 2-3 shows the locations of Orange County's transit nodes.

Figure 2-3 Orange County Transit Nodes



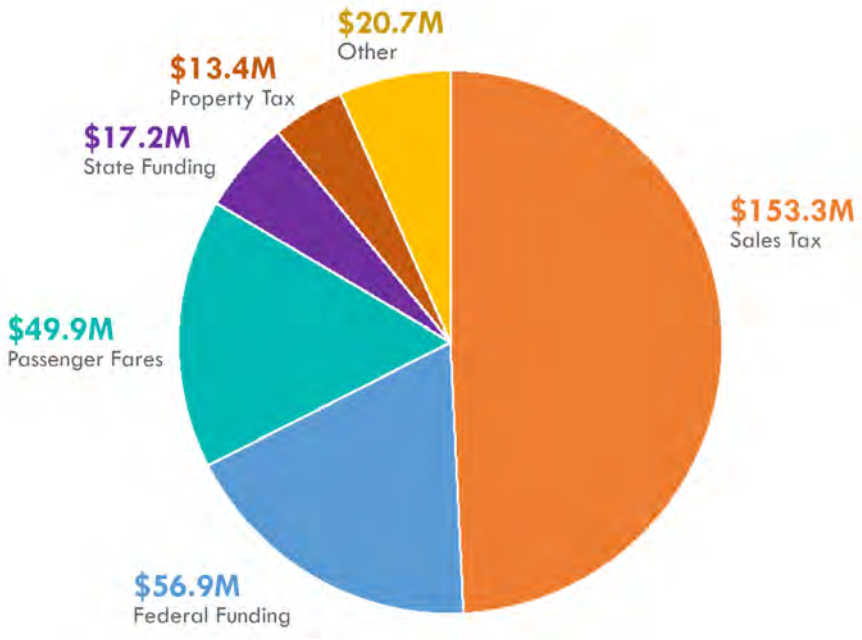
OCTA has begun taking steps to address recent ridership declines, and the future OC Streetcar and Bravo! lines provide a template for ridership growth.

- The agency is tailoring service to context, focusing on fixed-route bus and rail service in its most productive and cost-effective corridors and exploring creative mobility solutions in other areas. The OC Transit Vision considers a range of modes for other priority corridors, including rapid streetcar (similar to the western segment of the OC Streetcar), bus rapid transit, and rapid bus.
- OCTA has also emphasized connectivity, including connectivity between the bus system and the LOSSAN rail spine.

Limited funding has constrained OCTA's ability to boost ridership.

- OCTA and other agencies have gone to great lengths to understand and respond to the external factors—such as lower gas prices—driving ridership declines. However, ridership largely results from the quality and level of service offered, and funding constraints have kept OCTA from offering more and better service. Figure 2-4 illustrates OCTA's revenue sources in 2016. Fares account for only a small portion of OCTA funding, and the agency relies heavily on sales taxes and other external funding sources, which have been volatile recently.

Figure 2-4 OCTA Bus and Paratransit Revenues (2016)

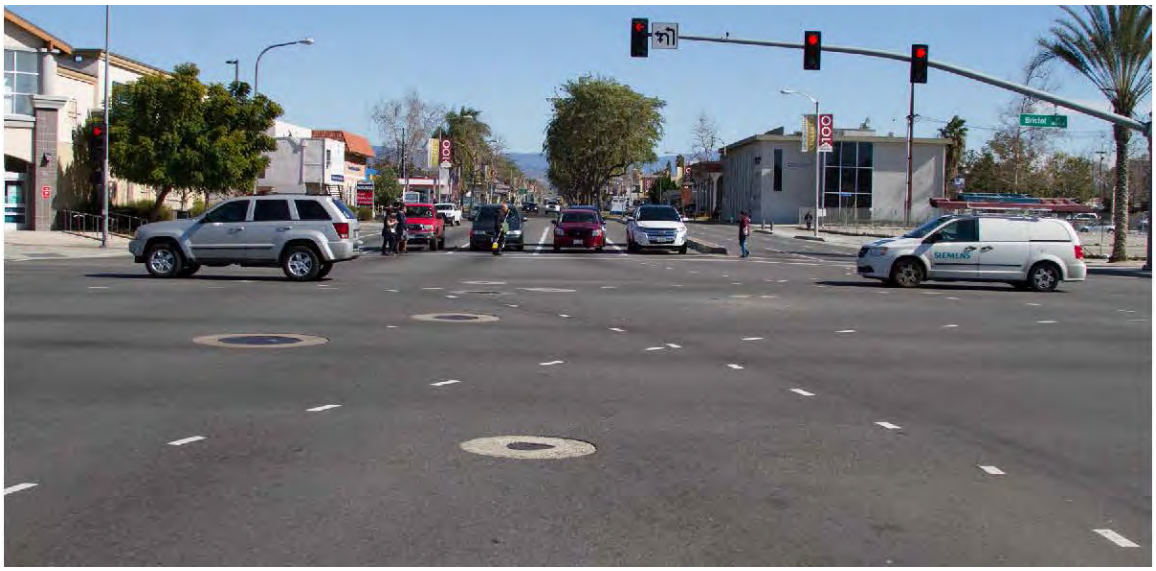


Land uses and demographics in Orange County—as well as Orange County's overall transportation network—present both challenges and opportunities for effective transit service.

- While Orange County is suburban, it does exhibit some attributes of urban areas, including racial and economic diversity (particularly in the north/central part of the county), pockets of density, and major employment centers.
- The county features major destinations, including college campuses, retail centers, and unique recreational attractions such as Disneyland and popular beaches. The recreational

destinations are busiest on weekends, when there is traditionally less transit service. And these major destinations are dispersed across the county rather than concentrated as they would be in a traditional downtown.

- The northern part of the county presents a well-connected street grid suited to both transit and walking. However, wide, high-speed arterials featuring few crosswalks discourage walking. The image below shows a typical Orange County intersection at which pedestrians must cross eight lanes of traffic.
- South County has a more disconnected street network that creates out-of-direction pedestrian pathways. The irregular street network in South County and its auto-oriented land-use patterns are difficult to serve effectively with transit.



Typical Orange County Intersection

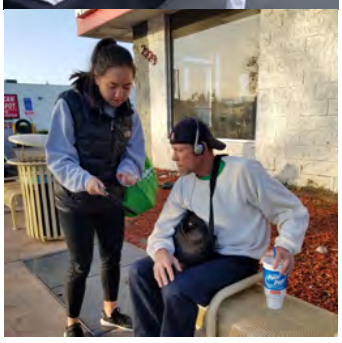
Long-term trends offer a mixed message.

- There are both positive and negative signs for growth in Orange County transit ridership. Although cultural and demographic trends point in the right direction, ridership has declined lately, in part because of the rise of alternatives such as transportation network companies (Uber and Lyft) and reduced barriers to driving.
- New technologies may be both blessings and curses. Smartphones allow transit agencies to provide customers with real-time arrival information and app-based passes. They also connect potential riders to Uber and Lyft, which can provide a convenience benefit but may add to overall traffic congestion.
- Improving connectivity is key to future success, including both first-/last-mile feeder connections as well as connections between longer distance destinations.
- Transportation network companies could play a vital role in improving connectivity, including providing an alternative to traditional fixed-route service to lower-demand areas. Similarly, autonomous vehicle technology could benefit transit by reducing operating costs.

3 PUBLIC ENGAGEMENT

The OC Transit Vision reflects extensive public input collected throughout 2016 and 2017 using a combination of in-person and online engagement techniques:

- ***Stakeholder Engagement.*** The project team led four focus group discussions and conducted interviews with nearly 20 groups and individuals representing a broad cross-section of the Orange County community.
- ***Interactive Surveys.*** The project team conducted three primary interactive online surveys to solicit feedback regarding the existing transit system and proposed OC Transit Vision recommendations.
- ***Citizens Advisory Committee, Elected Officials, and Planning Directors Meetings.*** The project team met quarterly with the OCTA Citizens Advisory Committee and participated in two meetings with county elected officials and planning directors.



Across these various engagements and from the thousands of people who shared their feedback, a number of priorities emerged. People expressed support for the following improvements to transit in Orange County:

Faster and more frequent transit that is time-competitive with driving, such as rapid transit or express bus serving trips over long distances, across the county.

Longer hours of operation, and more frequent service during off-peak periods, including mid-day on weekdays, evenings, and weekends.

High-capacity or rapid transit modes (rail or bus rapid transit) serving the busiest corridors.

Easier connections to, from, and between transit routes, including improvements to walking and biking access as well as park-and-rides.

More seasonal and special event services, similar to the existing Newport Trolley, OC Fair Express, and Angels Express.

The following sections briefly describe the findings from each of the major public touchpoints, focusing specifically on those that connect to the recommendations included in the OC Transit Vision. Appendix B provides detailed summaries of each interactive survey.

STAKEHOLDER ENGAGEMENT

Initial stakeholder engagement provided opportunities for direct connections with individuals and groups who could offer a range of feedback about their goals for the OC Transit Vision. The project team posed open-ended questions to gather insight on what works and what could be improved to encourage more people to use transit in Orange County.

Stakeholder Interviews

The project team interviewed representatives from the following communities and organizations in the first four months of the project:

- Automobile Club of Southern California
- California Department of Transportation District 12
- Calvary Chapel Costa Mesa
- County of Orange
- County of Orange Executive Staff
- Irvine Company
- Irvine Transportation Commission
- John Wayne Airport
- Mariners Church
- North Orange County Chamber
- OCTA Bus Customer Roundtable
- OCTA Diverse Community Leaders
- OCTA Committees, including: Citizens Advisory Committee, Special Needs Advisory Committee, and Technical Advisory Committee
- Orange County Visitors Association
- Rancho Mission Viejo
- Saddleback Church
- South Coast Metro Alliance
- Spectrumotion, Irvine
- The Disneyland Resort
- Transportation advocate and former OCTA Board Member Sarah Catz
- WTS-OC Executive Board

Each group was asked to describe its vision for the future of Orange County transit. Interviews generally followed a script of about 15 questions geared to the interviewee's background and expertise. Transit-related questions focused on identifying barriers, priorities, and opportunities, as well as what is already working well.

Interviewees shared a wide range of ideas, issues, and insights. Recurring themes included the following:

- Demographic change is driving changing travel needs. As baby boomers reach retirement age, there will be a greater need for transportation tailored to seniors. At the same time, millennials are pushing changes, including an increase in creative office space and greater demand for evening travel.
- A number of popular non-commute travel markets in Orange County are poorly served by transit, including evening, weekend, and special-event service.
- High-capacity transit modes may be appropriate for Orange County, including both rail and higher-quality bus service (bus-only lanes and express buses with park-and-ride lots).

- Improving connectivity will be key to the future success of transit in Orange County, including both first-/last-mile feeder connections and connections between longer distance destinations, such as inland and coastal areas and North and South County.
- Transportation network companies such as Uber and Lyft could play an important role in improving first-/last-mile connectivity. They could also supplement transit by providing alternative service to lower-demand areas.
- Similarly, autonomous vehicle technology could benefit transit by reducing transit operating costs.

Focus Groups

The project team met with four focus groups and found that transit is viewed as an essential element of the future transportation system in Orange County. However, it must be affordable, efficient, accessible, convenient, and reliable.

Additional findings relevant to the OC Transit Vision included the following:

- Transit improvements are the top priority for investment in the transportation system.
- Increasing service in areas of high demand is more important than greater coverage to all areas.
- Orange County needs improved regional connections, including connections to the Los Angeles Metro Rail system and LAX Airport.
- The existing transit system in Orange County is good relative to those in other areas, including Los Angeles County.

Focus group discusson with OCTA staff

INTERACTIVE SURVEYS

The project team conducted three primary interactive, qualitative online surveys to solicit feedback regarding the existing transit system and proposed recommendations:

- A Transit Master Plan Vision Survey to gather high-level feedback at the beginning of the project;
- A "Build Your Own System" survey of the community's transit-related priorities conducted midway through the project, following release of the *State of OC Transit Report* and prior to development of project recommendations;
- An OC Transit Vision Recommendations Survey, conducted toward the end of the project to gather feedback on potential OC Transit Vision recommendations, including the 10 TOCs (see Chapter 5).

These surveys were solicited via social media, e-blasts, OCTA's *On the Move* blog, press releases, and during more than 20 community events. The team directly reached out to more than a dozen target audiences, including local jurisdictions, industry and diversity leaders, college students, express lanes customers as well as bus, train, and vanpool riders.

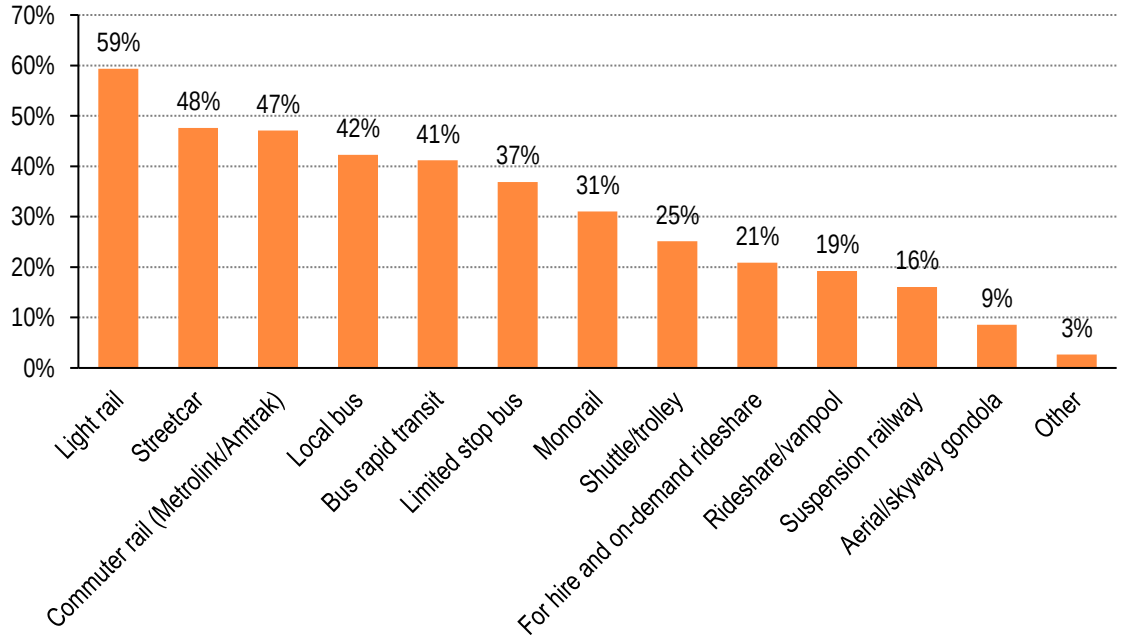
The following sections summarize the key findings from each survey; full survey results, including results from secondary surveys, are available in Appendix B.

Transit Master Plan Vision Survey

The Transit Master Plan Vision Survey was conducted early in the project and closed in January 2017. Its purpose was to introduce the project and gather feedback on the types of transit investments respondents would like to see included in the OC Transit Vision. A total of 191 respondents completed the survey, with the following results:

- Nearly all (94 percent) of respondents believed that Orange County needs more transit options.
- Light rail, streetcar, and commuter rail were the top three transit modes that respondents most desired and believed would help achieve the OC Transit Vision (Figure 3-1).
- When asked which areas of the county would benefit most from new or improved transit options, the most common responses were Disneyland, John Wayne Airport, the Anaheim resort area, Downtown Anaheim, and along the I-405 and I-5 corridors.

Figure 3-1 Preferred Transit Modes



Build Your Own System Survey

The Build Your Own System Survey was open from March 31 to June 23, 2017 and generated 1,694 responses to the first interactive survey and 1,370 responses to the follow-up survey. The purpose of the survey was to identify community priorities related to potential transit improvements.

As part of the interactive exercise, respondents were given a hypothetical budget of $100 to prioritize various transit improvements. Each improvement had a cost of $5 to $25 relative to actual costs for implementation. In addition to spending their $100 budget, respondents could also maximize benefits in real time—including speed and reliability, the passenger experience, accessibility, and ridership impacts—based on the improvements selected. A screen capture of the introduction to the Build Your Own System survey is shown in Figure 3-2 and a screenshot of select response choices for Information and Amenities improvements is shown in Figure 3-3.

Figure 3-2 Build Your Own System Survey – Introduction

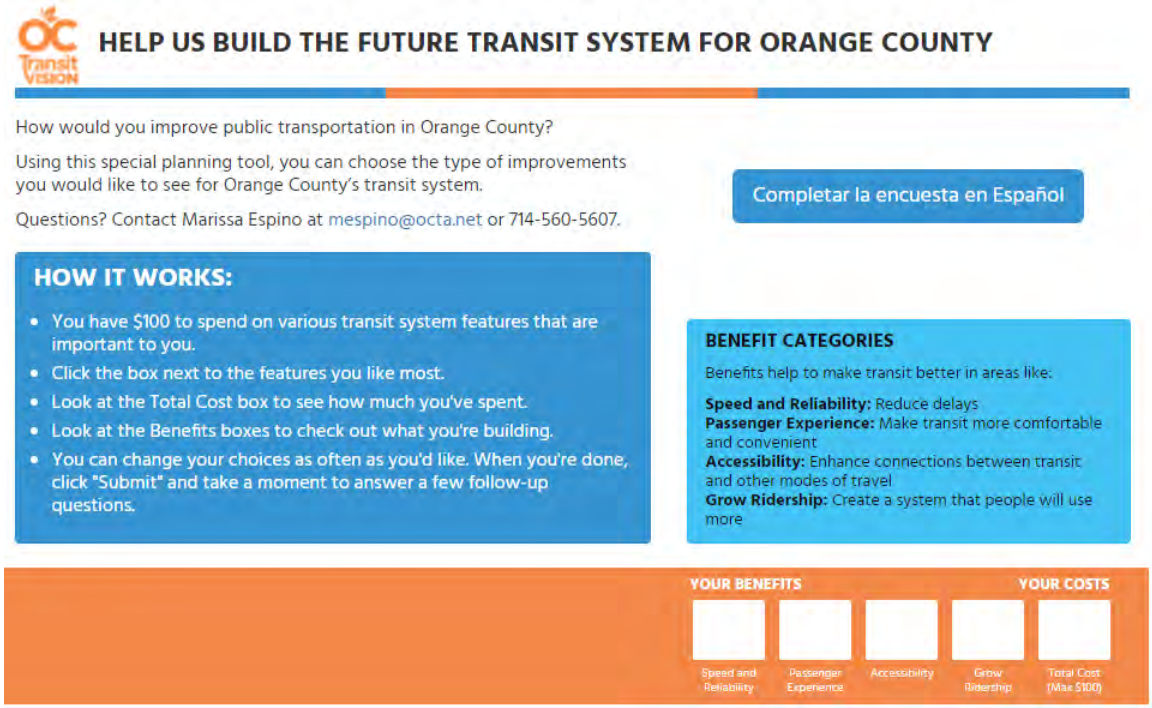
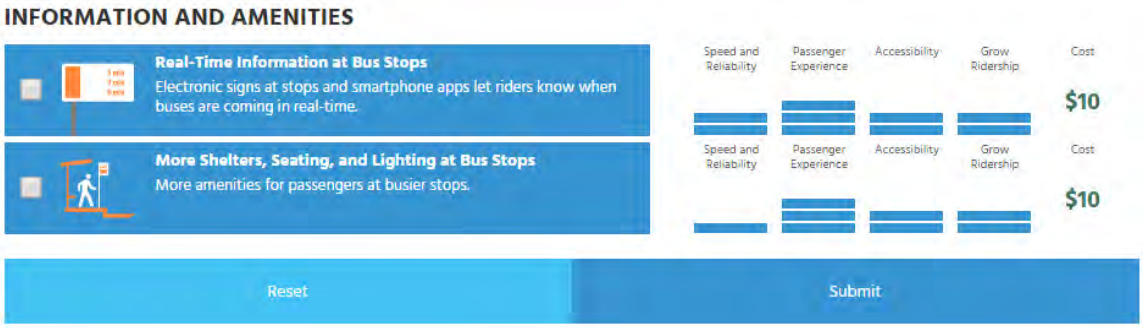


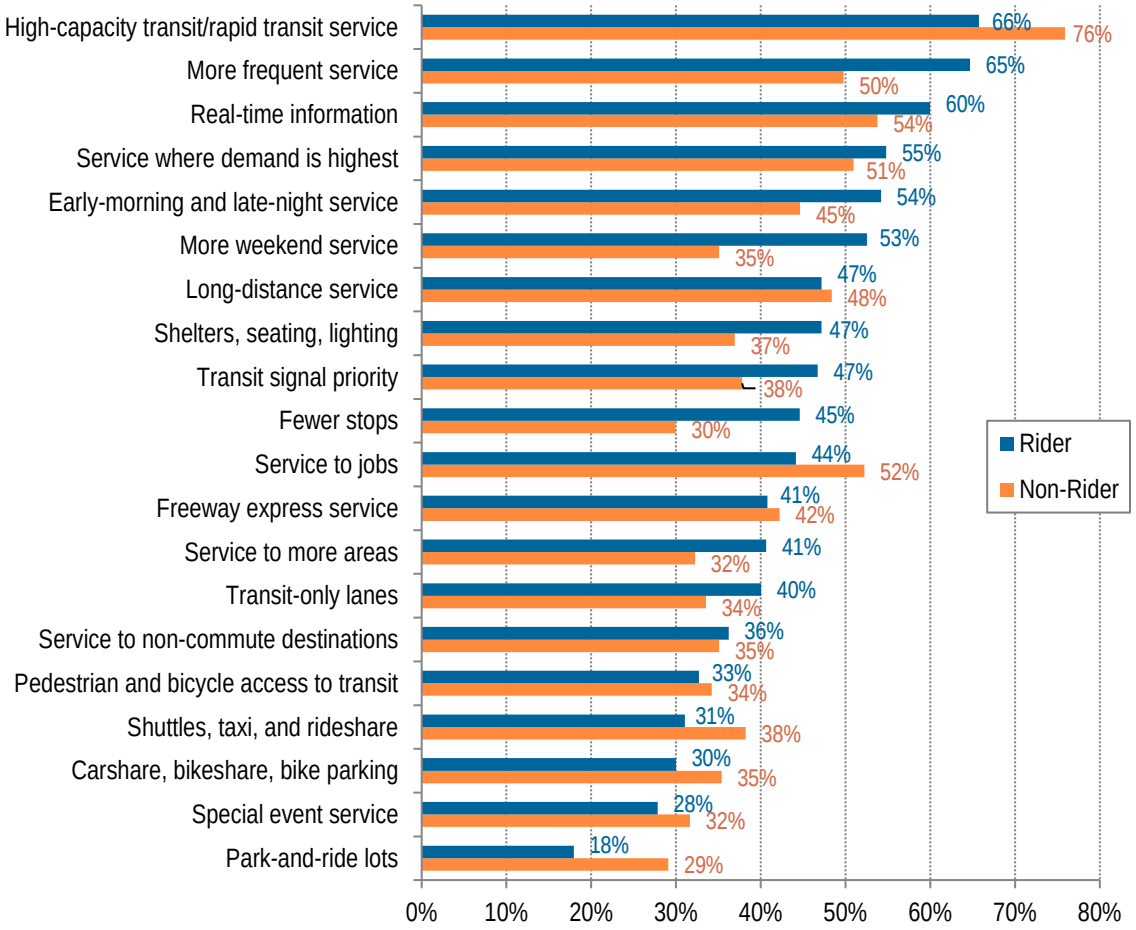
Figure 3-3 Build Your Own System Survey – Select Improvements



The results of the interactive exercise are shown in Figure 3-4 and summarized below:

- Despite being the most expensive improvement, high-capacity transit/rapid transit services were desired by both existing riders (66%) and non-riders (76%).
- The second and third most popular improvements were service and amenities enhancements. Riders preferred more frequent service and real-time information at bus stops. Non-riders preferred real-time information at bus stops and service to jobs.
- The lowest priority investment was park-and-ride lots.

Figure 3-4 Preferred Transit Improvements for Riders and Non-Riders



After spending their $100 to improve transit in Orange County, participants were directed to a follow-up survey that asked questions about their decision-making process when building their own system, their impressions of the interactive exercise, as well as their individual travel behavior and demographic characteristics. Key findings include the following:

- A desire to "make transit more available" and "making it easier for people to use the bus" ranked as the top two considerations in the decision-making process (Figure 3-5).
- Most respondents do not ride OCTA services more often because the bus takes too long and it does not take them where they need to go (Figure 3-6). This sentiment likely contributed to the priority placed on "High-Capacity/Rapid Transit" in the Build Your Own System survey, an improvement selected by more than half of the respondents.

Figure 3-5 Importance of Decision-Making Criteria

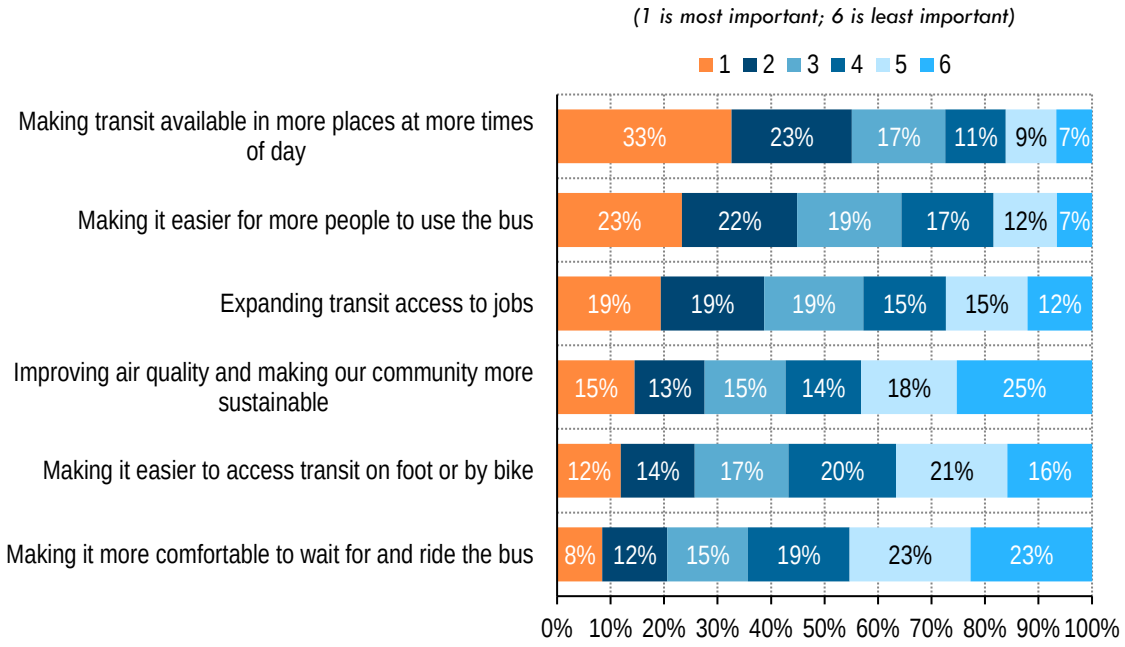
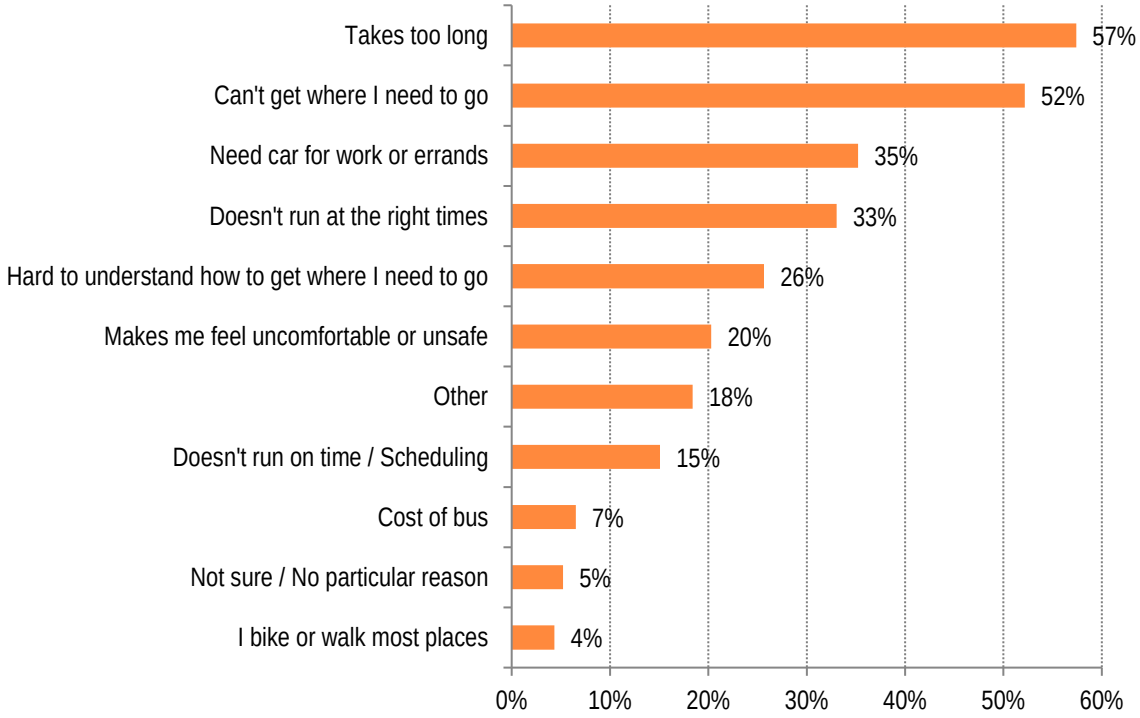


Figure 3-6 Reasons for Not Riding OCTA Services



OC Transit Vision Recommendations Survey

The OC Transit Vision Recommendations Survey was conducted from November 17 to January 21, 2018 to collect feedback on draft recommendations of the OC Transit Vision. The interactive survey captured nearly 1,000 respondents. The survey included five screens or pages. The first Welcome screen provided a brief introduction to the OC Transit Vision. The remaining four screens contained questions related to final Transit Opportunity Corridor recommendations, options for other types of transit service improvements, potential enhancements to access, connections, and policies, and respondent demographics.

In order to distinguish preferences among different user groups, results were analyzed separately for transit riders and non-riders. For purposes of this analysis, "transit riders" consists of respondents who indicated that they used transit at least 12 times per year, or once per month. A number of survey respondents selected "decline to state," and are not included in either category.

The second screen showed an interactive map of 11 potential high capacity or rapid transit lines based on the Transit Opportunity Corridors (TOCs) identified through the OC Transit Vision analysis of potential transit demand. Participants were asked to select up to five lines that they would prioritize for high capacity or rapid transit investment (Figure 3-7).

Figure 3-7 OC Transit Vision Recommendations Survey – Transit Opportunity Corridors

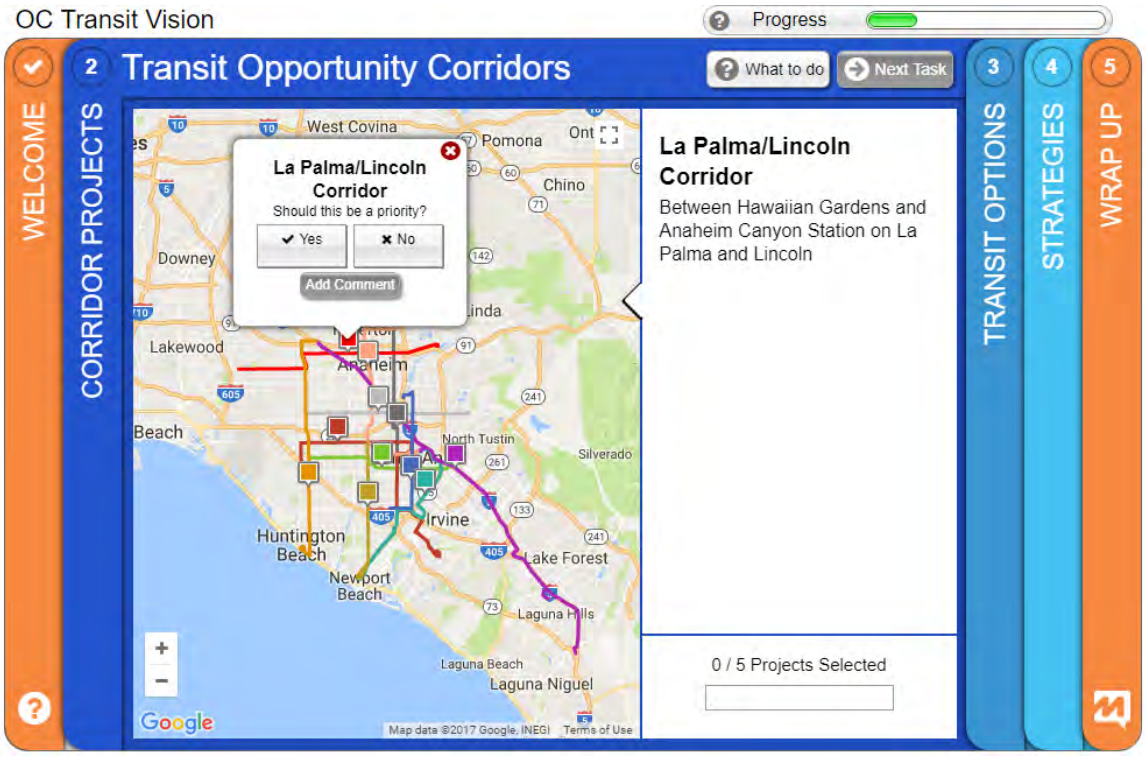
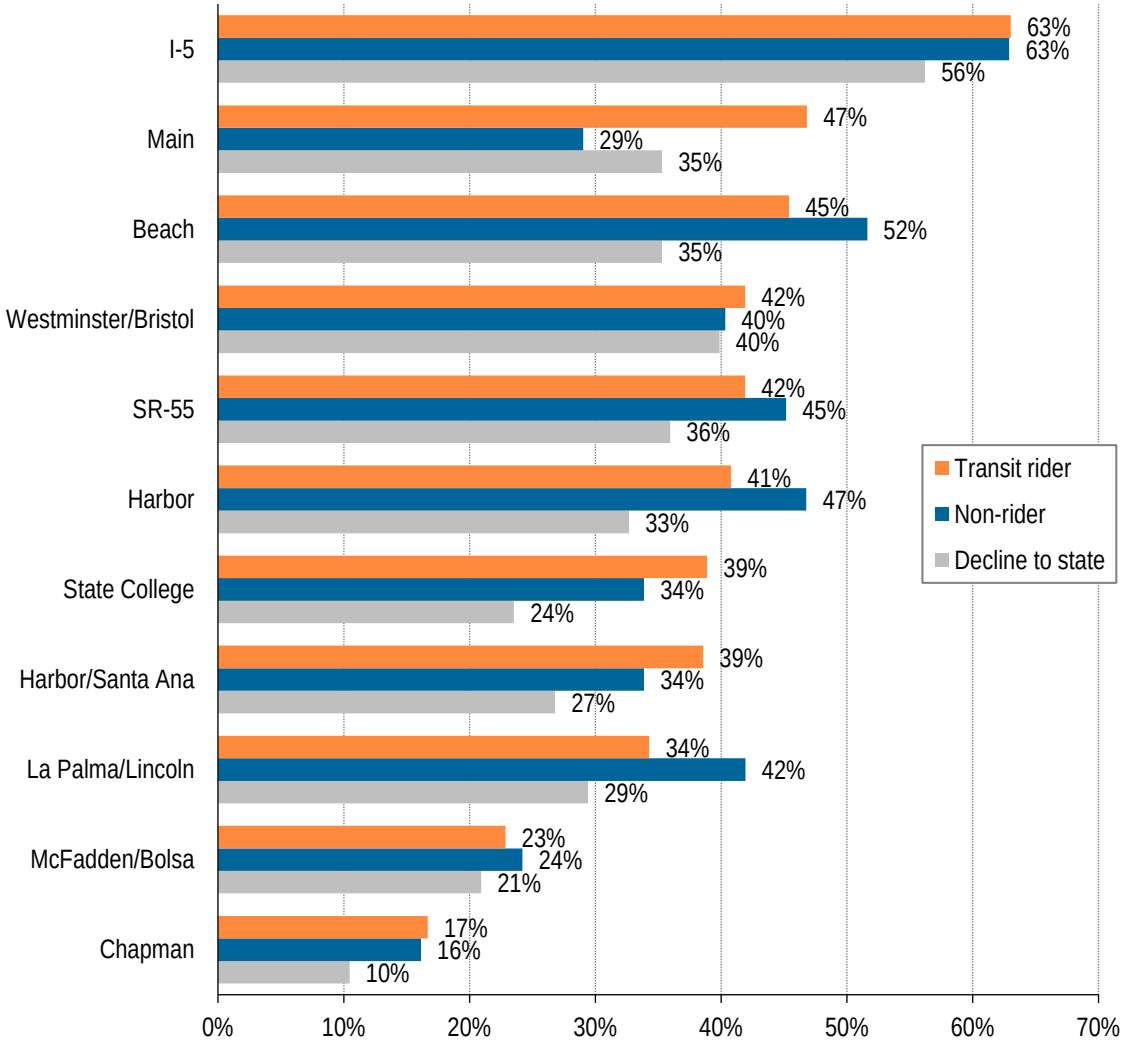


Figure 3-8 shows the percent of respondents who voted "yes" for each corridor. As reflected in the Transit Opportunity Corridor Survey described previously, the majority of respondents supported the I-5 corridor. The following next most popular corridors for transit riders were: Main, Beach, SR-55, Westminster/Bristol. Non-riders prioritized Beach, Harbor, SR-55, and La Palma/Lincoln. There was limited support for the McFadden/Bolsa and Chapman corridors.

Figure 3-8 Percent of Respondents Voting "Yes" by Transit Corridor



The second content screen asked respondents to rank their top five (out of seven) transit investment priorities in order, with "1" representing most important and "5" representing least (see Figure 3-9).

Figure 3-9 OC Transit Vision Recommendations Survey – More Transit Improvements

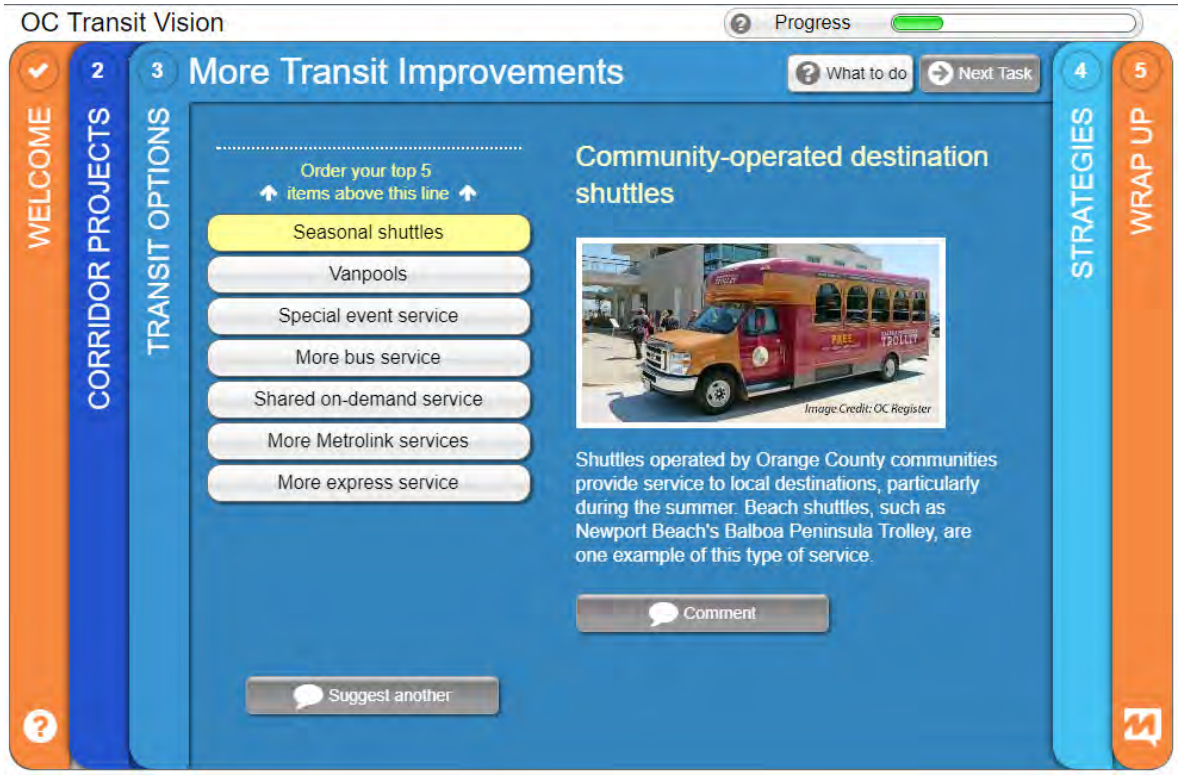


Figure 3-10 through Figure 3-12 show the overall ranking of priorities by transit user type (transit riders, non-riders, and those who declined to state). More Metrolink service was most commonly selected as a top priority ("1") across all user groups, with 40 percent of respondents choosing this option.

The following five improvements were identified as a top priority by the greatest numbers of transit riders: more Metrolink service, more bus service, more express service, special event service, and shared on-demand service. Non-riders prioritized more Metrolink service, more bus service, vanpools, special event service, and shared on-demand service.

Figure 3-10 Ranking of Transit Investment Priorities for Transit Riders

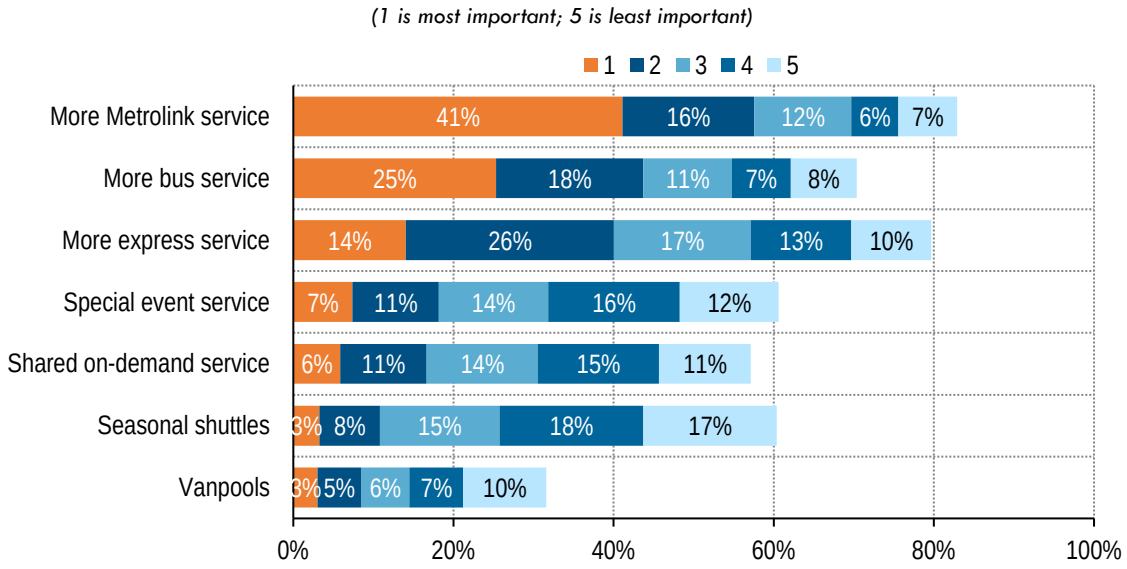


Figure 3-11 Ranking of Transit Investment Priorities for Non-Riders

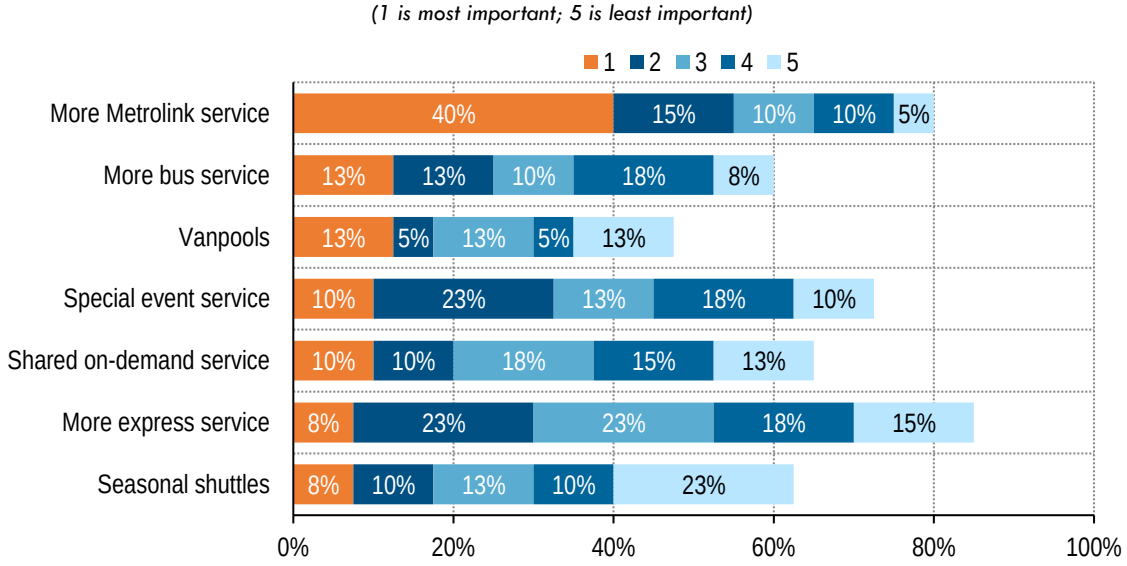
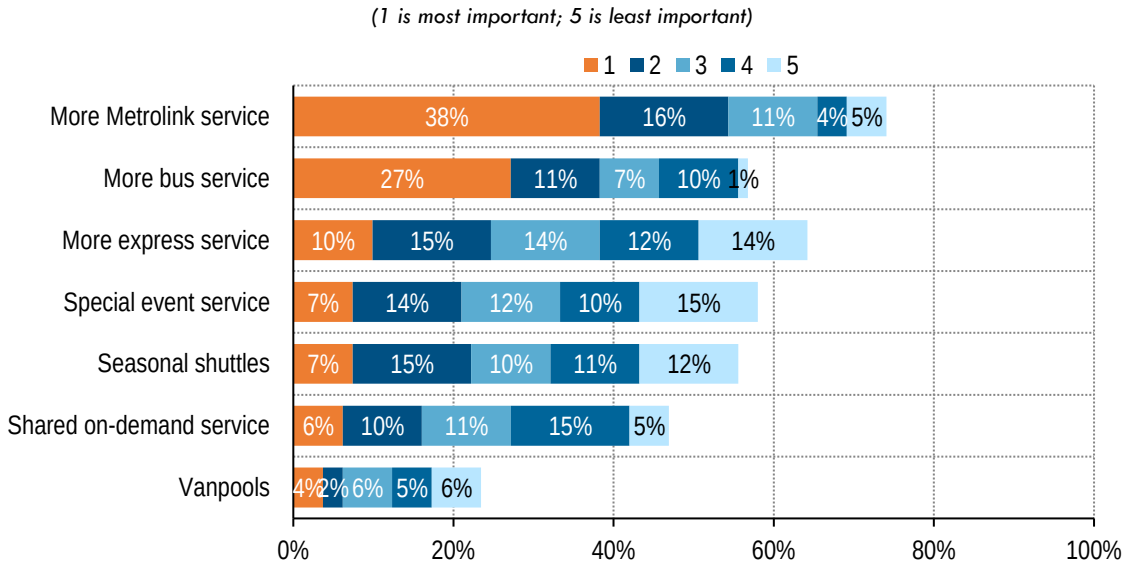


Figure 3-12 Ranking of Transit Investment Priorities for "Decline to State"



The fourth screen asked respondents to choose their preferred strategies for improving access and connections to transit. Strategies were grouped into three categories: passenger amenities, land use and polices, and connections to transit (see Figure 3-13). The top priorities for each category and user group were the following, with the percent of respondents to this question selecting that improvement shown in parentheses:

- **Passenger Amenities** (see Figure 3-14)
  - Transit riders, non-riders, and "decline to state" all selected real-time arrival info as a top priority (46, 58, and 50 percent, respectively)
- **Land Use & Policies** (see Figure 3-15)
  - Transit riders: give transit priority over cars (41 percent)
  - Non-riders: create additional park-and-ride lots (39 percent)
  - "Decline to state": concentrate new developments near transit centers (38 percent)
- **Connections to Transit** (see Figure 3-16)
  - Transit riders: improve nearby sidewalks and pedestrian crossings (34 percent)
  - Non-riders: provide space for shuttles, taxis, and Uber/Lyft (37 percent)
  - "Decline to state": improve nearby sidewalks and pedestrian crossings (36 percent)

Figure 3-13 OC Transit Vision Recommendations Survey – Improving Access and Connections

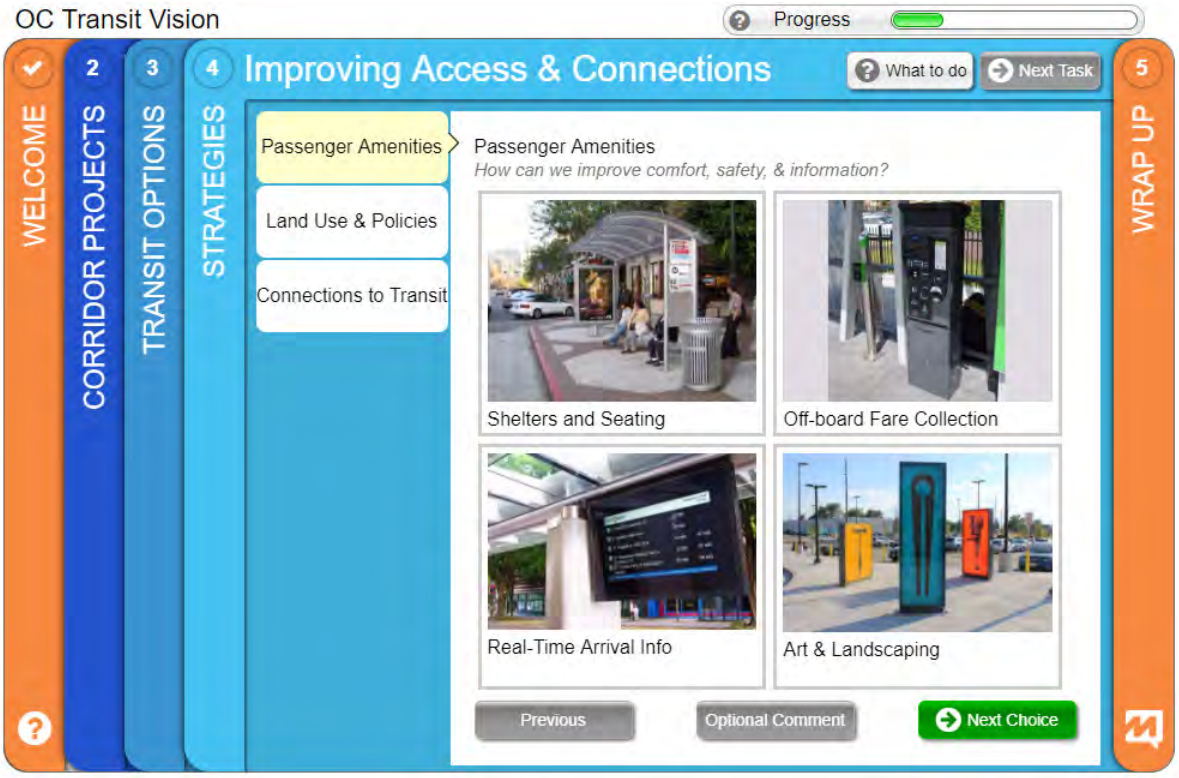


Figure 3-14 Passenger Amenities Preference by Transit Use

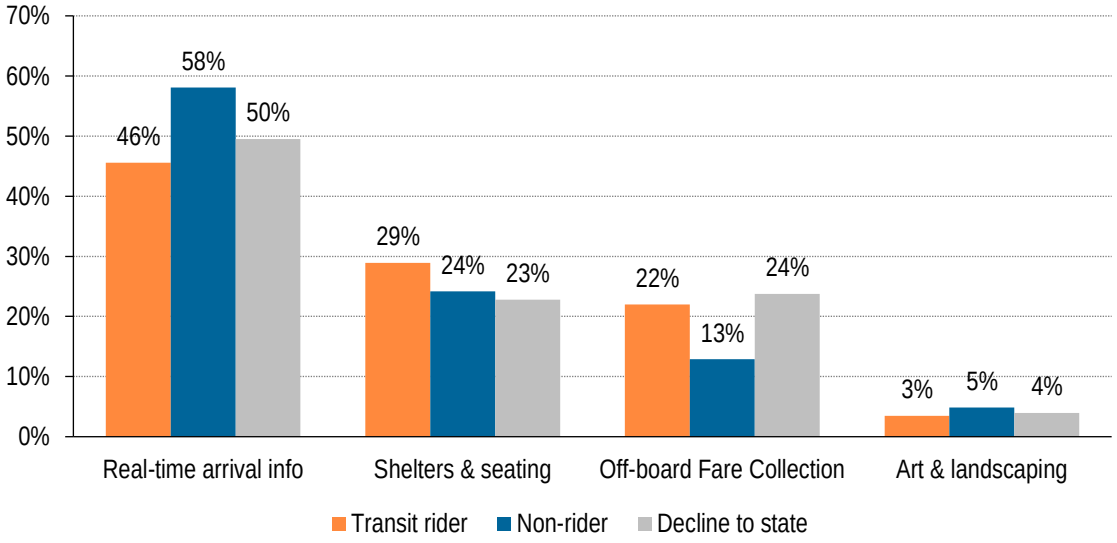


Figure 3-15 Land Use & Policies Preference by Transit Use

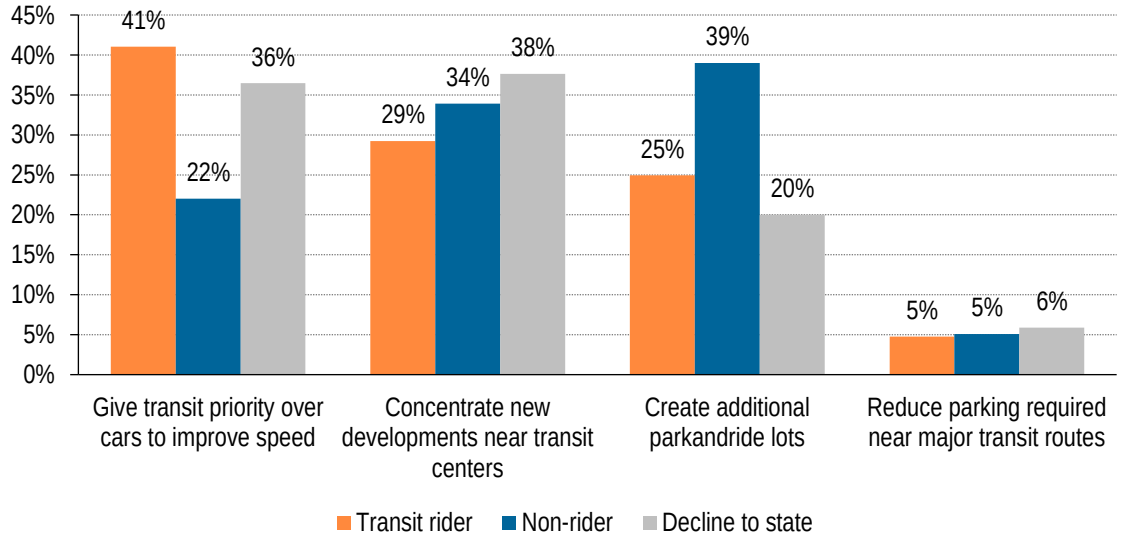
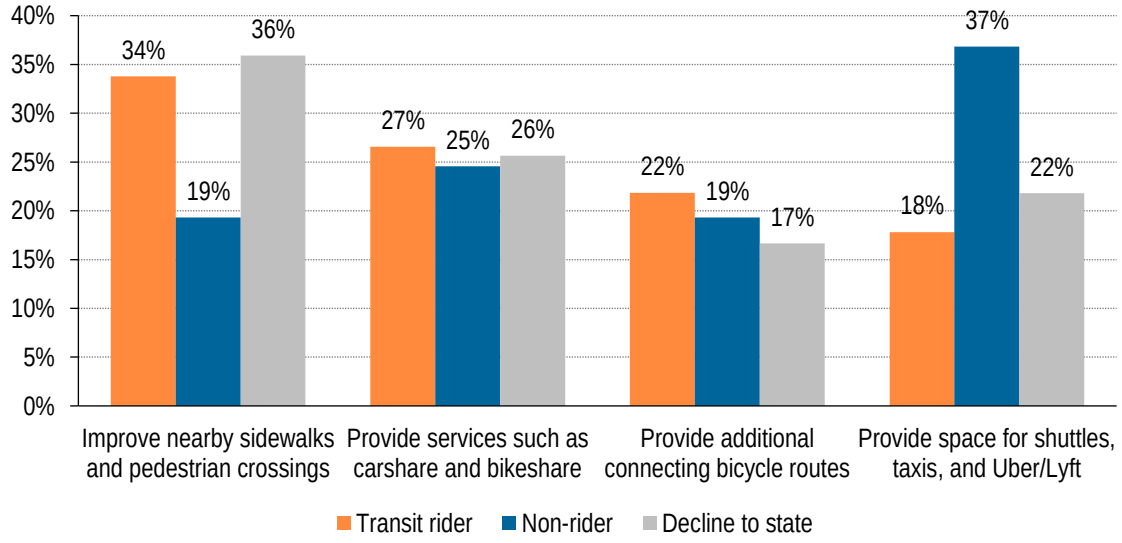


Figure 3-16 Connections to Transit Preference by Transit Use



The last screen included demographic questions asking about respondents' transit use, age, gender, and ZIP code (see Figure 3-17). Characteristics of respondents included the following:

- **Transit Use:** The majority of respondents were transit users; only 9 percent have never ridden a bus or train. Forty-three percent of respondents use transit at least 12 times per week, indicating that transit is their primary mode of transportation (see Figure 3-18).
- **Age:** The majority of respondents were between the ages of 20 and 65. Age 51 to 65 was the most common age group, making up 32 percent of respondents (see Figure 3-19).
- **Gender:** There was an equal representation of males and females, with each accounting for 49 percent of respondents. Remaining respondents did not answer this question.
- **Zip:** Figure 3-20 shows the top 12 ZIP codes where respondents live. The most common ZIP codes are associated with Costa Mesa, Santa Ana, and Anaheim.

Figure 3-17 OC Transit Vision Recommendations Survey – Wrap Up

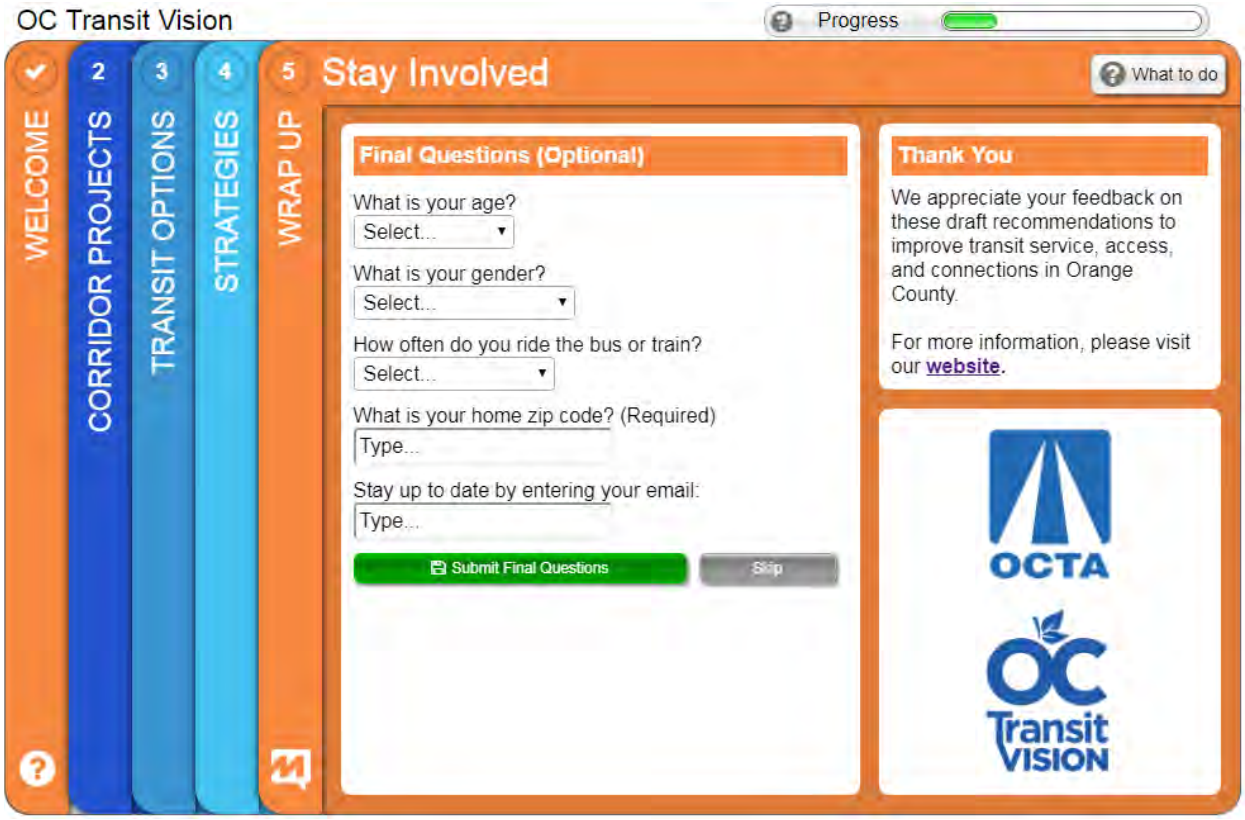


Figure 3-18 Transit Use of Respondents

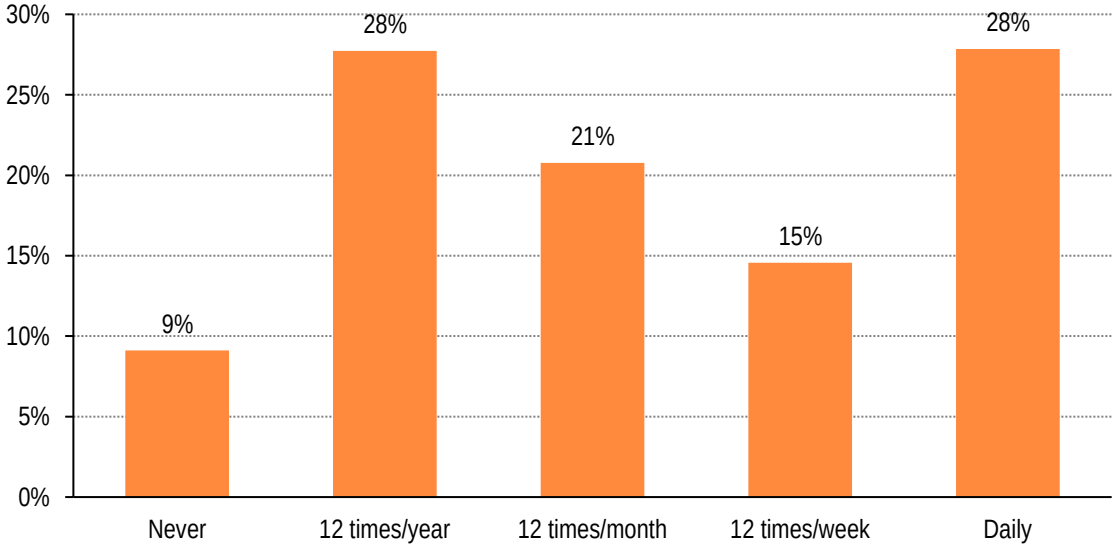


Figure 3-19 Age of Respondents

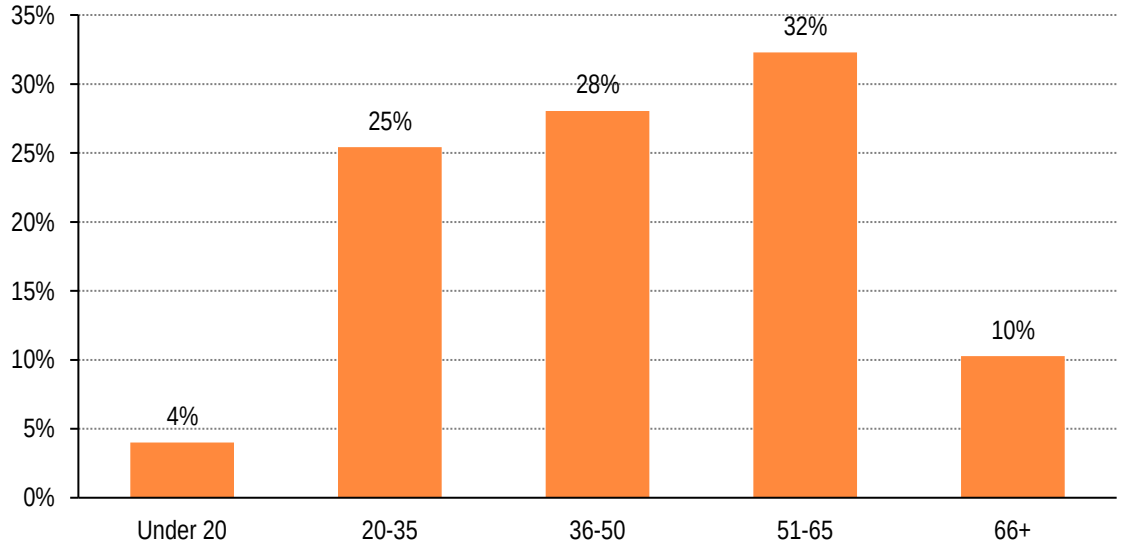


Figure 3-20 Top ZIP Codes of Respondents

Zip Code	Associated City(s)	Count	Percent
92627	Costa Mesa, Santa Ana Heights	22	3%
92673	San Clemente, San Juan Capistrano	21	3%
92626	Costa Mesa	19	2%
92701	Santa Ana	19	2%
92630	Lake Forest	18	2%
92707	Santa Ana, Costa Mesa	18	2%
92832	Fullerton, Anaheim	18	2%
92706	Santa Ana, Orange	17	2%
92805	Anaheim	16	2%
92648	Huntington Beach	15	2%
92780	Tustin	15	2%
92804	Anaheim, Stanton	15	2%

CITIZENS ADVISORY COMMITTEE, ELECTED OFFICIALS, AND PLANNING DIRECTORS MEETINGS

Throughout the development of the OC Transit Vision, the project team met quarterly with the OCTA Citizens Advisory Committee and twice with Orange County elected officials and planning

directors. These meetings provided the opportunity to gather feedback at key milestones, including input on preliminary recommendations.

The Citizens Advisory Committee provided input on the following topics:

- Framing the OC Transit Vision, with a focus on strengths and opportunities for transit in Orange County (October 2016)
- *State of OC Transit* report, including feedback on the transit propensity analysis and key findings (January 2017)
- The OCTA Transit Investment Framework, with an exercise to identify priorities tied to the Build Your Own System survey (April 2017)
- Transit Opportunity Corridors, including the screening of segments and stops (July 2017)
- Preliminary OC Transit Vision recommendations, focusing on the results of the corridor evaluation and other service improvement opportunities (October 2017)

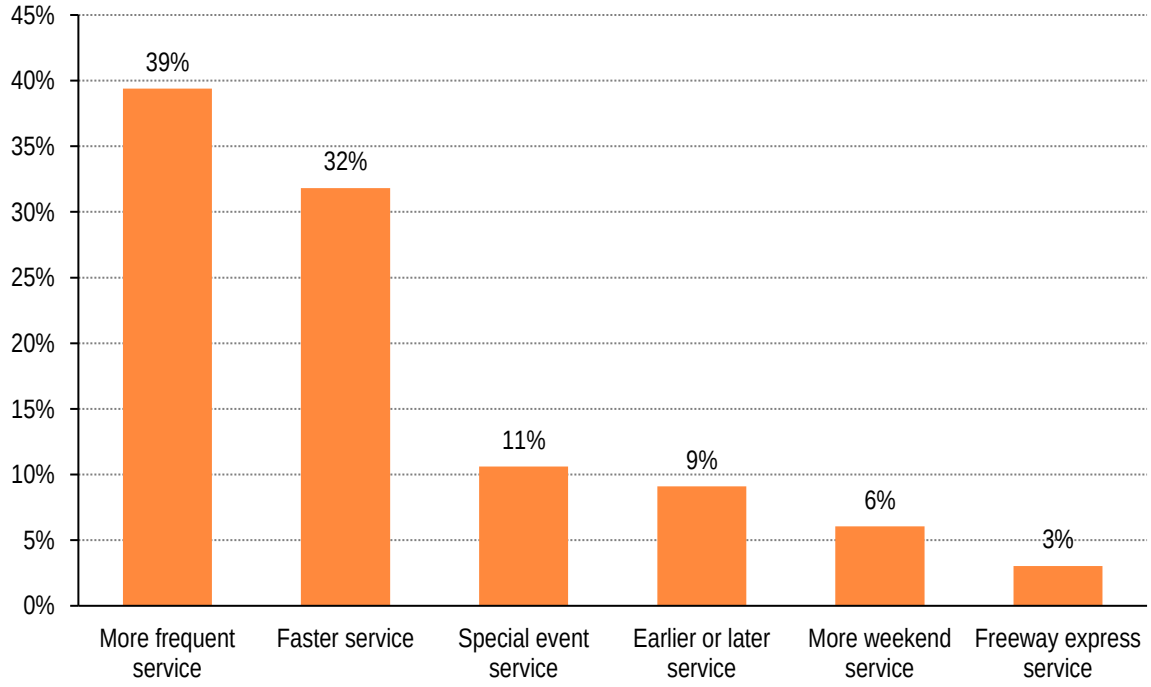
Citizens Advisory Committee meeting

Orange County elected officials and planning directors were engaged to provide input on the OC Transit Vision as well as the update to OCTA's Long-Range Transportation Plan. Like the Citizens Advisory Committee, the feedback from these groups was tied to key milestones and helped to shape the final recommendations. The first meetings were held in May 2017, to present key findings from the *State of OC Transit Report* and to introduce the Transit Investment Framework, and in September 2017 to share preliminary recommendations for the Transit Opportunity Corridors and other service enhancements.

At both the May and September meetings, "Poll Anywhere," an interactive audience participation surveying tool, was used to solicit feedback on elements of the OC Transit Vision. Appendix B contains full results of these polls, and

Figure 3-21 shows the elected officials' responses to a question asking, "What improvements to transit service are most important?" Much like the feedback received through the surveys described in the previous section, more frequent service and faster service were the most popular answers. This information helped to shape recommendations around improving service on current OC Bus routes and advancing studies on promising Transit Opportunity Corridors.

Figure 3-21 Elected Officials Workshop Feedback on Priority Transit Improvements



4 TRANSIT INVESTMENT FRAMEWORK

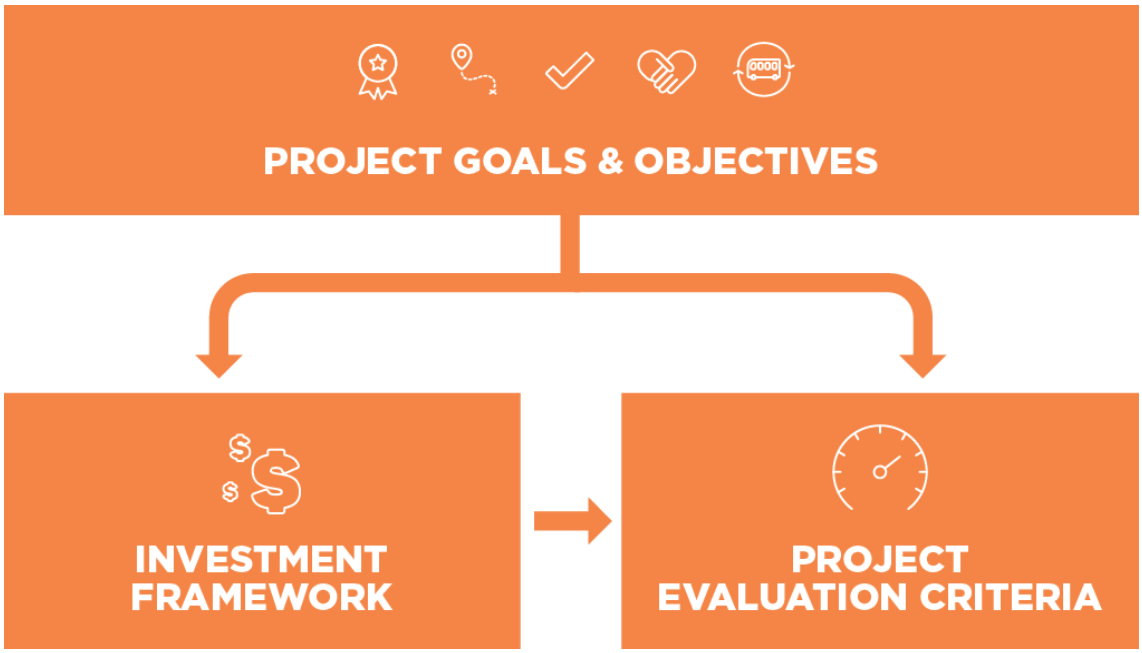
The OC Transit Vision includes a Transit Investment Framework that was presented to the OCTA Board of Directors in spring 2017. The Transit Investment Framework serves two primary purposes:

- **To guide OCTA** in allocating operating resources for bus service and in allocating capital resources for both bus and rail projects, and
- **To guide Orange County cities and other agencies** in developing transit-supportive land use, street design, and other transportation policies (further addressed in Chapter 8).

As shown in Figure 4-1, the Transit Investment Framework builds from the OC Transit Vision goals and objectives and provides a basis for the capital project evaluation process described in Chapter 5. The framework's guidelines incorporate industry standards, state and federal grant program evaluation criteria, and research into existing policies adopted by OCTA and peer agencies, including Los Angeles Metro, King County Metro (Washington State), and TransLink (Vancouver, British Columbia).

The framework consists of two categories: Service Allocation Guidelines and Capital Investment Guidelines. The complete Transit Investment Framework is available in Appendix C.

Figure 4-1 Relationship of Transit Investment Framework to Other Transit Vision Elements



SERVICE ALLOCATION GUIDELINES

The Service Allocation Guidelines for fixed-route bus operations and other non-paratransit services open to the general public are based on seven characteristics of transit corridors:

- **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, park-and-rides, and transfers to other routes)
  - Intersection Density

These corridor characteristics, the thresholds set for each, and the resulting service guidelines were selected based on a peer review and an assessment of the role of each characteristic in demand for transit service in Orange County.

Figures 4-2 and 4-3, respectively, describe the corridor characteristics and service guidelines associated with each category of OCTA fixed-route bus service as well as the characteristics of corridors requiring either non-traditional transit solutions or lacking the demand to justify public investment. The categories as defined for this framework are:

- ***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. Bravo! 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*** 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 car. Express routes rely on proximity to park-and-ride lots.

Service guidelines are not absolute requirements. Few corridors have characteristics consistent with just one category, and OCTA must allocate service based on other factors in addition to those stated above, including productivity, equity, and funding.

Figure 4-2 Service Allocation Guidelines: Demographics and Connections

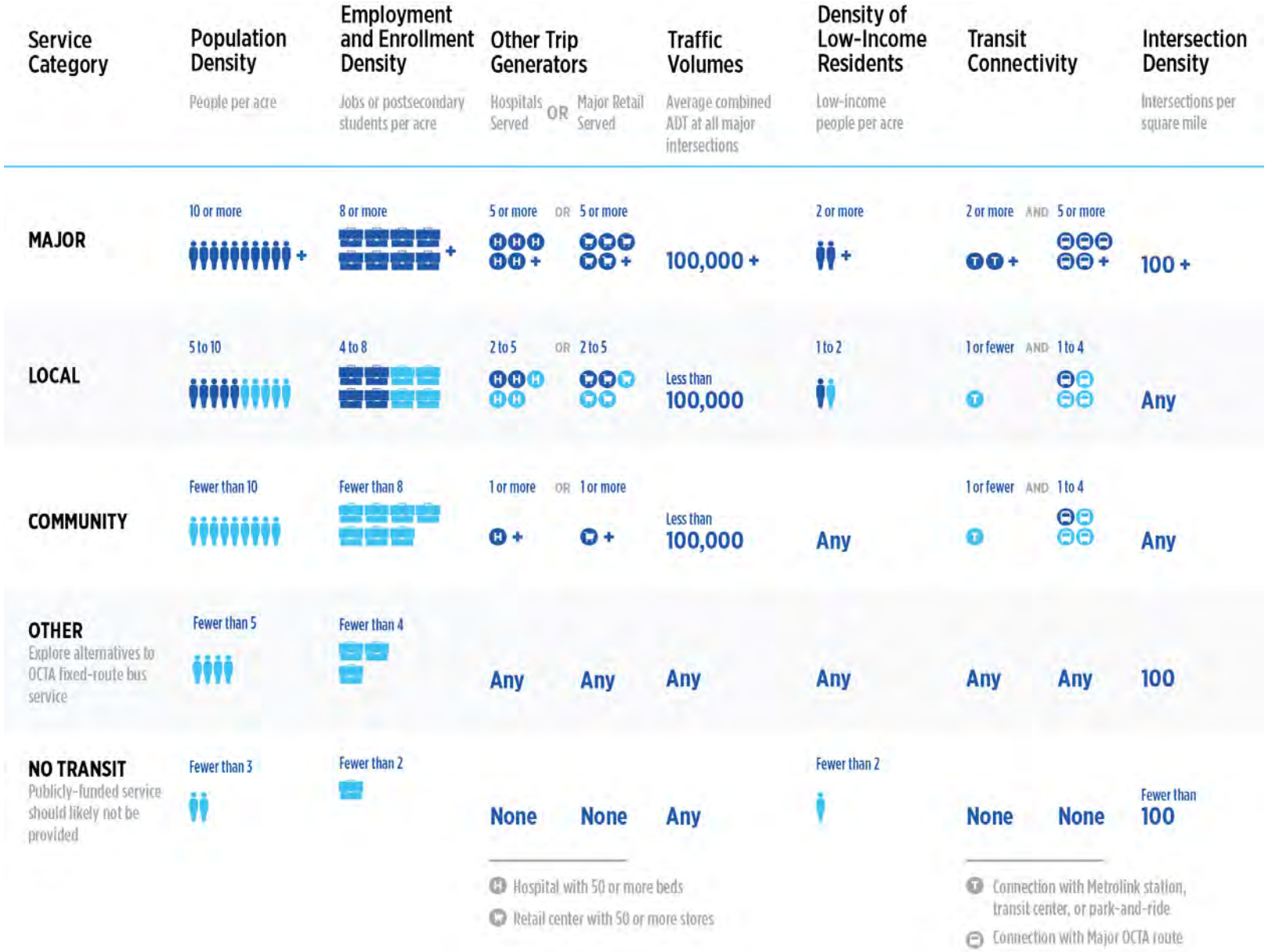


Figure 4-3 Service Allocation Guidelines: Level of Service

Service Category	Peak Frequency Buses per hour	Base Frequency Buses per hour	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 Explore alternatives to OCTA fixed-route bus service	N/A	N/A	N/A	N/A
NO TRANSIT Publicly-funded service should likely not be provided	N/A	N/A	N/A	N/A

CAPITAL INVESTMENT GUIDELINES

The Capital Investment Guidelines are divided into two categories of infrastructure spending: investments supporting existing bus operations, and investments in new high-capacity transit lines (such as rapid streetcars or bus rapid transit [BRT]). These guidelines help to identify both existing and future corridors where capital investments—in addition to potential service investments—may be justified.

Bus Investment Guidelines

Capital investments in existing bus service fall into three categories: vehicles; transit-priority improvements to the right-of-way; and major improvements to stops and stations (including operational improvements and 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 other jurisdictions and agencies (see Chapter 8).

Vehicles

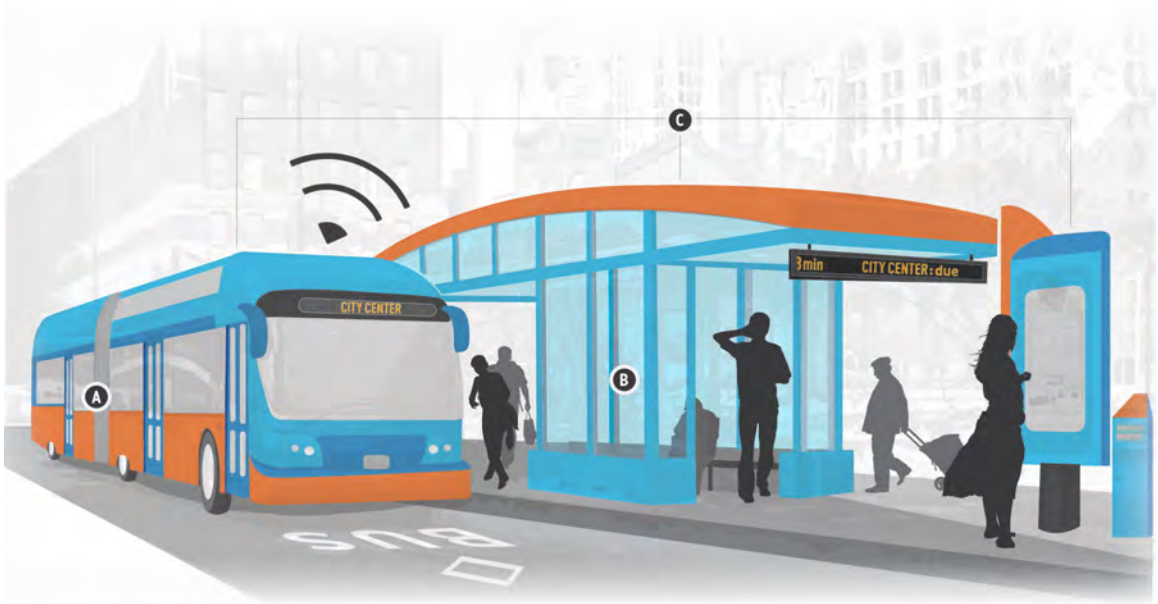
New vehicles can help to improve the current fleet in terms of capacity, emissions, reliability, maneuverability, comfort, and brand identity, among other factors. Vehicle-related investments are illustrated in Figure 4-4, and include the following:

A. Vehicle capacity, and the related issue of overcrowding

B. Comfort, both aboard vehicles and while waiting at stops

C. Vehicle and station branding, to enhance awareness of specialized and premium services such as BRT

Figure 4-4 Vehicle and Waiting Enhancements



Transit Priority Improvements

Transit priority improvements to the right-of-way can include the following treatments:

- Business, Access, and Transit (BAT) lanes prohibit general-purpose travel except for right turns and access to businesses and curbside parking; may be 24-hour lanes or peak-only
- "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

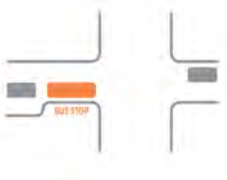
Transit Priority Signals

Signal Timing

Stop and Station Improvements

Major improvements to stops and stations include the following:

- Operational improvements:
  - "Bulb-out" or curb extension stops allow 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 access stops
  - Off-vehicle fare collection and all-door boarding



Bulb-Out Stop

Stop Relocation

Curb Management

Streamlined Fare and Boarding

- Enhanced passenger amenities:
  - Shelters at additional stops, and additional 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 recommend varying degrees of capital investment for each category of OCTA bus service (similar to the Service Allocation Guidelines), as shown in Figure 4-5.

Figure 4-5 Bus Capital Investment Guidelines

Service Type	Investment Level	Investment Types
Major	High	▪ Higher-capacity vehicles ▪ Vehicle branding (Bravo! routes only) ▪ All types of transit priority treatments, including transit lanes ▪ Operational stop improvements and enhanced stop amenities ▪ Off-vehicle fare collection and all-door boarding
Local	Medium	▪ Signal timing improvements ▪ Enhanced passenger amenities at busier stops
Community	Low	▪ Standard bus stop
Express	Medium	▪ 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	▪ Standard bus stop
Other	Low	▪ Vehicle branding (shuttles only) ▪ Technology integration

High-Capacity Transit Investment Guidelines

In developing guidelines for high-capacity transit investments, it is important to understand the following:

- Rail and (to a lesser extent) BRT infrastructure requires a sizeable capital investment. High ridership is required to justify these investments, and corridor characteristics must support transit.
- Historically, research into the minimum population and employment densities required to justify investment in high-capacity transit has resulted in a range of findings. But as a general rule, the bigger the capital investment, the more density required to justify the expense: subways require more density than at-grade light rail or streetcars, which in turn require more density than BRT.
- High-capacity transit uses larger vehicles, and investment in high-capacity transit may be called for if standard buses at frequent headways cannot comfortably accommodate ridership.
- Larger vehicles also reduce operating costs because a single operator can provide service to more passengers. While a 40-foot bus can only carry around 50 passengers[1], 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 costs[2].
- Capital costs for BRT projects have varied widely, but transit-priority investments 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 (such as 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.

Corridor analysis suggests that, at least for the time being, it would be difficult to argue for investment in the highest-capacity transit modes—such as subways—in Orange County. However, the county exhibits characteristics comparable with peer regions that operate light rail, streetcars, and BRT running in 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 Metro Orange Line BRT). The San Diego Trolley system also 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 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. 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

[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.

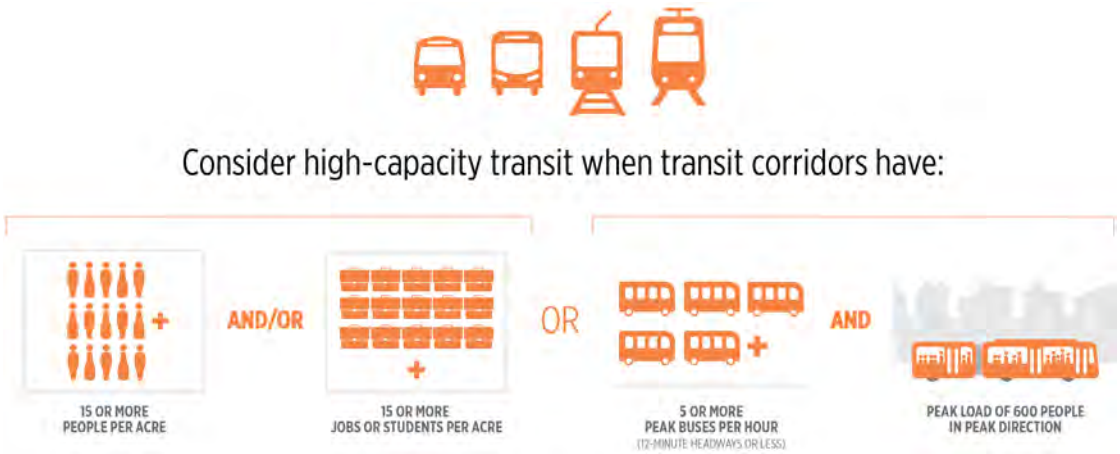
[2] Higher-capacity vehicles may be more expensive to operate in other ways, such as required maintenance of rail tracks, which may offset some of the savings from improving the operator-to-passenger ratio.

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.

The OC Transit Vision helps to answer the question of where light rail, streetcar, BRT, or other high-capacity transit lines might make sense in Orange County (see Chapter 5). In general, the following thresholds should be viewed as appropriate when considering high-capacity transit capital investments (Figure 4-6):

- 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 all seats full (i.e., peak loads greater than 1.0) and peak headways of 12 minutes or less

Figure 4-6 Thresholds for Consideration of High-Capacity Transit



A number of major corridors in the north-central core of Orange County appear to be at or near these thresholds. Many of these corridors feature other major trip generators identified in the Service Investment Guidelines, including large retail centers, hospitals, and other destinations.

5 TRANSIT OPPORTUNITY CORRIDORS

OCTA is currently developing Orange County's first local rail line, the OC Streetcar line in Santa Ana and Garden Grove[1]. The OC Transit Vision identifies additional corridors—called Transit Opportunity Corridors (TOCs)—for future investment in rail or bus rapid transit (BRT) service. Based on analysis of more than 30 potential TOCs throughout Orange County, ten have been identified as candidates for capital investment (shown in Figure 5-1). They include eight corridors on arterial streets and two on freeways:

- ***Beach Boulevard*** from Fullerton Park and Ride to Downtown Huntington Beach
- ***Harbor Boulevard*** from Cal State Fullerton to Hoag Hospital Newport Beach
- ***State College Boulevard/Bristol Street*** from Brea Mall to the University of California, Irvine
- ***Main Street*** from Anaheim Regional Transit Intermodal Center (ARTIC) to South Coast Plaza Park-and-Ride
- ***La Palma Avenue/Lincoln Avenue*** from Hawaiian Gardens to Anaheim Canyon Station
- ***Chapman Avenue*** from Beach Boulevard to Hewes Street
- ***17th Street/Westminster Avenue*** from Cal State Long Beach to Tustin Street
- ***McFadden Avenue/Bolsa Avenue*** from Goldenwest Transportation Center to Larwin Square
- ***I-5*** from Fullerton Park and Ride to Laguna Niguel/Mission Viejo Station
- ***SR-55*** from Santa Ana Regional Transportation Center to Hoag Hospital Newport Beach

Based on in-depth evaluation of these TOCs, the OC Transit Vision includes recommendations for moving forward with planning, design, and implementation on the highest priority corridors:

- Conduct corridor-level studies of rail and other rapid-transit options in the North Harbor/Santa Ana and Westminster/Bristol corridors (see Figure 5-1).
- Introduce Bravo! service in the Beach Boulevard corridor, and develop a strategy to upgrade Bravo! corridors to BRT (see Chapter 6).
- Conduct a network study of freeway-based BRT corridors (see Chapter 7).

A complete report on the identification, screening, and evaluation of the TOCs is available in Appendix D. The following is a summary of the process used to select and assess the TOCs, as well as an overview of the transit modes that might operate in them.

[1] Amtrak and Metrolink provide intercity and commuter rail service in Orange County.

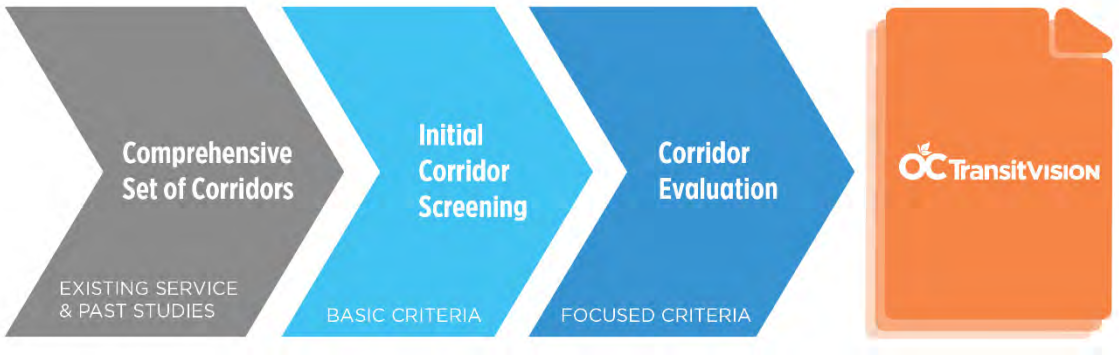
Figure 5-1 Transit Opportunity Corridors

TOC PROCESS

Selecting Transit Opportunity Corridors consisted of four steps (illustrated in Figure 5-2):

- Identifying potential TOCs based on factors such as transit demand
- Initial screening of many potential TOCs based on evaluation criteria, and identifying the ten TOCs to analyze in greater detail
- Detailed analysis of the ten TOCs
- Identifying potential next steps for the TOCs

Figure 5-2 Corridor Evaluation Process



Evaluation Framework

The evaluation criteria used for the initial screening and more detailed evaluation of TOCs are shown in Figure 5-3. The criteria are based on the OC Transit Vision goals and objectives described in Chapter 1.

Figure 5-3 Corridor Screening and Evaluation Criteria

Category	Measures	Initial Screening Methodology	Evaluation Methodology
Speed & Reliability	% of Route w/ Transit-Only ROW	--	Calculation based on conceptual design
	% of Route w/ Grade Separation	--	Calculation based on conceptual design
	Peak and Base Frequency	--	From conceptual service plan
	Average Speed	--	From model
Ridership/Mode Shift/VMT Reduction	New Transit Trips	--	Forecast project ridership per mile (from model)
	Vehicle Miles Traveled/CO2 Emissions	--	Based on ridership
Density/Connections to Activity Centers	Population Density Within ½ Mile	GIS analysis (Census data)	GIS analysis (Census data)
	Employment/Postsecondary Enrollment Density Within ½ Mile	GIS analysis (Census data)	GIS analysis (Census data)
	Density of Hospital Beds/Retail Stores Within ½ Mile	GIS analysis (available sources)	GIS analysis (available sources)
	Additional Major Destinations (e.g., Stadiums & Theme Parks) Within ½ Mile	GIS analysis (based on assessment of "destinations")	GIS analysis (based on assessment of "destinations")
	Traffic Volumes at Arterial Intersections per Corridor Mile (Within ½ Mile)	GIS analysis (available sources)	GIS analysis (available sources)

Category	Measures	Initial Screening Methodology	Evaluation Methodology
 Multimodal Connectivity	Number of Connections to Existing or Future Metrolink Stations, Transit Centers, Major Routes, and Park-and-Rides	GIS analysis (available sources)	GIS analysis (available sources)
	Intersection Density per Square Mile	GIS analysis (available sources)	GIS analysis (available sources)
	Pedestrian Network Serving Transit	WalkScore within ½ mile of corridor	WalkScore within ½ mile of corridor
	Number of Connections to Existing or Planned High-Quality Bicycle Facilities (Off-Street or Protected On-Street)	--	Based on review of existing routes/plans
 Capacity	Person Throughput	--	Analysis based on vehicle capacity, conceptual service plan, and roadway capacity
	Traffic Impact	--	Change in volume/capacity ratio along TOC Line
 Safety	Potential for Reduction in Collision Rates and Collision Severity	--	Based on ridership and existing rates of severe collisions
 Passenger Comfort/Amenities	Passenger Comfort	--	Qualitative assessment based on vehicle capacity, movement (e.g. lateral sway)
	System Legibility	--	Qualitative assessment based on visibility, alignment

Category	Measures	Initial Screening Methodology	Evaluation Methodology
Equity	Density of Households with Annual Incomes < $40,000	GIS analysis (Census data)	GIS analysis (Census data)
	Density of Seniors and People with Disabilities	GIS analysis (Census data)	GIS analysis (Census data)
	CalEnviroScreen Scores	Analysis based on EnviroScreen ratings for disadvantaged communities	Analysis based on EnviroScreen ratings for disadvantaged communities
Economic Development	Support for Retail Activity	Density of retail jobs within ½ mile of corridor	Qualitative assessment based on project design (e.g., turn restrictions, additional sidewalk space, parking impacts)
Transit-Supportive Policy	Support for Transit-Oriented Development	Qualitative assessment based on inclusion of corridor in regional and local transit-oriented plans and adoption of supportive zoning	Qualitative assessment based on inclusion of corridor in regional and local transit-oriented plans and adoption of supportive zoning

Category	Measures	Initial Screening Methodology	Evaluation Methodology
 Cost-Effectiveness/ Productivity	Capital Cost per Boarding	--	Analysis based on high-level capital cost estimates (based on peer review, service plan and high-level travel time estimates) and ridership from OCTAM model
	Operating Cost per Boarding	--	From OCTAM model
	Boardings per Revenue Hour	--	Ridership from OCTAM model / revenue hours derived from operating cost estimates
	Boardings per Revenue Mile	--	Ridership from OCTAM model / revenue miles derived from operating cost estimates

TOC IDENTIFICATION

The ten TOCs were selected after screening more than 30 corridors (divided into 96 segments) and 32 locations for freeway BRT stations (freeway stations rather than corridors were evaluated because Freeway BRT would feature very wide spacing between stops, rendering analysis of areas between station areas irrelevant).

The 96 segments and 32 additional station locations were identified based on the following factors:

- Public input, including stakeholder interviews and the "Build Your Own Transit System" interactive survey (see Chapter 3)
- Corridors identified in previous studies, from the CenterLine light rail proposals of the 1990s to the current Central Harbor Boulevard Transit Corridor Study
- Demographic, land use, and existing transit service analysis conducted as part of the OC Transit Vision and summarized in the State of OC Transit report
- The Transit Investment Framework, which includes guidance for identifying potential high-capacity transit corridors (see Chapter 4)
- Discussions with OCTA staff, the OCTA Board, and the OCTA Citizens Advisory Committee
- Additional OCTA analysis of high-ridership segments of existing bus routes

The segments and Freeway BRT station locations are shown in Figure 5-4.

Figure 5-4 Screening Segments and Stations

Figure 5-5 and Figure 5-6 show results of the initial screening. In general, segments and station locations in the more densely populated and lower-income north-central part of Orange County performed best. This is generally consistent with existing patterns of OC Bus ridership.

Figure 5-5 Segment Screening Results

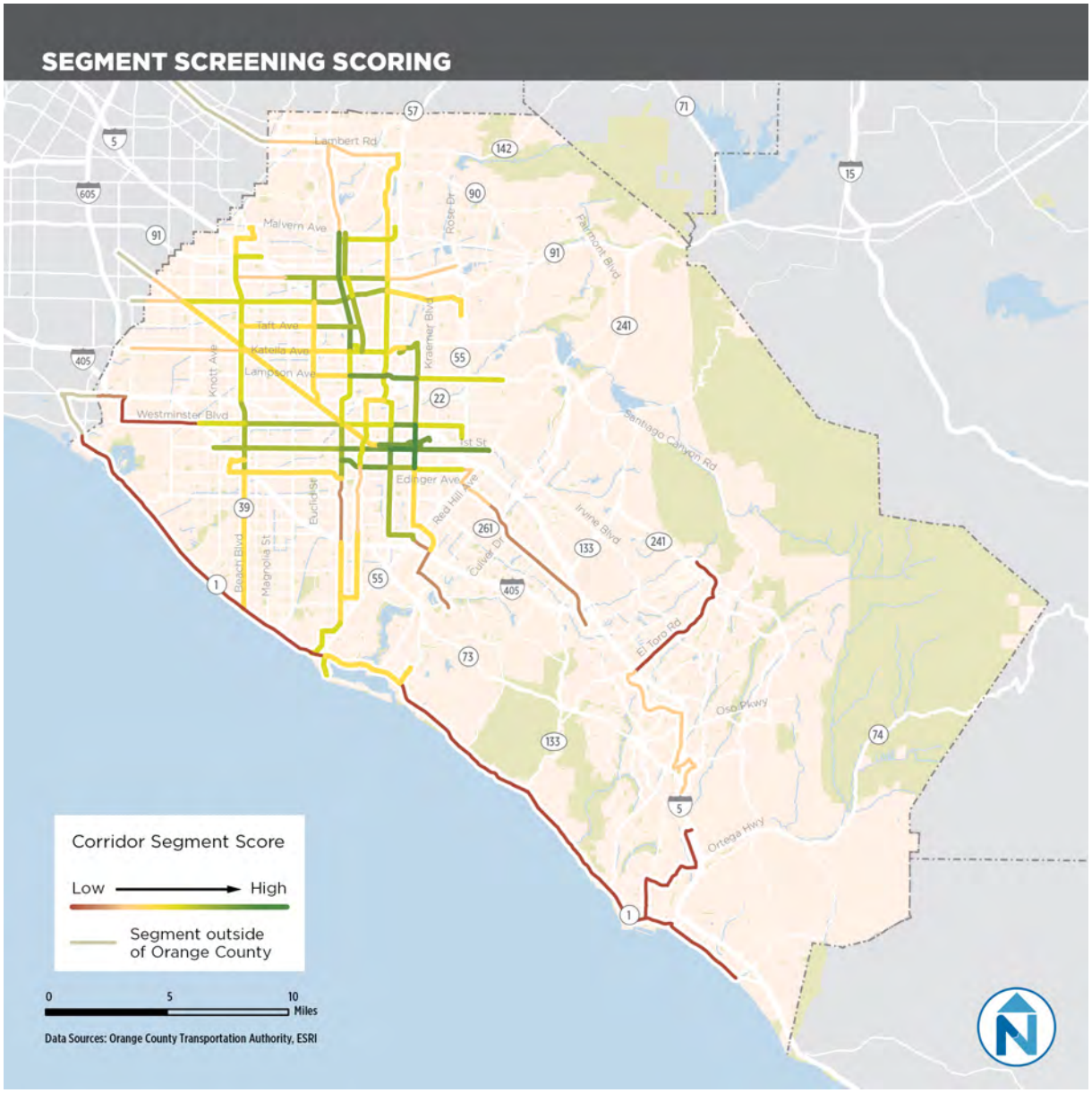


Figure 5-6 Station Screening Results

TOC EVALUATION

The ten TOCs developed following the initial screening were converted into hypothetical transit modes and lines to facilitate detailed evaluation of each corridor.

Modes

Transit modes are described in detail in the State of OC Transit report. The following four modes appear most feasible for Orange County and were used for TOC evaluation:

Rapid Streetcar. The OC Streetcar will serve a corridor a little over four miles long. It will feature closely spaced stops in its on-street segment in central Santa Ana, and more widely spaced stops in the off-street Pacific Electric right-of-way connecting to Garden Grove. For purposes of evaluation, it was assumed that future streetcar segments in longer corridors would have widely spaced stops—generally a mile or so apart—even if on-street. Such spacing corresponds to the distance between major arterials in the northern part of the county.

Arterial BRT. Arterial BRT and rapid bus were distinguished by one important factor: BRT would run in transit-only lanes.

Rapid Bus. This service would be similar to existing Bravo! service, operating in mixed traffic but distinguished from regular bus service by transit-priority features designed to make buses faster and more reliable.

Freeway BRT. Buses would operate in high-occupancy vehicle (HOV) or managed lanes on freeways. They could stop either at existing transit hubs near freeways (assumed for this analysis), or at new stations in the freeway right-of-way.

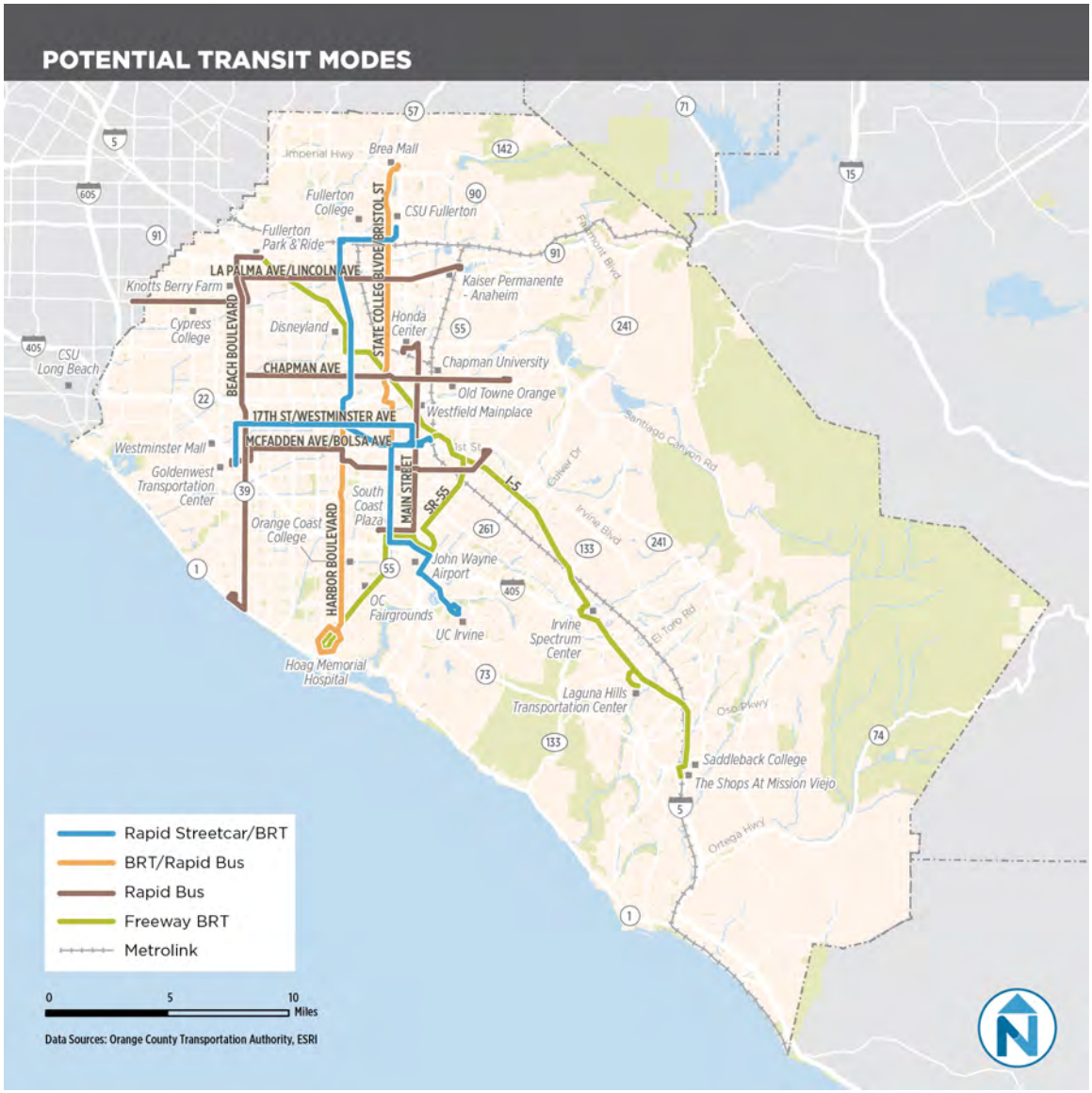
Transit Opportunity Corridor Lines

The ten TOCs were converted into 11 transit lines based on factors such as opportunities to connect future streetcar segments to the OC Streetcar line, available rights-of-way, and assessments of demand (with higher-demand corridors warranting greater investments). Each line was assigned one or two modes (evaluation was based on the most intense modes, for example rapid streetcar rather than BRT).

The following is a list of the 11 TOC lines created for analysis; they are illustrated in Figure 5-7:

- **Rapid streetcar or BRT between Cal State Fullerton and the Santa Ana Regional Transportation Center,** primarily via North Harbor (and including the OC Streetcar alignment)
- **Rapid streetcar or BRT between the Goldenwest Transportation Center and the University of California, Irvine,** via 17th/Westminster and Bristol (including short segments of Main and the OC Streetcar alignment and serving South Coast Plaza, the Irvine Business Complex, and John Wayne Airport)
- **BRT or rapid bus on South Harbor** between 17th/Westminster and Hoag Hospital Newport Beach
- **BRT or rapid bus on Bristol and State College** between the Brea Mall and Downtown Santa Ana
- **Rapid bus on Beach** between the Fullerton Park-and-Ride and Downtown Huntington Beach
- **Rapid bus on Main** between ARTIC and the South Coast Plaza Park and Ride
- **Rapid bus on La Palma and Lincoln** between Hawaiian Gardens and Anaheim Canyon Station
- **Rapid bus on Chapman** from Hewes to Beach
- **Rapid bus on McFadden and Bolsa** from Goldenwest Transportation Center to Larwin Square
- **Freeway BRT on I-5** from the Fullerton Park and Ride to Laguna Niguel/Mission Viejo Station
- **Freeway BRT on SR-55** from the Santa Ana Regional Transportation Center to Hoag Hospital Newport Beach

Figure 5-7 TOC Lines and Modes for Analysis



Evaluation

Summary findings of the TOC line evaluation are below, and complete evaluation results can be found in Appendix D:

- **Lines modeled with a rapid streetcar substantially out-performed other lines.** While the OCTAM model projected ridership for rapid streetcar projects that was several times higher than for bus-based projects, the rapid streetcar projects were projected to have relatively high capital costs. In return for this expense, however, they would perform well across a broad range of categories. (Note that rapid streetcar ridership could vary significantly depending on factors such as if projects would have transit-only lanes.)
- **Performance among bus-based projects varied:** La Palma/Lincoln was projected to have the highest ridership, but Main, McFadden/Bolsa, State College, and Beach scored the highest.
- **The Freeway BRT projects performed moderately well**, in part due to their speed advantage over other modes and the proximity of major travel demand generators to I-5 and SR-55 interchanges. Capital costs would vary substantially depending on Orange County's ultimate definition of Freeway BRT, but a cost of approximately $11.5 million per mile was assumed based on a peer review.

Conclusions

Based on the evaluation, the following next steps for TOCs were identified:

- Based on their superior performance in a broad range of categories, OCTA should conduct corridor studies for the North Harbor/Santa Ana and Westminster/Bristol corridors.
- Implementation of rapid streetcar or BRT in these corridors would greatly expand the fixed-guideway network, suggesting the need for a phased implementation strategy. The North Harbor/Santa Ana line somewhat outperformed the Westminster/Bristol line in the evaluation, and OCTA is already studying the Central Harbor segment of this line. As part of all future streetcar or BRT project development processes, a project alternative based on exclusive right-of-way for streetcar or BRT operations should be considered.
- In the near term, OCTA should proceed with introduction of Bravo! service in the Route 29/Beach corridor, and over the medium term it should add Bravo! service to the Main corridor and other TOCs. OCTA should also seek to upgrade both these and existing Bravo! routes to improve speed and passenger amenities. Initial steps could include introduction of off-board fare payment, all-door boarding, and transit signal priority. In the long term, OCTA should consider queue jumps, improved shelters, and priority transit lanes on the highest ridership corridors. (See Chapter 6 for additional details.)
- Freeway BRT is a new mode for OCTA, and one that has varied widely in its implementation elsewhere. Rather than advance individual projects, OCTA should proceed with a network study of potential Freeway BRT corridors including I-5, SR-55, and others such as I-405. This study would seek to identify the most promising corridors and begin to shape Freeway BRT's infrastructure and operational characteristics.

6 FIXED-ROUTE RECOMMENDATIONS

Chapter 5 identified potential corridors for future rapid transit investment. This chapter discusses additional recommendations related to OCTA's existing fixed-route services:

- ***Service Investments.*** Continue to upgrade OC Bus routes to meet the headway and span standards in the Board-adopted Service Investment Guidelines described in Chapter 4.
- ***Bravo! Upgrade Strategy.*** In addition to introducing Bravo! rapid bus service in additional corridors (as recommended in Chapter 5), incrementally upgrade existing and new Bravo! routes to improve operating speed and passenger amenity.
- ***Seasonal and Special Event Services.*** Building on the success of existing services such as the Laguna Beach Summer Breeze, the OC Fair Express, and the Angels Express, seek other opportunities to provide service where traffic and parking issues make transit an attractive alternative.
- ***LOSSAN/Metrolink Corridor Improvements.*** Support improvements to Orange County rail service planned by Metrolink and other partner agencies. Proceed with existing plans to improve station access and to reduce the number of at-grade road crossings.

SERVICE INVESTMENTS

OCTA's new Service Allocation Guidelines, developed as part of the OC Transit Vision and presented to the OCTA Board, are described in Chapter 4. The guidelines establish minimum service levels for different categories of service (route in each category are shown in Figure 6-1), based on both span (hours of operation) and headway (frequencies) as shown in Figure 6-2. They are intended to reflect reasonable customer expectations while remaining practical from an agency perspective.

As Figure 6-2 indicates, all Major routes—OCTA's services in its busiest corridors—should operate at least every 15 minutes during peak periods, and until midnight seven days a week. This will ensure that most OCTA passengers can take transit trips at the busiest times without having to consult or plan around schedules, and have service available 18+ hours a day. The expanded hours of service will make OCTA's core services a viable option for all types of trips, serving people well beyond the 9-to-5 commuter market.

The guidelines also call for Local routes to operate every 30 minutes throughout the day. This ensures most OCTA services are at least reasonably convenient and potentially attractive to large numbers of passengers, rather than functioning only as basic lifeline services for those with no other travel options.

By standardizing the service offered on different categories of transit routes, these recommendations will also improve customer understanding of OCTA bus service. For example, passengers will be able to assume that any OCTA route on a busy street will arrive at least every 30 minutes all day. That level of certainty will encourage use of OCTA bus service for both planned and unplanned trips. OCTA has begun to increase service on some lines to meet the new

standards, and additional improvements are anticipated in 2018. OCTA will need to also make sure that added service meets minimum productivity and cost recovery standards.

Figure 6-1 Routes by Category

Category	Routes	
Major	▪ 26 Buena Park-Yorba Linda ▪ 29/A La Habra-Huntington Beach ▪ 37 La Habra-Fountain Valley ▪ 38 Lakewood-Anaheim Hills ▪ 42/A Orange-Seal Beach ▪ 43 Fullerton-Costa Mesa ▪ 47/A Fullerton-Balboa ▪ 50 Long Beach-Orange ▪ 53/53X Anaheim-Irvine ▪ 54 Garden Grove-Orange	▪ 55 Santa Ana-Newport Beach ▪ 57/57X Brea-Newport Beach ▪ 60 Long Beach-Tustin ▪ 64/64X Huntington Beach-Tustin ▪ 66 Huntington Beach-Irvine ▪ 70 Sunset Beach-Tustin ▪ 83 Anaheim-Laguna Hills ▪ 543 Fullerton Transportation Center-Costa Mesa ▪ 560 Santa Ana-Long Beach
Local	▪ 1 Long Beach-San Clemente ▪ 21 Buena Park-Huntington Beach ▪ 24 Buena Park-Orange ▪ 25 Fullerton-Huntington Beach ▪ 30 Cerritos-Anaheim ▪ 33 Fullerton-Huntington Beach ▪ 35 Fullerton-Costa Mesa ▪ 46 Los Alamitos-Orange ▪ 56 Garden Grove-Orange ▪ 59 Anaheim-Irvine ▪ 71 Yorba Linda-Newport Beach ▪ 72 Sunset Beach-Tustin	▪ 76 Huntington Beach-John Wayne Airport ▪ 79 Tustin-Newport Beach ▪ 82 Foothill Ranch-Rancho Santa Margarita ▪ 85 Mission Viejo-Laguna Niguel ▪ 86 Costa Mesa-Mission Viejo ▪ 87 Rancho Santa Margarita-Laguna Niguel ▪ 89 Mission Viejo-Laguna Beach ▪ 90 Tustin-Dana Point ▪ 91 Laguna Hills-San Clemente
Community	▪ 129 La Habra-Anaheim ▪ 143 La Habra-Brea ▪ 150/A Santa Ana-Costa Mesa ▪ 153 Brea-Anaheim	▪ 167 Orange-Irvine ▪ 177 Foothill Ranch-Laguna Hills ▪ 178 Huntington Beach-Irvine
Stationlink	▪ 453 Orange Transportation Center-St. Joseph's Hospital ▪ 454 Orange Transportation Center-Garden Grove ▪ 462 Santa Ana Regional Transportation Intermodal Center-Civic Center	▪ 463 Santa Ana Regional Transportation Intermodal Center-Hutton Centre ▪ 472 Tustin Metrolink Station-Irvine Business Complex ▪ 473 Tustin Metrolink Station-UCI ▪ 480 Irvine Metrolink Station-Lake Forest

Category	Routes	
Express	▪ 206 Santa Ana-Lake Forest Express ▪ 211 Huntington Beach-Irvine Express ▪ 212 Irvine-San Juan Capistrano Express ▪ 213/A Brea-Irvine Express ▪ 216 San Juan Capistrano-Costa Mesa Express	▪ 701 Huntington Beach-Los Angeles Express ▪ 721 Fullerton-Los Angeles Express ▪ 794/A Riverside/Corona-South Coast Metro Express

Figure 6-2 Service Allocation Guidelines: Level of Service

Service Category	Peak Frequency Buses per hour	Base Frequency Buses per hour	Weekday Span	Weekend Span
MAJOR	4+	2+	5 AM to 12 AM	6 AM TO 12 AM
LOCAL	2+	2+	5:30 AM to 8:30 PM	7 AM to 7 PM
COMMUNITY	1+	1+	5:30 AM to 8:30 PM	7 AM to 7 PM
OTHER Explore alternatives to OCTA fixed-route bus service	N/A	N/A	N/A	N/A
NO TRANSIT Publicly-funded service should likely not be provided	N/A	N/A	N/A	N/A

BRAVO! UPGRADE STRATEGY

Bravo! Route 543 on Harbor Boulevard

Bravo! is OCTA's brand for "rapid bus" service[1], a variant of BRT. Compared to conventional local bus service, both rapid bus and BRT feature enhancements to help improve bus speed and reliability. However, rapid bus service features a shorter list of enhancements than BRT (see Figure 6-2).

Figure 6-3 Attributes of Regular Bus, Rapid Bus, and BRT

[1] Los Angeles County Metro refers to its version of such service as "Metro Rapid."

Both rapid bus and BRT are comprised of packages of operational and capital improvements that can include dozens of possible features. Bravo! service includes four elements common to most rapid bus systems:

- Wide stop spacing, with stops only at busier locations such as transfer points at major cross streets
- Relatively frequent service during periods of higher demand
- Custom branding of vehicles, signs, and other marketing and informational elements such as maps

Bravo! Route 543 was introduced in the Harbor Boulevard corridor in 2013, and Route 560 followed in the 17th Street/Westminster corridor in 2016. Both have proven successful, attracting riders with faster, more reliable service. OCTA is planning to expand Bravo! service to the Beach Boulevard corridor, and Chapter 5 recommends implementing Bravo! service on other busy corridors, including Main Street.

In addition to introducing new Bravo! service, OCTA should improve its existing Bravo! service, converting it over time from rapid bus to more robust BRT service. Because both rapid bus and BRT consist of packages of improvements, upgrades can be made incrementally, as funding allows.

The Institute for Transportation and Development Policy has developed a BRT rating system[2] that assigns Gold, Silver, Bronze, and Basic rankings to BRT systems based on a scorecard of features. OCTA should aim to provide Bronze-level or better service in all Bravo! corridors, which would be equivalent to the existing sbX service operated by Omnitrans in San Bernardino (shown below; note the light-rail caliber station and bus-only lanes in the center of the street).

San Bernardino sbX BRT

Source: Omnitrans

OCTA should begin implementing phased upgrades to Bravo! service as described below.

[2] https://www.itdp.org/the-brt-standard/

Near-Term (0-3 years):

- Expanded evening and weekend service
- Transit signal priority (TSP) at select traffic signals, resulting in fewer red lights for buses
- Curb extensions at select stops
- Additional shelters, seating, and other amenities at stops (e.g., real-time arrival information displays, maps, bicycle racks)
- All-door boarding pilot program in which passengers with prepaid fares (passes) may enter through rear doors
- Expanded all-door boarding program, including ticket vending machines at busy stops

Medium-Term: (3-10 years):

- More frequent service
- Additional TSP corridors
- Queue-jump bypass lanes at select intersections (using existing right-turn lanes from which buses proceed ahead of other traffic with a dedicated signal phase)
- Business Access and Transit (BAT) lanes in select segments
- Raised platforms at busier stops, allowing for near-level boarding
- Additional accommodations for bicycles on vehicles or at stops
- Transition to lower- or zero-emission vehicles
- Use of larger (60-foot) vehicles

Long-Term (10-20 years):

- Further expansion of service
- Additional queue jumps
- Additional BAT lanes
- Median or center-running transit lanes and stations in select segments
- Expanded stop-based improvements where feasible

In the near term, OCTA can work with local jurisdictions to pilot some of these improvements. Additionally, bus stops in the existing and future Bravo! corridors may qualify for Measure M Project W funding to improve passenger amenities such as customer information, bus shelters, and seating.

SEASONAL AND SPECIAL EVENT SERVICES

Orange County boasts many recreational destinations. While some—such as theme parks—are open year-round, others operate for only part of the year or are much busier during the summer.

Public engagement for the OC Transit Vision (see Chapter 3) found widespread support for specialized services to part-time destinations. This support is also reflected in strong ridership on existing routes of this type, including the Laguna Beach Summer Breeze (Route 869) (Figure 6-4), and special-event services such as the OC Fair Express and Angels Express. Many such services are partly funded by partner agencies, for example by the City of Laguna Beach and by grants from the South Coast Air Quality Management District.

Additionally, seasonal and special-events services help introduce new riders to OCTA, who may then become regular riders.

OCTA should explore opportunities to expand its existing seasonal and special-event services. It should also pilot new services through Project V (its program of competitive matching grants for city-provided transit services). A Measure M2 Project V Call-for-Projects in 2018 should focus on additional opportunities for seasonal and special event services that reduce local traffic congestion.

Figure 6-4 Route 869: Laguna Beach Summer Breeze

LOSSAN/METROLINK CORRIDOR IMPROVEMENTS

Amtrak Pacific Surfliner at San Clemente Pier

The LOSSAN (Los Angeles-San Diego-San Luis Obispo) corridor is the existing rail spine for Orange County. A commuter/intercity rail line, it connects Orange County to downtown Los Angeles. Within Orange County, it runs from Buena Park in the north to San Clemente in the south via major destinations including downtown Fullerton, Anaheim's Platinum Triangle, downtown Santa Ana, Irvine, and Laguna Niguel. It is served by multiple operators and several lines, including Amtrak's Pacific Surfliner from San Luis Obispo to San Diego as well as the Metrolink Orange County, 91/Perris Valley, and Inland Empire-Orange County lines.

Figure 6-5 LOSSAN Corridor

Source: LOSSAN Rail Corridor Agency

Additionally, the Metrolink 91/Perris Valley and Inland Empire-Orange County lines operate on tracks east of the LOSSAN corridor, connecting to Riverside County. Figure 6-6 shows the rail network in Orange County, along with station locations and ridership at those stations (note that a new station is currently under construction in Placentia).

Figure 6-6 Orange County Rail Transit

A number of entities are planning improvements to the LOSSAN corridor and the remaining Metrolink corridors in Orange County:

- OCTA, through its grade separations program;
- The LOSSAN Rail Corridor Agency (staffed by OCTA), through its *LOSSAN Corridorwide Strategic Implementation Plan;*
- The Southern California Regional Rail Authority, operator of Metrolink, through its *Integrated Service and Capital Plan (with Discussion on Electrification);*

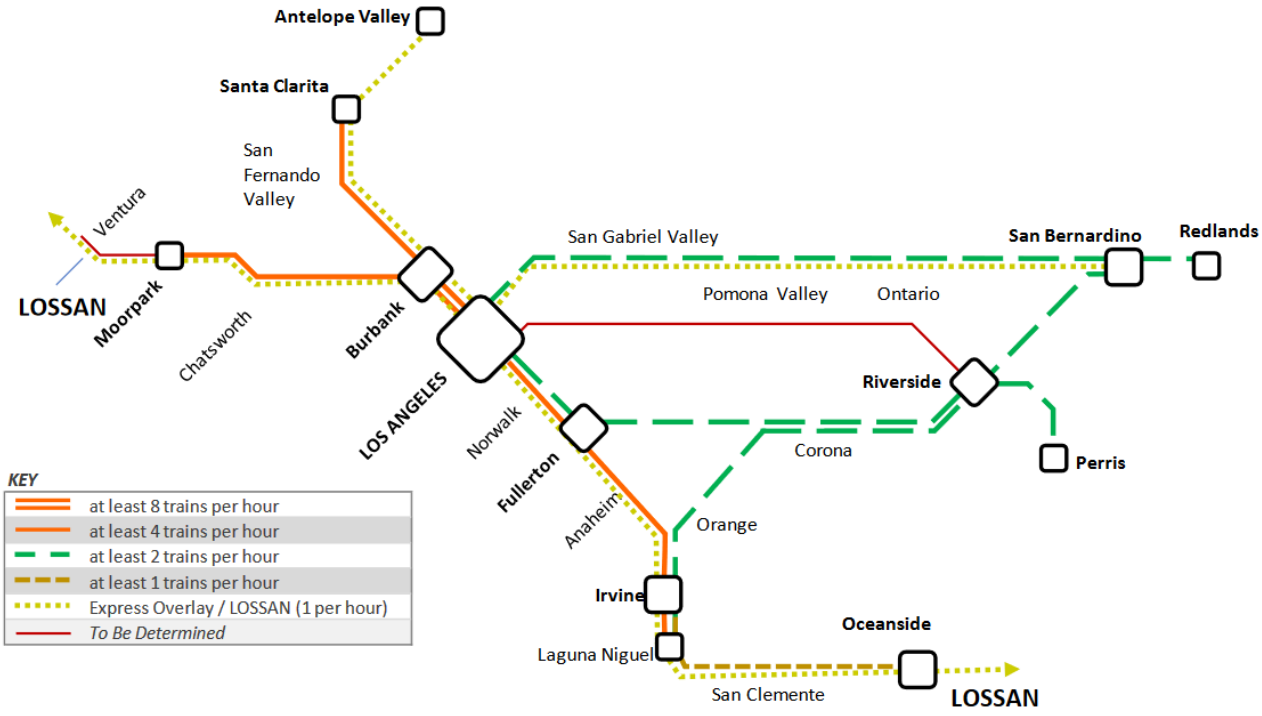
- The California Department of Transportation (Caltrans), through its *California State Rail Plan;* and
- The California High Speed Rail Authority, through its *2016 Business Plan* and other documents related to the Los Angeles to Anaheim Project Section.

Additionally, OCTA has studied multimodal access improvements to Metrolink stations in its *Nonmotorized Metrolink Accessibility Strategy*.

Highlights of these efforts include the following:

- OCTA is partnering with the cities of Santa Ana and Anaheim to grade-separate one rail crossing in each city (at 17th Street and at Ball Road).
- The *LOSSAN Corridorwide Strategic Implementation Plan* calls for Orange County service to nearly double by 2030 to 124 daily trains (88 commuter and 36 Surfliner). Some commuter trains would extend from Los Angeles to San Diego. Trains that now terminate at Union Station near downtown Los Angeles would continue north to Santa Clarita and Antelope Valley.
- The Metrolink *Integrated Service and Capital Plan (with Discussion on Electrification)*, released in November 2017, calls for a series of improvements to be completed by 2028, when Southern California will host the Summer Olympic Games (see Figure 6-6). Foremost among these would be electrification of segments including the LOSSAN corridor north of Irvine, allowing service in that segment to increase to every 15 minutes during peak periods. Trains would operate every 30 minutes peak and hourly off-peak on the 91/Perris Valley and Inland Empire-Orange County lines. Changes would also be made in the interim, starting with improved schedule coordination in 2018 to support better connections between trains and buses.

Figure 6-7 Metrolink Planned Service Expansion



Source: Metrolink

- The *California State Rail Plan* calls for changes to intercity rail lines throughout the state by 2040. These include faster service (up to 125 miles per hour on Orange County lines), more frequent service (starting with 30-minute local and hourly express service between Los Angeles and San Diego, with stops in Santa Ana and Laguna Niguel/Mission Viejo, by 2022), electrification (as far south as Laguna Niguel/Mission Viejo), and greater multimodal integration.
- The California High Speed Rail Authority plans to extend high-speed rail service from San Francisco to the Anaheim Regional Transportation Intermodal Center (ARTIC) by 2029, with a possible station in Fullerton. A blended approach calls for high-speed trains to share the LOSSAN corridor with Amtrak and Metrolink. Toward that end, interim improvements include grade-separation of seven crossings in Orange County, benefiting all three operators. Consistent with the Metrolink and state plans, the LOSSAN corridor would be electrified north of Anaheim.
- The OCTA *Nonmotorized Metrolink Accessibility Strategy* recommended a range of pedestrian and bicycle access improvements within Metrolink station areas. It also recommended countywide/systemwide access enhancements including a consolidated bike locker program.

Currently, all of the above plans remain largely unfunded. As the local managing agency for the LOSSAN Rail Corridor Agency (and owner of more than 40 miles of the Orange County railroad), OCTA has an important role to play in advocating for funding. The agency can also move forward to partner with cities on projects including access improvements and grade separations.

7 RECOMMENDATIONS FOR OTHER SERVICES AND ADDITIONAL STUDIES

In addition to recommendations for fixed-route transit, the OC Transit Vision includes recommendations for other types of service and for other areas of OCTA activity. These include the following:

- ***OC Flex.*** OCTA will soon introduce on-demand "microtransit" service in limited areas as part of a pilot program. Assuming the pilot is successful, this service could be expanded to locations throughout the county.
- ***OC Vanpool Expansion.*** OCTA's existing program to incentivize employee vanpools could expand in a number of ways, including in conjunction with continued expansion of the county's high-occupancy vehicle lane network.
- ***Paratransit Enhancements.*** Costs for ACCESS paratransit services have been rising and will likely continue to rise. To keep the program sustainable, OCTA will need to further existing efforts to manage demand.
- ***Additional Studies.*** Chapter 5 identified a need for new and ongoing corridor-level project development efforts in two corridors, as well as a countywide study of freeway-based bus rapid transit (BRT). Additionally, OCTA should continue its engagement efforts with partners including local cities and developers as well as with Los Angeles County Metro.

OC FLEX

OC Flex is a microtransit pilot program that will start in mid-2018, and last at least one year. Like other microtransit services, including those currently in development in Los Angeles County, OC Flex service will be on-demand, meaning customers will use a smartphone app or call to reserve a vehicle that should arrive within 15 minutes. It will also be a shared-ride service, meaning that vehicles may stop along the way to serve other passengers (see Figure 7-1).

In a broad sense, OC Flex will resemble on-demand, shared-ride services offered by transportation network companies (TNCs) such as Uber and Lyft. However, OC Flex will be available to those without smartphones, cash payments will be accepted, vehicles will be fully wheelchair-accessible, and drivers will be trained by OCTA. Fares will also be lower than those charged by TNCs, and as a shared-ride service, OC Flex should generate fewer vehicle miles traveled. Service will be available seven days a week, until mid-evening.

Figure 7-1 OC Flex Vehicle

OC Flex is OCTA's attempt to use emerging technology to offer a new type of service that has the potential to both better serve some existing customers as well as attract new customers. It might also serve as a replacement for fixed-route service in areas where regular bus service has proven costly and ineffective. At the same time, microtransit can extend the reach of the fixed-route system by providing connections to areas not served by regular transit. Successful micro-transit services could serve as the foundation for new fixed-route bus service.

OC Flex will operate within two service zones approximately six square miles in size (compact enough so they can be served with one or two vehicles at most times). Trips must begin and end within the service zones.

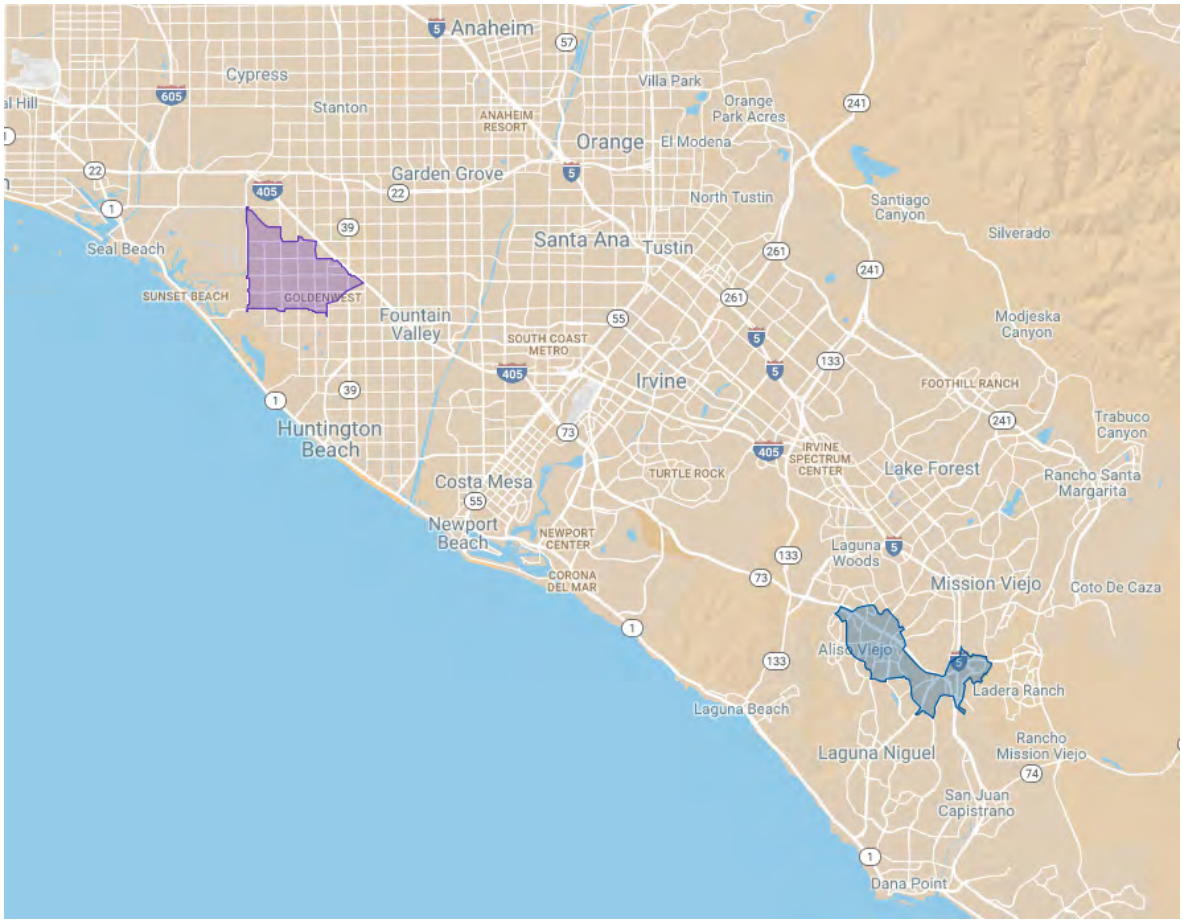
To develop the pilot program, OCTA first conducted market surveys of potential customers to establish demand. Staff then evaluated seven possible zones located throughout Orange County in a variety of land use and demographic contexts. In general, these were areas where fixed-route service has proven relatively unproductive, and has either been reduced or eliminated, or may be reduced or eliminated in the near future. They were also areas featuring major destinations such as Metrolink stations and other transit hubs where on-demand customers could potentially connect to the fixed-route transit network.

OCTA evaluated potential zones based on criteria identified through the OC Transit Vision propensity analysis (see the *State of OC Transit Report*). Factors included population; employment

and enrollment; low-income population density; traffic volumes (an indicator of travel demand); intersection density (an indicator of walkability); transit connections; and major trip generators. The analysis also accounted for existing fixed-route and ACCESS paratransit ridership.

Based on this evaluation, OCTA selected two zones for the pilot program: Bolsa Dorado, in northern Huntington Beach near Westminster Mall and the Goldenwest Transportation Center; and Aliso Niguel in Aliso Viejo and Laguna Niguel, near Aliso Viejo Town Center and the Laguna Niguel/Mission Viejo Metrolink station (see Figure 7-2). Notably, the former is in the older, northern part of the county, where the built environment is more transit-oriented, while the latter is a newer area in more autocentric South County.

Figure 7-2 OC Flex Pilot Program Zones



At the conclusion of the pilot program, OCTA will evaluate its success based on a variety of factors. The agency's goal is to serve at least six passengers per revenue hour at a subsidy of less than $9 per passenger. The pilot program also aims to serve multiple passengers on at least 25 percent of trips, connect to transit hubs on at least 25 percent of trips, and satisfy 85 percent of customers.

If OCTA eventually formalizes the program, it must then determine whether to continue service in both existing zones. The pilot may offer valuable lessons about the context in which microtransit can succeed. OCTA may also make adjustments in other program areas, such as fares and fleet size. If the agency expands the program, the logical step would be to add some or all of the five additional zones initially evaluated. OC Flex might also be used to provide paratransit service (see Paratransit Enhancements section below).

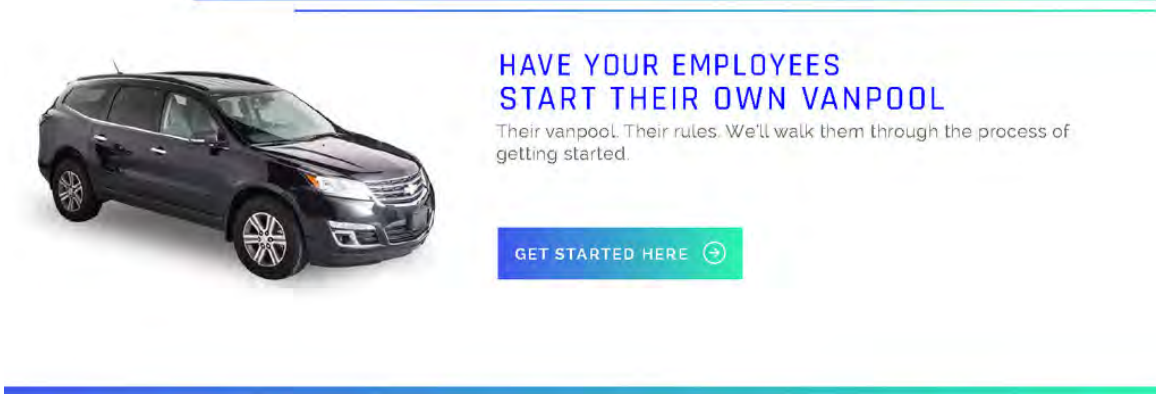
OC VANPOOL EXPANSION

OCTA's commuter vanpool program is already quite popular: there are approximately 530 vanpools in the county. Since vanpool vehicles have 7 to 15 seats and must be at least 50 percent occupied, this means that daily combined ridership on vanpools totals several thousand—more than many OC Bus routes. Additionally, vanpools require a lower subsidy than express bus service. Vanpooling is an essential component of the transportation system in Orange County, even more so because it reduces traffic congestion during peak periods.

There are three ways that OCTA could leverage and expand on this success:

- ***Increase the financial incentives offered to participants.*** Currently, OCTA offers up to $400 per month toward vehicle leases, which could be increased. However, this existing subsidy already results in substantial savings for vanpool program participants—OCTA estimates that vanpooling can save participants up to $650 per month in reduced fuel, repairs, and other costs.
- ***Expand outreach efforts to employers.*** Under new policies described in Chapter 8, California employers will be increasingly required to reduce solo driving by their employees and may be good partners in encouraging OC Vanpool use (see Figure 7-3).
- ***Continue partnering with Caltrans to expand the high-occupancy vehicle (HOV) lane network on freeways.*** Caltrans is studying "managed" lanes in Orange County, which allow solo drivers to use the lanes for a fee, while remaining free to carpoolers and vanpoolers. Additionally, OCTA and Caltrans are proceeding with a project on Interstate 405 north of State Route 73 to the Los Angeles County line that will convert the existing HOV lanes to managed/express lanes and add a second express lane in each direction. HOV lane expansion, including managed or express lanes, would offer benefits for rideshare vehicles of all kinds, including vanpools.

Figure 7-3 OC Vanpool Employer-Focused Advertising



PARATRANSIT ENHANCEMENTS

Like other transit operators, OCTA provides paratransit services for customers with mobility limitations. OC ACCESS is the agency's legally-required, curb-to-curb, shared-ride van service available by reservation (or on a subscription basis) for eligible or certified customers. The agency also offers same-day taxi service, provides rides to and from Regional Center of Orange County programs for people with developmental disabilities, and subsidizes group trips provided by nonprofit senior day programs under cooperative agreements.

Both demand and costs for OCTA's paratransit services have escalated: between 2008 and 2015, paratransit's share of OCTA's transit budget increased from 10 percent to 19 percent. Additionally, while 72 percent of current OC ACCESS riders are under age 65, projected growth in the population of older Americans will boost paratransit demand in the future.

The City of San Juan Capistrano received a grant from OCTA to offer no-cost transportation to the community center for seniors residing in the city.

Source: City of San Juan Capistrano

Recognizing the rapid growth in paratransit costs, OCTA has begun taking steps to manage demand, including continued support of senior mobility programs; expanding cooperative agreements; and expanding the same-day taxi program. Going forward, the following additional steps are recommended:

- Develop and promote economical supplementary services to provide customers with disabilities added convenience or flexibility not available on ADA paratransit.
- In addition to the existing same-day taxi service and cooperative agreements with senior day programs, explore opportunities to provide paratransit using OC Flex (see previous section). Monitor developments in the ability and willingness of TNCs like Uber and Lyft to participate in programs for people with disabilities while meeting regulatory requirements.
- Track technology developments with the potential to increase the efficiency of ADA paratransit while maintaining or improving customer experience.

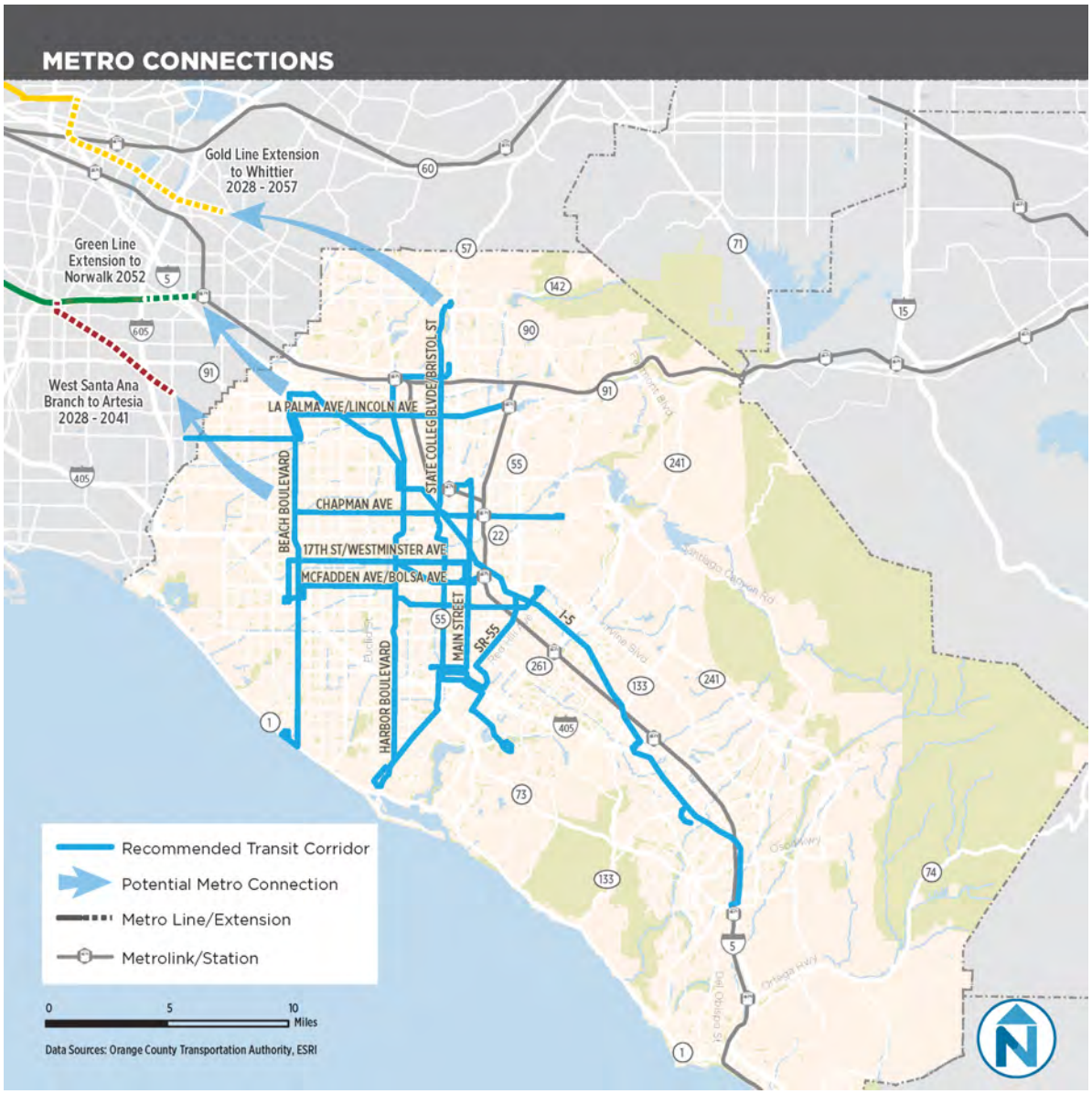
ADDITIONAL STUDIES

Chapter 5 recommended that OCTA undertake several near-term studies to advance promising Transit Opportunity Corridors (TOCs):

- ***Corridor-level investment studies for the North Harbor/Santa Ana and Westminster/Bristol corridors.*** Through its Central Harbor Boulevard Transit Corridor Study (now nearing completion), OCTA is exploring the potential for streetcar or bus rapid transit on Harbor north of Westminster. It should initiate a similar effort for the Westminster/Bristol corridor. As for the OC Streetcar, these studies serve as first steps in the Federal Transit Administration (FTA) project development process—which requires alternatives analysis, design and engineering, and environmental review—that can ultimately result in federal grants. While the OC Transit Vision explored rapid streetcar or bus rapid transit lines in these corridors, the actual project design and mode would be determined through the project development process, which would include extensive public engagement.
- ***A Freeway BRT system study.*** Two "Freeway BRT" corridors, I-5 and SR-55, were included among the TOCs. As envisioned, Freeway BRT service would be unlike today's freeway express routes: it would operate all day, in both directions, relatively frequently. However, there is much to be defined. Freeway BRT might have its own infrastructure, including transit-only ramps and stations in the freeway right-of-way, similar to the Los Angeles County Metro Silver Line on Interstates 10 and 110; or, it could use existing park-and-rides and street stops near freeway interchanges; or, there could be some combination of those approaches. A systemwide study of Freeway BRT would help answer these questions, provide more detailed analysis of potential costs and ridership, and confirm the corridors (if any) to be advanced for further study.

In addition to advancing the TOC-related studies, OCTA should continue to partner with other agencies on a variety of planning and project development efforts (see Chapter 8 as well). Specifically, OCTA should collaborate with regional partners, including Los Angeles County Metro, to advance intercounty connections (see Figure 7-4, and note that dates are based on current Metro timelines and are subject to change). Recently, Metro staff have reached out to OCTA staff and Board members to discuss future connections, including the possible extension of a planned Metro light rail line in the Pacific Electric right-of-way into Orange County. While this was not identified as one of the final TOCs in Chapter 5, a rapid transit line extending into Los Angeles County as far as Downtown Los Angeles would merit further study.

Figure 7-4 Potential TOC Connections to LA Metro Lines



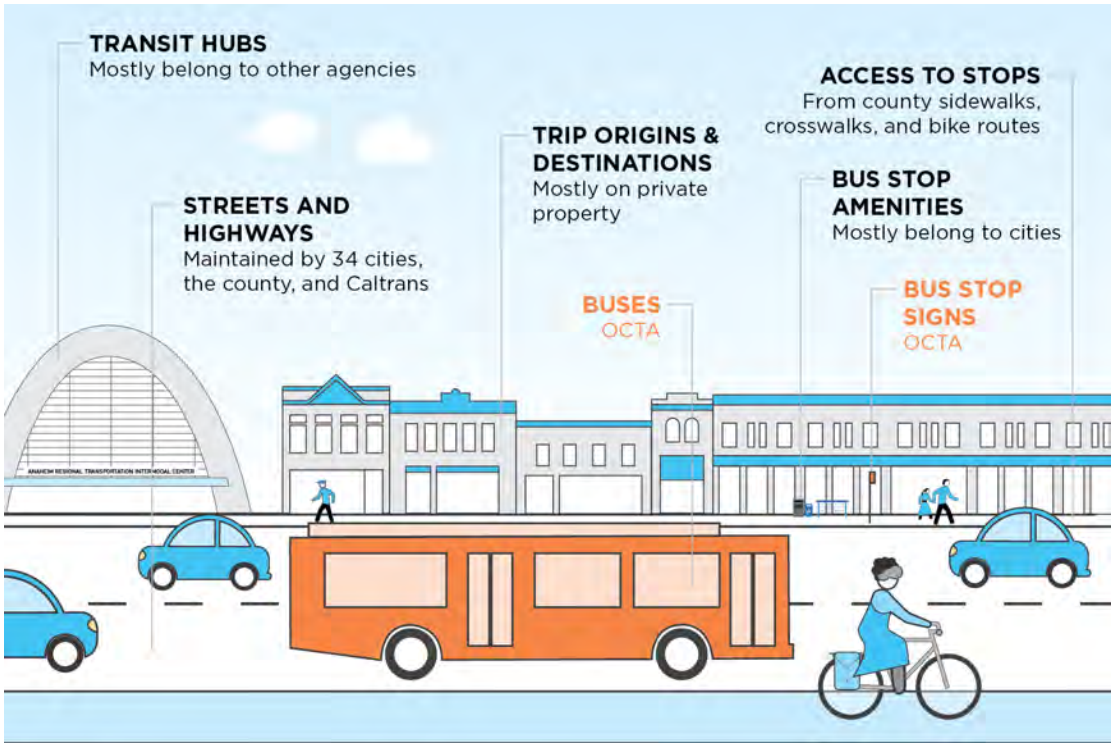
8 TRANSIT-SUPPORTIVE DESIGN AND POLICIES

This chapter briefly describes steps that OCTA's community partners—cities, developers, and others—can take to support effective transit. (The complete *Transit-Supportive Design and Policy Handbook* can be found in Appendix E.) These steps fall into two general areas: high-quality access to transit, and transit-supportive land use design and policy.

NEED FOR TRANSIT-SUPPORTIVE DESIGN AND POLICIES

OCTA's vehicles operate on streets and highways maintained by the county's 34 cities, the county itself, and the California Department of Transportation. OCTA bus stops are on city and county property, as are the sidewalks, crosswalks, and bike routes that provide access to them. Transit hubs are mostly the property of other public agencies. For OCTA to be successful in its mission of providing high-quality transit service, it must partner with other public and private entities (see Figure 8-1).

Figure 8-1 Control of Transit-Related Features in Orange County



Source: Nelson\Nygaard

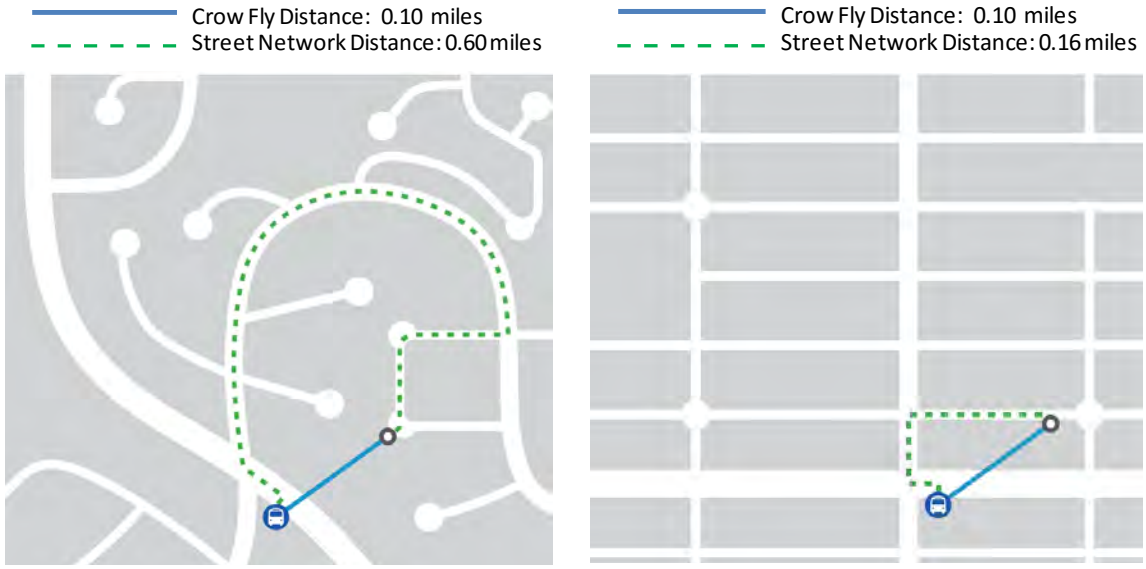
TRANSIT-SUPPORTIVE TRANSPORTATION SYSTEMS

This section discusses street networks, transit stop location and design, street design, and transit system integration.

Street Networks

Figure 8-2 shows the street networks in a typical post-World War II subdivision and a pre-World War II neighborhood. Walking distances are much shorter in the latter, and straight streets offer more direct routes for transit.

Figure 8-2 Street Networks and Travel Distance



Source: TransLink Transit Oriented Communities (2011)

Many older neighborhoods in Orange County (typically in the north/central part of the county) sit on traditional street grids, and it is in these neighborhoods that OC Bus ridership is highest. Serving subdivisions is more challenging, but they can be retrofitted with cut-through pedestrian paths.

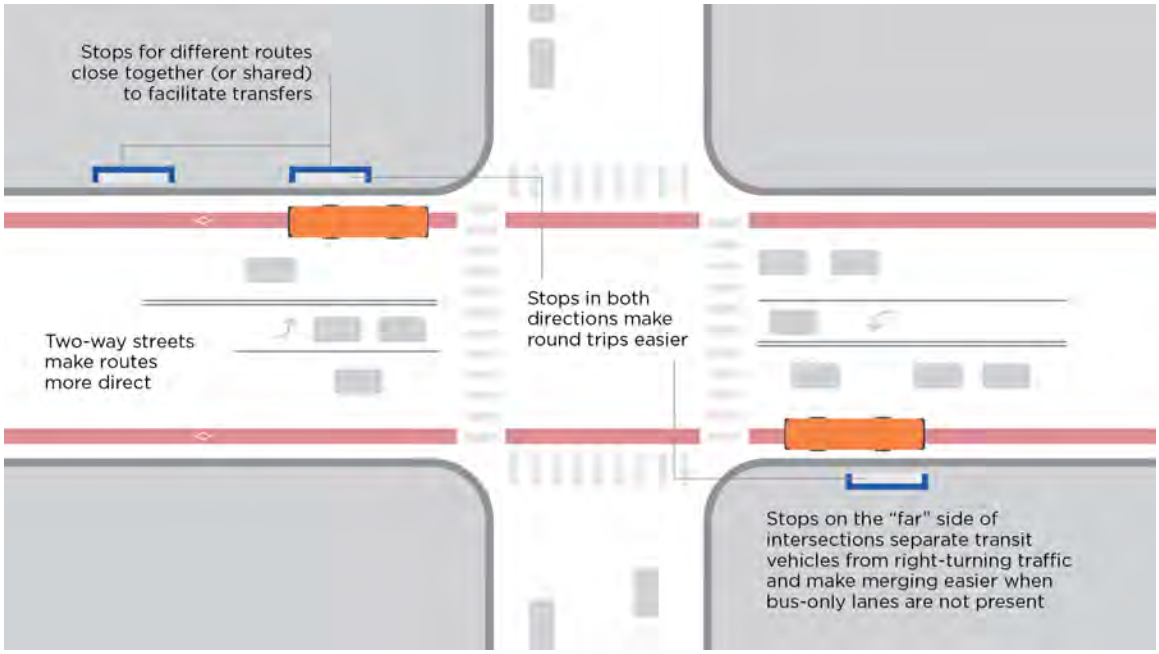
Transit Stop Location and Design

Figure 8-3 illustrates several principles for locating transit stops. Transit stops must be located at intersections a short walk from origins and destinations and accessible via direct paths. Stops should also be along wide, continuous sidewalks. Stops where routes converge should be close together to facilitate transfers.

To support round-trip travel, every stop should be accompanied by a stop in the other direction. Two-way streets support more direct routes and enable clear sightlines between pairs of stops.

Stops on the far side of intersections are usually preferable, as they separate transit vehicles from right-turning traffic, make it easier for them to merge back into traffic, and allow pedestrians to cross the street behind the transit vehicle.

Figure 8-3 Elements of Transit Stop Location

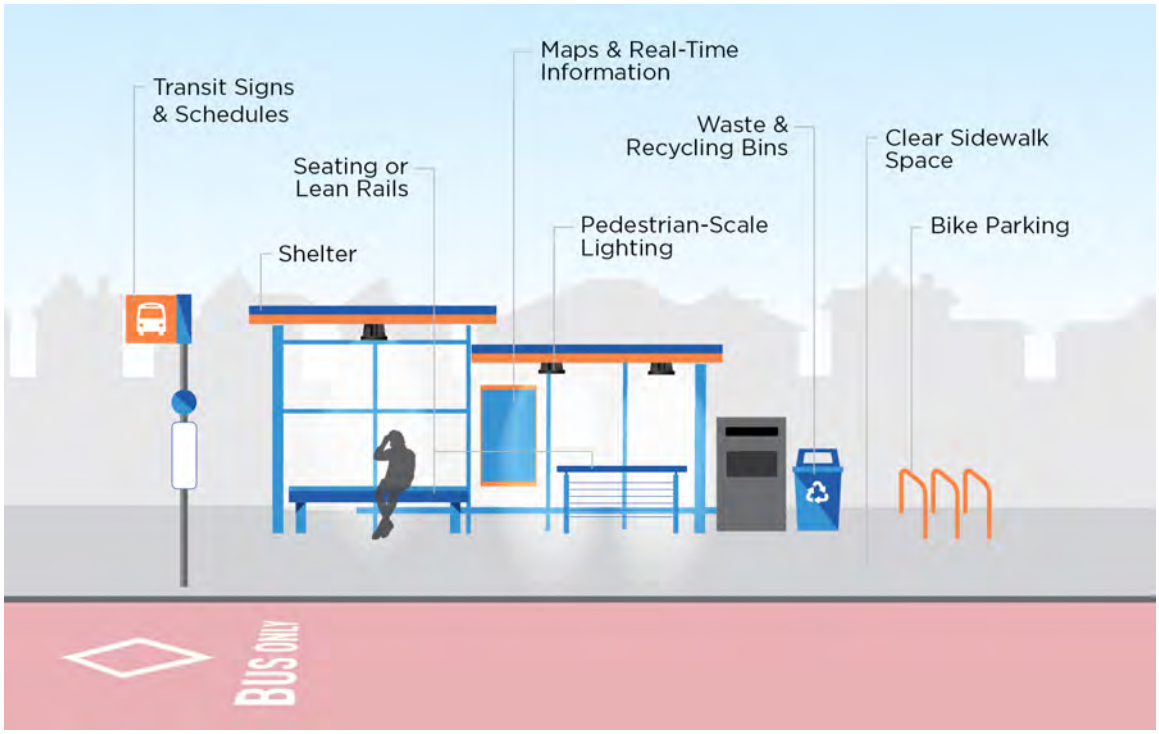


Source: Nelson\Nygaard

Many communities locate stops at turnouts where buses can pull out of traffic, forcing buses to merge back into travel lanes. If there are multiple lanes of traffic, buses should be allowed to stop in the outside lane. If streets are quiet enough, buses can temporarily block traffic. On streets with curbside parking, stops can be located on sidewalk extensions.

New stops must be ADA-accessible and older stops should be retrofitted to meet ADA standards for seniors and people with disabilities. Stops should be comfortable, safe, and clean, with seating, shelters at busier stops, pedestrian-scale lighting, and trash cans (see Figure 8-4). They should provide schedules, maps, and (at busier stops) real-time updates. They should provide enough space for wheelchair, walker, stroller, and bike access, and room for pedestrians to pass easily.

Figure 8-4 Amenities at High-Quality Bus Stops



Transit centers have varying design requirements, but a few universal rules apply. Distances between stops or platforms should be minimized. Where possible, transit centers and their stops should be close to the street and should avoid circuitous access and circulation pathways. In some cases, putting some stops on the street next to the transit center may reduce passenger travel time. Wayfinding and directional signage are essential. Transit centers should also be designed around intermodal connectivity and access, as discussed later in this chapter.

Street Design

Most transit in Orange County operates on city streets, and street design is essential to providing effective transit service. Historically, this has meant simply accommodating bus movements, but current best practice is to design "complete streets" for all people.

The Orange County Council of Governments has published a handbook providing detailed guidance for complete-street design in Orange County. In general, complete streets support transit. Even where they don't provide transit priority, they provide additional space for transit stops, improve pedestrian and bicycle access to transit, and bolster land uses such as pedestrian- and transit-oriented retail.

OCTA's Bus Stop Safety and Design Guidelines provide detailed specifications on street design and engineering requirements for transit vehicles and transit-priority treatments. Transit-priority treatments reduce delay for transit vehicles and passengers. The transit-priority toolbox ranges from the simple to more extensive interventions such as exclusive transit lanes. Three relatively simple measures cities can implement to significantly reduce transit travel times are shown in Figure 8-5

Figure 8-5 Simple Measures to Reduce Transit Travel Times

Signal timing adjustments

Signal timing adjustments, synchronization, and adaptive signal systems optimize traffic flow.

Transit signal priority (TSP)

TSP uses sensors to extend green lights a few seconds for approaching transit vehicles, allowing them to avoid red lights (or, in some cases, to turn red lights green a few seconds early).

Queue jumps

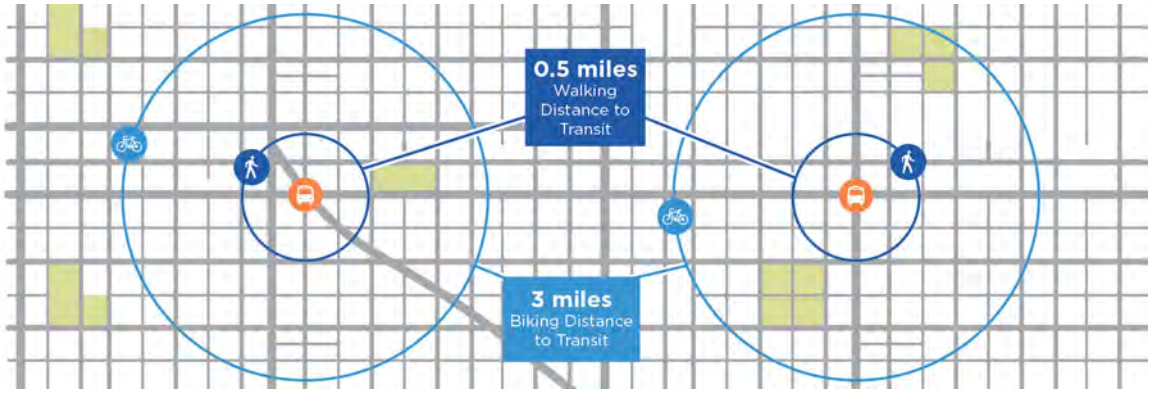
Bypass lanes on intersection approaches accompanied by brief transit-only signal phases allow transit vehicles to bypass lines of cars stopped at red lights.

A fourth type of transit-only treatment is transit-only lanes, which may be exclusive or semi-exclusive and can be somewhat more challenging to implement. Transit lanes are most effective when physically separated from traffic, but lanes that are not can be made more effective by coloring them (most often red) or posting signs. Where transit service is relatively frequent, transit-only lanes can increase a street's capacity, as transit vehicles carry many more people than individual cars.

Transportation System Integration

Ideally, transit stops should be located a short walk from trip origins and destinations. But for a variety of reasons, they may be a half-mile, a mile, or even several miles away. In these cases, passengers rely on first-/last-mile connections to sidewalks, bike routes, and to other transit services. Research has found that most transit riders will walk up to a quarter- or half-mile to stops, and that most cyclists will ride three to five miles (see Figure 8-6). Improvements to pedestrian and bicycle infrastructure can improve access to transit.

Figure 8-6 Walking and Biking Distance to Transit Stops



Source: Nelson\Nygaard

Transit stops should support direct pedestrian connections. Pathways should be as comfortable and safe as possible, using complete streets practices. Marked street crossings should be both relatively close together and as short as possible. Crossings can be shortened by aligning them at right angles to sidewalks, by reducing travel lanes, and by providing sidewalk extensions and pedestrian refuges in medians. Crossing times at signals should be sufficient to allow people of all

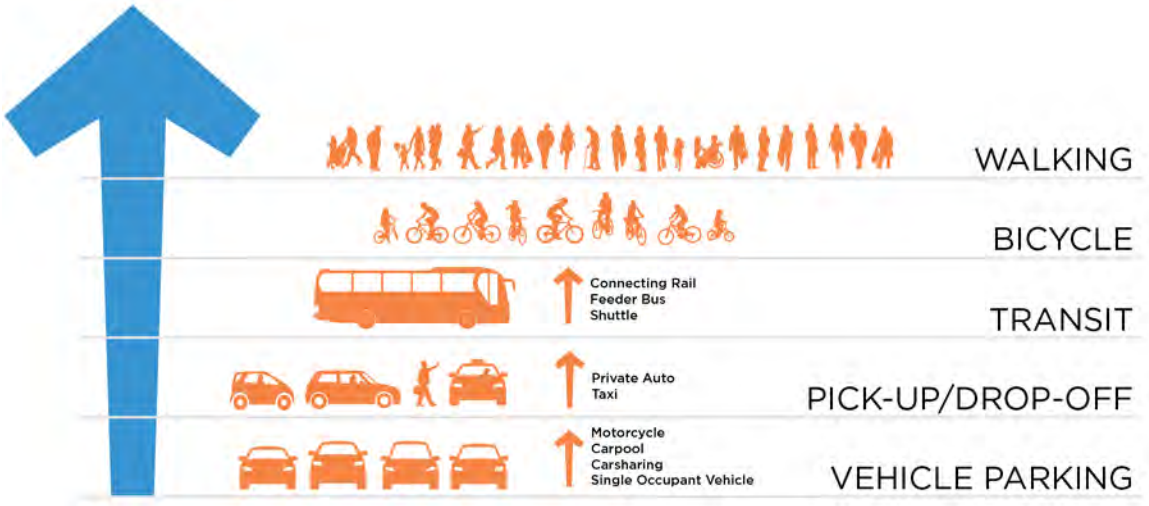
ages and abilities time to cross the street safely. Motorist awareness of pedestrians can be enhanced by using high-visibility crosswalk treatments and other measures to improve safety.

ADA-compliant curb ramps should be provided at all intersections. Grade-separated crossings, including pedestrian bridges, should be avoided, as these make pathways less direct and can be difficult for less mobile people to navigate.

Bicycle routes to transit stops should follow the same principles: direct paths with frequent, short, high-visibility crossings. Ideally, busy transit stops should connect to designated bicycle routes featuring high-quality facilities such as off-street paths, separated or buffered on-street lanes, or prioritized treatments on lower-volume streets. Jurisdictions can minimize conflicts between transit and bicycles by providing dedicated space for both modes.

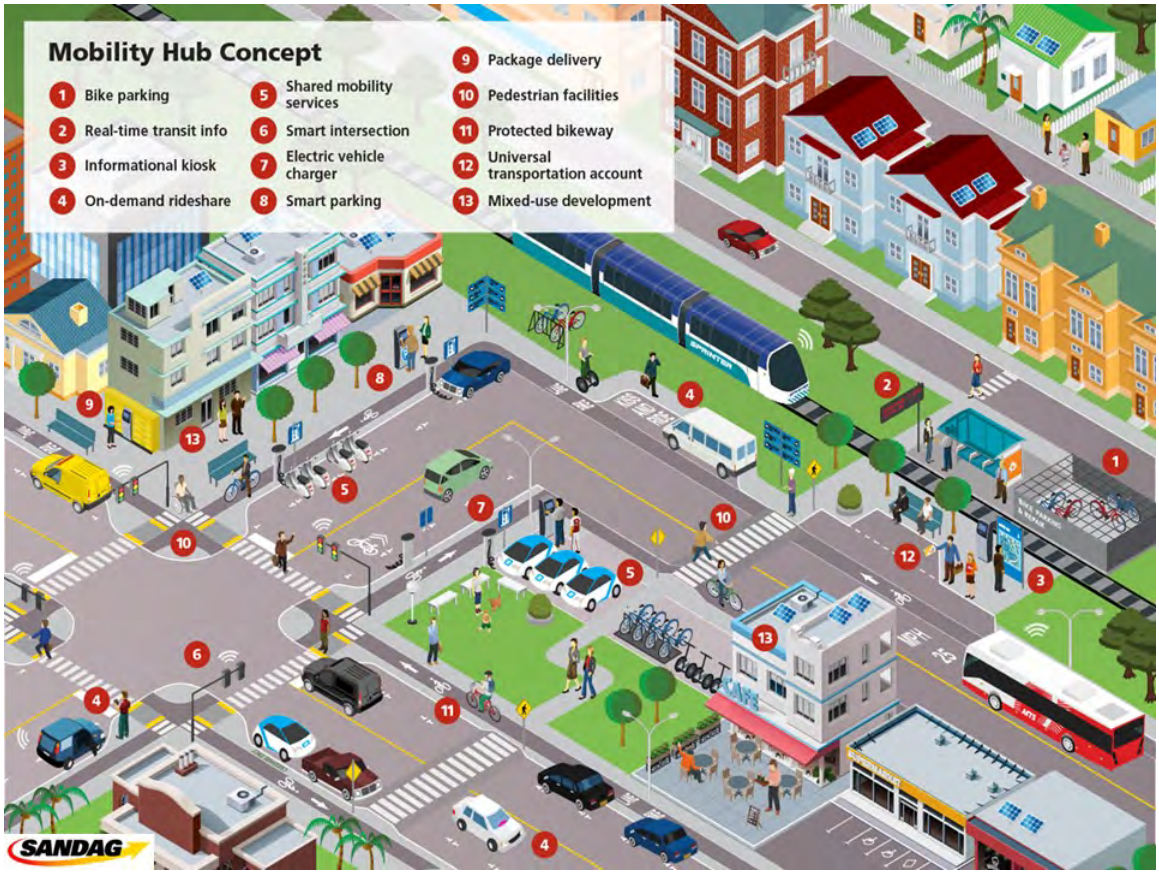
Transit centers should prioritize pedestrians and bicycles over people using other modes (see Figure 8-7). Connecting or feeder transit routes, kiss-and-rides, taxis, and services like Uber and Lyft should all be conveniently located. Finally, park-and-ride lots and garages can be located somewhat farther away from transit stops. Within parking lots, space for high-occupancy vehicles, low-emission vehicles, carshare vehicles, and motorcycles should be prioritized.

Figure 8-7 Potential Access Hierarchy for Orange County Transit Centers



The emerging best practice is to provide full-featured mobility hubs at transit centers. Mobility hubs ensure that transit riders have access to a wide range of options for first-/last-mile connectivity, greatly increasing the range and utility of transit routes serving the transit center. Such hubs feature bike stations with secure bike parking, repair, and rental facilities (and extensive rider amenities, such as showers); bikeshare docks; carshare vehicles; information kiosks; cafés; restrooms; and placemaking features such as plazas, art, and landscaping (see Figure 8-8).

Figure 8-8 Elements of a Mobility Hub



Source: SANDAG

TRANSIT-SUPPORTIVE LAND USE AND POLICIES

This section discusses land use in general as well as transit-supportive policies in the important areas of parking and transportation demand management (TDM).

Transit-Supportive Land Use

When considering the relationship between transit, buildings, and neighborhoods, it is useful to think in terms of the "6 Ds" (see Figure 8-9). Each of these is essential to building transit-friendly environments:

- **Destinations:** Land uses should be grouped together to form busy destinations, and destinations should be in locations that are easily accessible to transit.
- **Distance:** Origins and destinations should be relatively close together and connected by direct paths.
- **Density:** Putting more residents and workers or students close to transit increases the number of transit riders.
- **Diversity:** A mixture of land uses enables walkable, transit-friendly environments.
- **Design:** Architecture built around pedestrians is architecture that also supports transit. Adding interest to the streetscape is key to creating pedestrian-friendly places.
- **Demand Management:** Strategies to reduce driving are important to successful transit.

Figure 8-9 The 6 Ds of Transit-Supportive Land Use

Source: Nelson\Nygaard

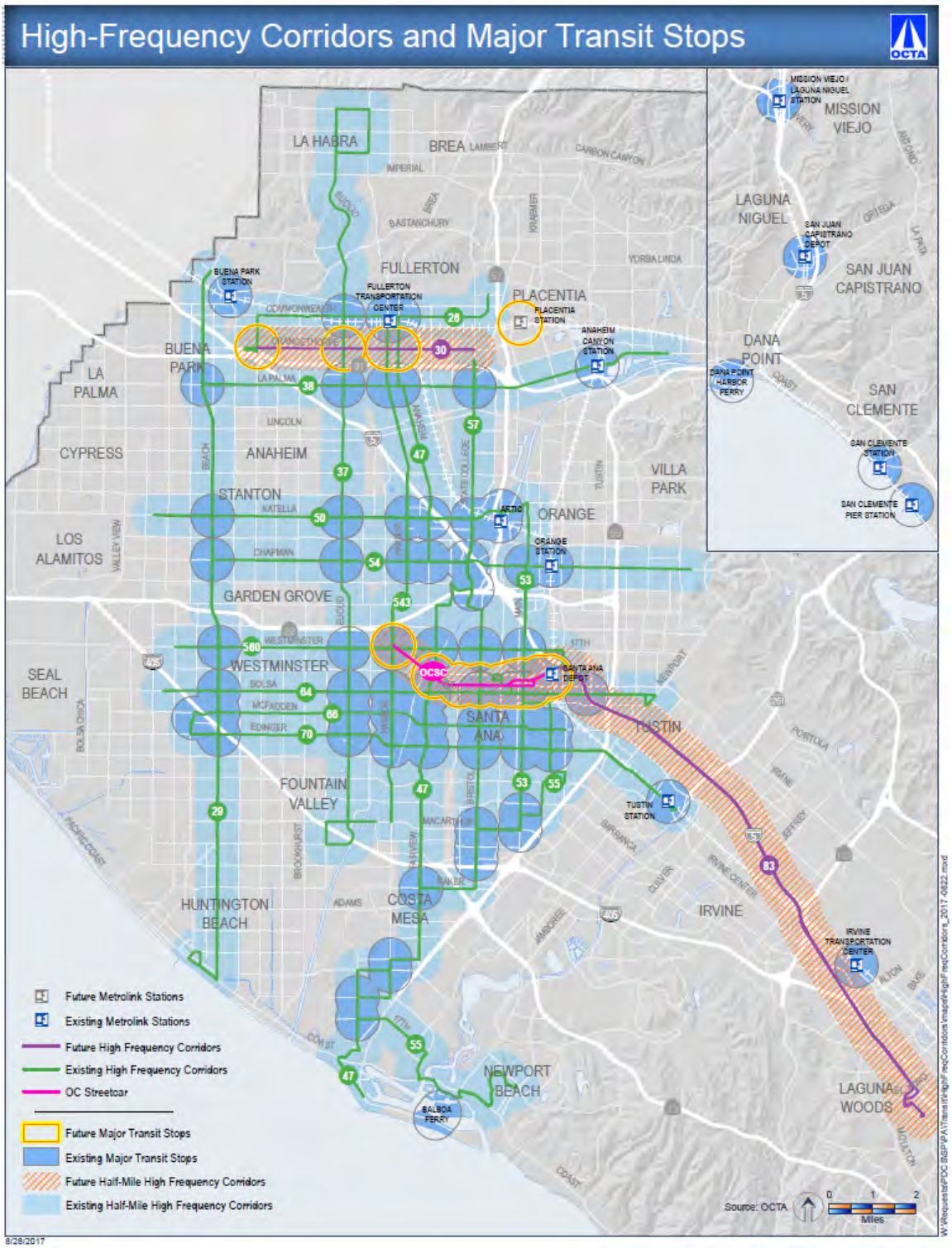
Transit-oriented development (TOD) is one important type of transit-supportive land use. TOD offers cities many benefits, including improvements to health and safety, reduced air and noise pollution, and lower costs to taxpayers from use of existing infrastructure. Transit-accessible locations are good places to concentrate higher-density residential and commercial development, and they make good sites for affordable housing, as lower-income residents benefit from access to transit.

In recent years, a series of policies have been adopted at the state and regional levels promoting TOD. These have ranged from grants and low-interest loans for transit-oriented development to measures to reduce greenhouse gases or carbon emissions and to promote TOD through changes to environmental review processes.

One of the highest-profile of these is Senate Bill 375, which streamlines California Environmental Quality Act (CEQA) regulations for residential and mixed-use developments that meet certain requirements and are within a half-mile of a transit corridor with frequent service. In the Southern California Association of Governments region, these locations are called "High Quality Transit Areas," and they can be found throughout northern Orange County and near Metrolink stations in the south, as shown in Figure 8-10.

Another, more recent effort by the state to promote TOD through changes to CEQA processes is Senate Bill 743, which will soon require transportation impacts to be analyzed using vehicle miles traveled rather than vehicular level of service. This change will benefit developments in walkable, transit-oriented locations generating fewer impacts, and will encourage use of transportation demand management strategies.

Figure 8-10 Orange County High-Quality Transit Areas

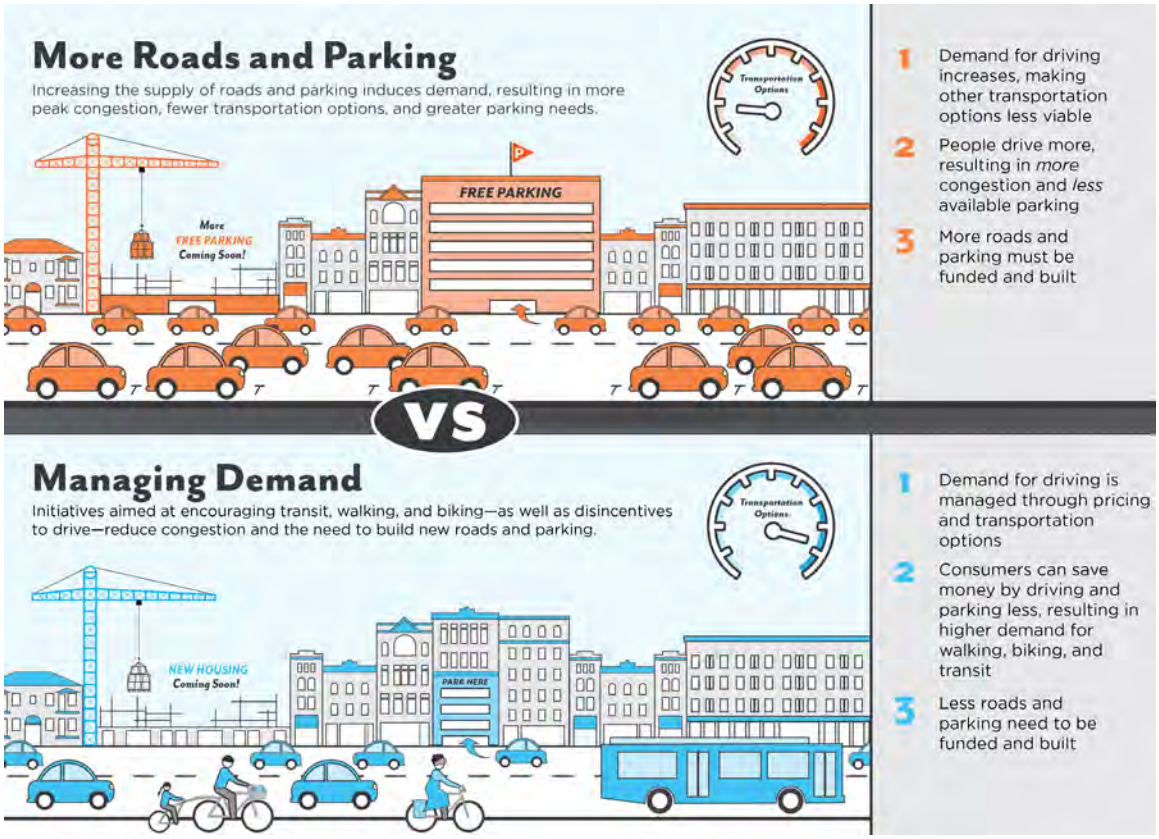


Source: OCTA

Transit-Supportive Policies

Cities, developers, and other entities can support transit by adopting policies and establishing programs to encourage transit use, walking, biking, and ridesharing. Collectively, these policies are referred to as transportation demand management (TDM) or parking demand management (PDM). A demand-management-based approach reduces the need for single-occupant vehicle (SOV) trips, making it easier to take trips in other ways. It also more efficiently and proactively manages limited parking and road supply (Figure 8-11).

Figure 8-11 Impacts of More Roads and Parking vs. Managing Demand



Source: Nelson\Nygaard

Parking Management

Smart parking policy focuses on availability, rather than supply. There are many policies that cities and developers can use to ensure that public and private parking is available when needed. The conventional approach is simply to spend money on more supply (or to require others to spend money). But in addition to its high cost, parking takes up valuable space. Because developments are limited in size, requiring too much parking in new development both reduces space for other uses and increases costs to developers, homebuyers, and tenants.

Generally, more parking means more traffic congestion and collisions, as it results in more cars on the road. Additionally, when existing parking is not proactively managed, lack of availability can lead to motorists "circling" or driving around looking for a space, further increasing traffic.

Strategies that can be used to proactively manage parking supply and ensure availability are described in detail in the *Transit-Supportive Design and Policy Handbook* in Appendix E. OCTA can

work with its member jurisdictions to determine the right parking management strategies for Orange County, focusing first on areas with the potential for high-capacity transit and significant increases in transit ridership.

Transportation Demand Management

TDM strategies reduce demand for solo driving. In California, cities generally require employers above a certain size to implement specific TDM measures; some municipalities have similar requirements for large multifamily residential developments. The emerging best practice is to require all major trip generators to adopt single occupant vehicle (SOV) trip-reduction strategies but provide a flexible menu of options for each employer or developer.

Following are select strategies that can be used to reduce SOV trips and potentially increase transit ridership. (A more complete list of strategies is available in the *Transit-Supportive Design and Policy Handbook* in Appendix E.)

- **Transit Passes:** Discounted bulk passes for large groups of students or employees partly or fully subsidized by an institution or employer can greatly reduce the cost of and increase rates of transit use. OCTA offers both student passes for participating colleges and universities as well as annual "perk passes" for interested employers. More information on the latter can be found at http://www.octa.net/Bus/Fares-and-Passes/Perk-Pass/.
- **Transit Information:** Demystify transit and reduce barriers to use by providing maps, schedules, rider guides, and other information. All of these can be found on the OCTA website at http://www.octa.net.
- **Ridesharing Programs:** Employers can help match their employees with other employees interested in carpooling. In some cases, employers even help arrange vanpools. Information about OC Vanpool can be found at http://www.octa.net/Vanpool/Overview/.
- **Guaranteed Ride Home:** Employees are offered a limited number of free taxi rides for use when they have to leave work unexpectedly or work late. In Orange County, employers who actively participate in the OC Vanpool, Perk Pass, or Metrolink Corporate Partner Programs are eligible to participate in a free Guaranteed Ride Home Program provided by OCTA: https://www.octa.net/Getting-Around/Rideshare/Employers/Guaranteed-Ride-Home-Program/.

9 ACTION PLAN AND NEXT STEPS

Implementing the recommendations of the OC Transit Vision will require concerted effort and resources from OCTA. While many of the projects identified in this plan will take years to come to fruition, there are steps that OCTA can take immediately to begin moving the vision to reality. This chapter outlines a phasing strategy, costs, and funding sources for implementing the OC Transit Vision.

PHASING STRATEGY

The phasing strategy shown in Figure 9-1 and described below addresses recommendations described in Chapters 5, 6, and 7 of the OC Transit Vision. Note that recommendations in some areas, such as paratransit, are not included here as they should be further defined through future processes.

Short-Term Recommendations (2018-2022)

Implement OC Flex Microtransit Pilot in Bolsa-Dorado and Aliso-Mission Zones (2018)

In summer 2018, OCTA will pilot OC Flex service, allowing customers to request shared on-demand rides by smartphone app or phone call. Two pilot zones, each approximately six square miles, have been identified around the Goldenwest Transportation Center and the Laguna Niguel/Mission Viejo Metrolink station. During operating hours, customers can be picked up or dropped off anywhere within these zones by branded OCTA vans. If successful, OCTA could expand OC Flex to additional areas where existing bus service is unproductive or nonexistent.

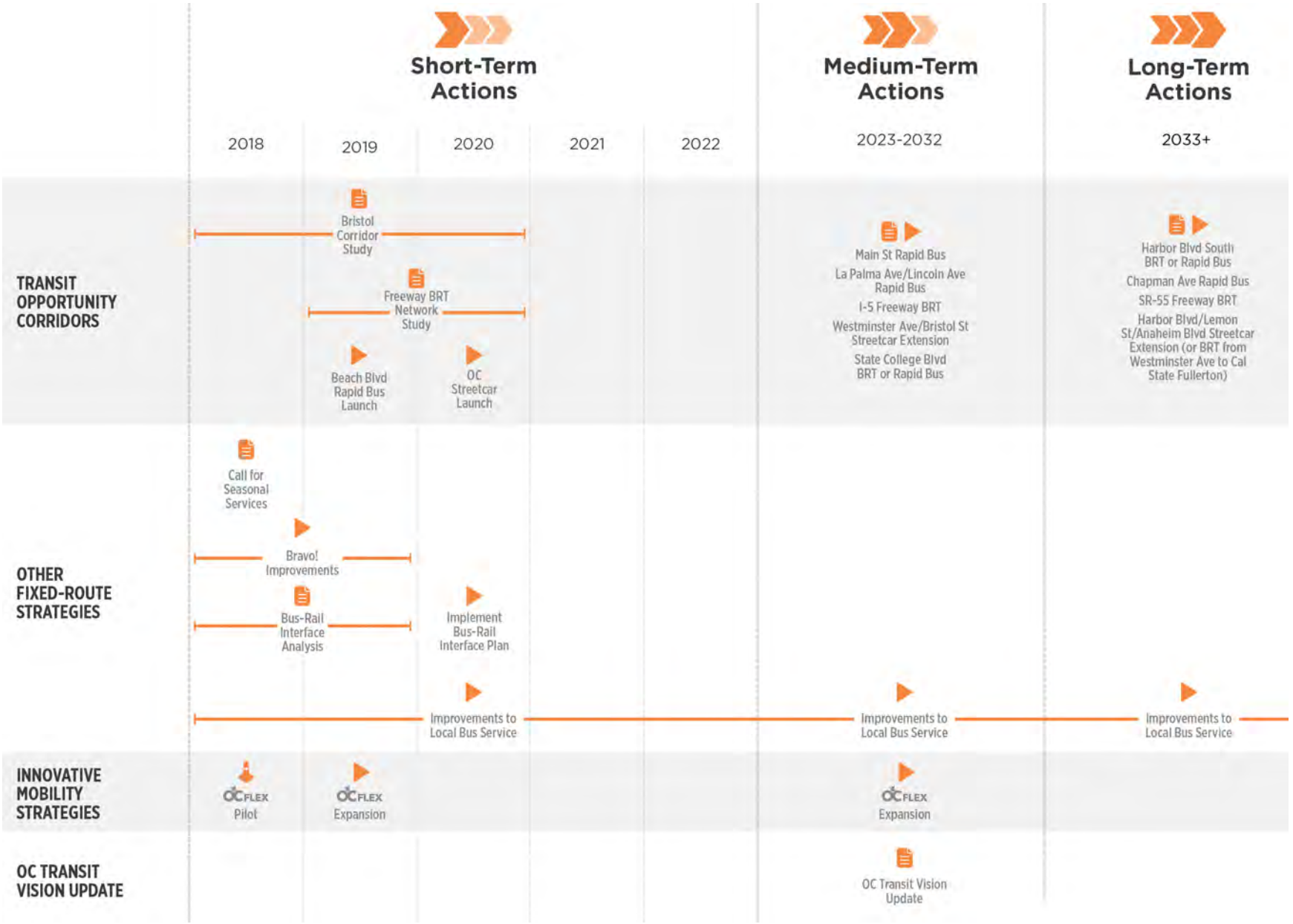
Issue Project V Call for Seasonal and Special Event Services (2018)

OC Transit Vision outreach identified a desire for more specialized fixed-route services, such as the increasingly popular OC Fair service. Additionally, while many community shuttle services funded under the Measure M2 Project V program have struggled to attract riders, seasonal services have proven popular. A Project V call-for-projects in 2018 should focus on additional seasonal and special event services that reduce local congestion.

Develop and Implement Strategies for Incremental Improvements to Existing and Future Rapid Bus (Bravo!) Routes (2018-2019)

Several lower-cost operational upgrades can improve the speed of existing and future Bravo! routes. These include off-vehicle fare collection, all-door boarding, and transit signal priority. OCTA staff will work with local jurisdictions, beginning on Harbor Boulevard and Beach Boulevard, to pilot select improvements. In addition, many bus stops along these corridors may qualify for Measure M Project W funding to improve passenger amenities such as customer information, bus shelters, and seating.

Figure 9-1 OC Transit Vision Recommendations Phasing



Analyze Regional Bus-Rail Connections as Part of Upcoming Los Angeles–Orange County Transportation Study (2018-2019)

As Los Angeles County builds out its Metro Rail system over the next 40 years, Orange County should continue to explore ways to integrate with lines terminating near the county border. The OC Transit Vision analyzed connections to these corridors within Orange County; however, they did not score well enough to recommend short- or medium-term improvements. A broader analysis of these connections should be included in an upcoming joint transportation study between the two counties.

Conduct Transit Corridor Study of Bristol Street from Initial OC Streetcar Alignment to South Coast Metro Area (2018-2020)

As OCTA completes the Central Harbor Transit Study, it is logical to study the next most viable alignment for streetcar or bus rapid transit (BRT). Based on initial ridership modeling, Bristol Street shows the greatest potential. Staff will present study-area limits and a project scope to the OCTA Board prior to proceeding with any study.

Implement Beach Boulevard Rapid Bus (2019)

The OCTA Board approved Bravo! service on Beach Boulevard in 2016, pending availability of necessary resources. OCTA staff has identified grant funding to purchase additional buses and operating resources to implement the service by 2019. A consultant is currently studying the feasibility of transit signal priority in this corridor to further improve transit speed and reliability.

Expand OC Flex (2019, pending successful pilot)

OCTA staff will provide the Board with updates on the OC Flex pilot project. If the service meets its performance criteria, the service could be expanded to two additional zones.

Conduct Freeway BRT Network Study (2019-2020)

Freeway BRT is a new mode for Orange County, and one that has varied widely in its implementation elsewhere. Rather than advance individual projects, OCTA will conduct a network study of potential Freeway BRT corridors, including I-5, SR-55, and others (such as I-405). This study would identify the most promising corridors and begin to shape Freeway BRT's infrastructure and operational characteristics. This work could be included as part of a larger study examining managed lanes throughout the county.

Begin Operations of Initial OC Streetcar Service and Implement Bus-Rail Interface Plan (2020)

The initial segment of the OC Streetcar is scheduled to open in December 2020. A bus-rail interface plan was developed to complement the streetcar service by making changes to alignments, frequencies, and service hours of connecting routes.

Improve Service on Major, Local, and Community routes to meet Transit Investment Framework Guidelines (ongoing, as resources are available)

The OC Transit Vision includes a Transit Investment Framework that OCTA should use to prioritize changes to routes not recommended for rapid bus, BRT, or streetcar upgrades. As funding is available beyond the resources needed to implement the other recommendations in the OC Transit Vision, service on these routes should be improved to meet the service span and frequency standards contained in the framework.

Mid-Term Recommendations (2023-2032)

Update OC Transit Vision (2023)

The OC Transit Vision—and the existing Transit Opportunity Corridor recommendations—will be updated to incorporate new studies or changes in travel demand. This update will also recommend additional corridor studies.

Mid-Term Service Recommendations

The following list includes transit projects that may be implemented in the mid-term based on project development and funding availability:

- Main Street rapid bus
- OC Flex expansion
- La Palma Avenue/Lincoln Avenue rapid bus
- I-5 Freeway BRT
- Westminster Avenue/Bristol Street streetcar extension or BRT from Goldenwest Transportation Center to UC Irvine
- State College Boulevard BRT or rapid bus

Long-Term Recommendations (2033+)

Based on project development and performance, these services are recommended for long-term implementation if funding is available:

- Harbor Boulevard/Lemon Street/Anaheim Boulevard streetcar extension, or BRT from Westminster Avenue to Cal State Fullerton
- Harbor Boulevard South BRT or rapid bus
- McFadden Avenue/Bolsa Street rapid bus
- Chapman Avenue rapid bus
- SR-55 Freeway BRT

COSTS

Following are estimated capital costs for the Transit Opportunity Corridor (TOC) projects and estimated changes in annual revenue hours required to operate services in each TOC (including changes to existing services in the corridor).

Capital Costs

Capital costs for TOC projects were estimated based on unit (primarily per-mile) costs specific to each mode. For streetcar, BRT, and rapid bus, per-mile costs were derived from alternatives in OCTA's Central Harbor Boulevard Transit Corridor Study. For Freeway BRT, costs could vary dramatically depending on project design, so a "high" per-mile cost was estimated based on the Los Angeles County Metro North Hollywood-Pasadena BRT project freeway BRT alternative, and a "low" cost was estimated based on projected vehicle requirements (including spares) and costs. Costs by mode (year 2017 dollars) are shown in Figure 9-2.

Figure 9-2 Estimated Capital Cost per Mile, by Mode (Year 2017 Dollars)

Mode	Cost
Streetcar	$52,730,000 per mile
BRT	$12,250,000 per mile
Rapid Bus	$3,400,000 per mile
Freeway BRT (high)	$11,500,000 per mile
Freeway BRT (low)	$915,000 per vehicle

Based on the unit costs above, capital costs were estimated for each TOC project (Figure 9-3 and Figure 9-4). These estimates are conceptual—based solely on mode and, in most cases, project length—and would be refined through project development and design. For TOCs in which two potential modes were identified (e.g., streetcar or bus rapid transit in the North Harbor/Santa Ana corridor), the more expensive mode served as the basis for the cost estimate.

Figure 9-3 Estimated Capital Cost per TOC Arterial Project (Year 2017 Dollars)

TOC Project	One-Way Miles	Cost
North Harbor/Santa Ana Streetcar	10.32	$540,000,000
Westminster/Bristol Streetcar	18.89	$1,000,000,000
Harbor BRT	10.39	$130,000,000
State College BRT	12.08	$150,000,000
Beach Rapid Bus	16.32	$55,000,000
Main Rapid Bus	9.92	$34,000,000
La Palma/Lincoln Rapid Bus	14.44	$49,000,000
Chapman Rapid Bus	10.78	$37,000,000
McFadden/Bolsa Rapid Bus	12.30	$42,000,000

Figure 9-4 Estimated Capital Cost per TOC Freeway BRT Project (Year 2017 Dollars)

TOC Project	Units	Cost
"High" Estimate		
I-5 Freeway BRT	34.52 one-way miles	$400,000,000
SR-55 Freeway BRT	15.10 one-way miles	$170,000,000
"Low" Estimate		
I-5 Freeway BRT	14 vehicles	$12,810,000
SR-55 Freeway BRT	9 vehicles	$8,235,000

The total estimated cost of the TOC projects listed above is approximately $2.1-2.6 billion (in year 2017 dollars).

In addition to the TOCs, the Metrolink improvements described in Chapter 5 would have significant capital costs. However, these would largely be funded by others and are therefore not included here.

Operating Costs

To estimate changes in operating costs associated with Vision Plan recommendations, annual revenue hours required to operate each service were estimated based on conceptual service plans for TOC lines, implementation of OC Flex service, and changes to existing services required to meet Transit Investment Framework standards. Arterial TOC services were assumed to operate every 10 minutes during the peak period and every 15 minutes through the day (weekday midday, or base period), while freeway BRT services would operate every 15 minutes during the peak and every 30 minutes throughout the day. "Complementary" existing local services would be retained but reduced somewhat—generally to every 20 minutes in the peak and 30 minutes off-peak—and "redundant" limited-stop services would be eliminated.

Estimated changes in annual revenue service hours by mode and by milestone year (i.e., the end of the short-, medium-, and long-term phases) are shown in Figure 9-5. This table includes both fixed-route and general-public demand-response (OC Flex) services as well as both arterial and freeway services in the BRT category.

Figure 9-5 Estimated Annual Revenue Service Hours by Mode and Milestone Year

Year	Mode					Total
	Rapid Bus	BRT	Other Bus	Streetcar	OC Flex	
2016	40,334	--	1,576,551	--	--	1,616,885
2022	139,730	--	1,695,768	30,496	24,000	1,750,264
2032	250,575	95,825	1,788,863	121,026	36,000	1,945,889
2040	357,815	169,725	1,900,602	160,780	36,000	2,097,382

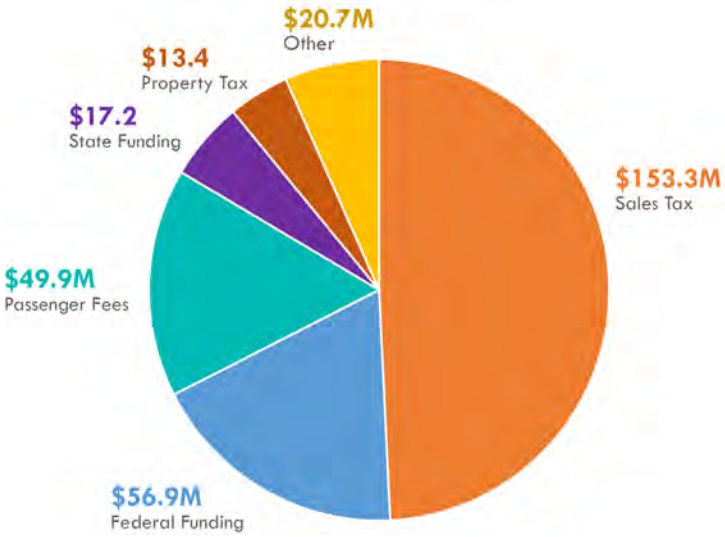
In total, the OC Transit Vision recommendations are projected to increase the number of annual revenue service hours required to operate all fixed-route and general-public demand-response services by approximately 30 percent by 2040.

Costs to operate accessible services (ACCESS paratransit and related services), meanwhile, will be dependent on the success of measures to maintain high-quality service while containing costs.

FUNDING

Many of the less-costly recommendations in this report, such as the OC Flex pilot program and expanded seasonal and special-event services, could be funded using existing OCTA sources such as the Measure M county sales tax (existing sources of OCTA revenue are shown in Figure 9-6, and Measure M funding categories are shown in Figure 9-7). However, the more expensive recommendations—large capital projects such as those proposed for the Transit Opportunity Corridors—would require a mix of sources likely including federal funds such as those used for the OC Streetcar project. In many cases, partnerships with other agencies (and in some cases, private partners) will be needed.

Figure 9-6 OCTA Bus and Paratransit Revenues (2016)



One important consideration in discussing funding options is the reliability of different funding sources for transportation projects. Many funding sources are formula-based, while other competitive grant programs are merit-based or discretionary. Funding sources for transit have proven volatile in recent years, particularly at the federal and state levels as old sources have been eliminated or reduced while new sources have been introduced.

The sections below identify potential funding sources for transit projects and match these sources to the projects and programs recommended as part of the OC Transit Vision.

Transit Capital and Operating Funding Sources

A list of potential funding sources to implement the OC Transit Vision recommendations is provided below. A comprehensive description of these funding sources is available in the *State of OC Transit* report.

Federal Sources

- The Federal Transit Administration (FTA) Section 5309 Capital Investment Grant (CIG) Program, including:
  - New Starts projects
  - Small Starts projects
  - Core Capacity projects

  - Programs of Interrelated Projects
- FTA Section 5307 Urbanized Area Formula Grants
- FTA Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities funds
- FTA Section 5337 State of Good Repair
- FTA Section 5339 Bus and Bus Facilities
- The Federal Highway Administration (FHWA) Surface Transportation Block Grant Program
- The FHWA Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Transportation Investment Generating Economic Recovery (TIGER)
- The Transportation Infrastructure Finance and Innovation Act (TIFIA)
- The Railroad Rehabilitation and Improvement Financing (RRIF) Program

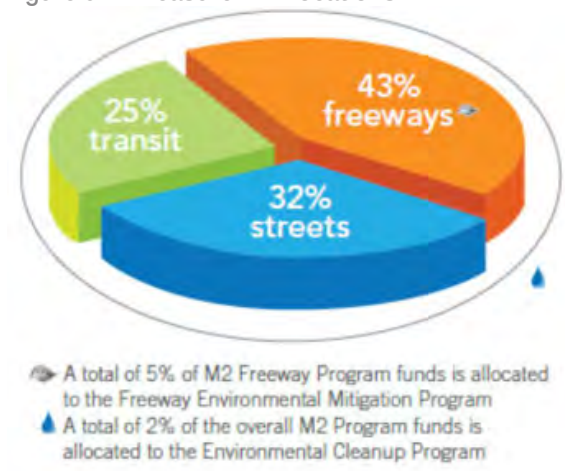
State Sources

- Cap and Trade Funds
- State Infrastructure Bank
- The Transportation Development Act (TDA)
- State Transportation Improvement Program (STIP)
- Senate Bill 1 (SB1) Competitive Grants

Regional, County and Local Sources

- SCAG Sustainability Planning Grants
- Measure M County Sales Tax
- Parcel Taxes
- Motor Vehicle Fuel/Gas Taxes
- Vehicle Registration Fees and Excise Taxes
- Real Estate Transaction Fees
- Community Facilities District
- Developer Fees and Agreements
- Real Estate Transfer Fees
- Rental Car and Hotel Taxes
- Commercial Parking Taxes
- Parking Benefit District
- General Obligation Voter-Approved Bonds
- City General Funds
- Other Local Sources, including:
  - Alcoholic Drinks in Bars
  - Payroll Taxes
  - Tolls

Figure 9-7 Measure M Allocations



Private Sources

- Community Benefit District/Business Improvement District (CBD/BID)
- Value Capture
- Naming Rights

Public-Private Sources

- Public-Private Partnerships (P3s)

Potential Funding Sources for OC Transit Vision Recommendations

Transit Opportunity Corridors

In recent years, the primary sources of federal funding available to support major transit capital projects, including rail and bus rapid transit lines, have been the following:

- Federal Transit Administration's (FTA) merit-based Capital Investment Grants Program, including the New Starts and Small Starts programs for larger and smaller projects, respectively;
- U.S. Department of Transportation's (USDOT) discretionary Transportation Investment Generating Economic Recovery (TIGER) program; and
- Federal Highway Administration (FHWA) formula-based Congestion Mitigation and Air Quality (CMAQ) grants distributed to states and localities.

As a point of comparison, nearly half ($148.9 million) the cost of the OC Streetcar project will be covered by a New Starts grant, with a large portion of the remainder coming from state cap-and-trade program and local Measure M sales tax revenues (specifically Measure M's Project S funding category for fixed-guideway projects).

While more expensive rail and BRT projects would likely require federal funding, less-costly rapid bus projects could be funded primarily using state and local sources (see Bravo! Upgrade Strategy below), while freeway BRT improvements could be integrated into larger highway projects with their own distinct funding sources.

One emerging option for funding major transit capital projects—which has been used in other areas, is under consideration in Los Angeles County, and has been used in Orange County for highway projects—is "P3s" or public-private partnerships. P3s can be structured in various ways, but typically reduce up-front cost and risk for public agencies in exchange for longer-term concessions. Some transit projects in other parts of the country, typically streetcar projects, have been partly financed using alternative forms of private financing such as assessment districts and other forms of value capture.

Service Investments

Increasing levels of fixed-route service to meet the Transit Investment Framework guidelines (Ch. 4) would require additional funding from operating-funding sources such as FTA Section 5307 grants and state Transportation Development Act sales tax revenues.

Bravo! Upgrade Strategy

Upgrades to existing and new rapid bus services could be funded with existing sources for transit capital improvements, including sources typically used to purchase new vehicles. FTA Section 5339 funds are one option; state cap-and-trade funds, which may be used for a variety of purposes, are another.

Seasonal and Special Event Services

These projects would be funded primarily using Measure M's Project V funding category for local projects.

LOSSAN/Metrolink Improvements

The regional rail upgrades described in Chapter 6 would be the responsibility of agencies other than OCTA, although Measure M funding could be used for access and other improvements such as grade separations.

OC Flex

Expansion of OCTA's pilot microtransit program could be funded using Measure M Project V funds.

OC Vanpool Expansion

Expansion of the OC Vanpool program could take two forms: 1) an expanded subsidy from existing sources, or 2) *de facto* expansion of the program through expansion of Orange County's HOV/managed land network, which is being funded through non-transit sources.

Paratransit Enhancements

FTA Section 5310 funds are a primary source of funding for paratransit services such as OCTA's ACCESS.

Additional Studies

A number of grant programs are available to support planning efforts, including Southern California Association of Governments (SCAG) Sustainability Planning Grants and Caltrans Transportation Planning Grants (a program funded by Senate Bill 1).

Access Improvements

Multimodal access to transit stops can draw on a variety of funding sources depending on mode, including FWHA Congestion Mitigation and Air Quality (CMAQ) funding, cap-and-trade dollars, and FHWA Surface Transportation Block Grant Program funding.

County	City	FIPS	Total Acres*	Population (2019)	Population (2045 Plan)	Population in 2045 HQTA	Population in 2045 HQTA (%)	Share of Regional Population within 2045 HQTA	Transit accessibility factor
San Bernardino	Grand Terrace city	30658	2,269	12,654	14,501	-	0.0%	0.00%	0
Los Angeles	Hawaiian Gardens city	32506	611	14,690	15,706	12,563	80.0%	0.12%	514
Los Angeles	Hawthorne city	32548	3,898	87,854	92,851	59,489	64.1%	0.58%	2,433
Riverside	Hemet city	33182	18,707	84,754	123,992	-	0.0%	0.00%	0
Los Angeles	Hermosa Beach city	33364	956	19,847	20,566	-	0.0%	0.00%	0
San Bernardino	Hesperia city	33434	46,488	96,362	168,067	-	0.0%	0.00%	0
Los Angeles	Hidden Hills city	33518	1,080	1,885	2,018	-	0.0%	0.00%	0
San Bernardino	Highland city	33588	11,948	55,778	68,942	1,546	2.2%	0.02%	63
Imperial	Holtville city	34246	736	6,779	7,733	-	0.0%	0.00%	0
Orange	Huntington Beach city	36000	17,414	203,761	205,310	74,791	36.4%	0.73%	3,059
Los Angeles	Huntington Park city	36056	1,928	59,350	63,965	60,689	94.9%	0.59%	2,483
Imperial	Imperial city	36280	3,736	19,929	27,833	-	0.0%	0.00%	0
Riverside	Indian Wells city	36434	9,328	5,445	6,369	4,932	77.4%	0.05%	202
Riverside	Indio city	36448	21,254	89,406	129,262	37,270	28.8%	0.36%	1,525
Los Angeles	Industry city	36490	7,699	432	440	1	0.1%	0.00%	0
Los Angeles	Inglewood city	36546	5,813	112,549	137,121	116,380	84.9%	1.14%	4,761
Orange	Irvine city	36770	42,194	280,202	327,664	43,892	13.4%	0.43%	1,795
Los Angeles	Irwindale city	36826	6,162	1,506	1,876	1,306	69.6%	0.01%	53
Los Angeles	La Canada Flintridge city	39003	5,532	20,602	21,640	-	0.0%	0.00%	0
Orange	Laguna Beach city	39178	5,652	23,358	23,508	-	0.0%	0.00%	0
Orange	Laguna Hills city	39220	4,252	31,572	34,004	4,300	12.6%	0.04%	176
Orange	Laguna Niguel city	39248	9,458	66,748	69,711	4,882	7.0%	0.05%	200
Orange	Laguna Woods city	39259	2,115	16,518	16,532	7,604	46.0%	0.07%	311
Orange	La Habra city	39290	4,713	63,542	66,198	20,983	31.7%	0.21%	858
Los Angeles	La Habra Heights city	39304	3,939	5,485	5,802	-	0.0%	0.00%	0
Riverside	Lake Elsinore city	39486	27,600	62,949	111,621	-	0.0%	0.00%	0
Orange	Lake Forest city	39496	10,735	86,346	92,938	2,585	2.8%	0.03%	106
Los Angeles	Lakewood city	39892	6,046	81,352	84,529	5,401	6.4%	0.05%	221
Los Angeles	La Mirada city	40032	5,017	49,558	52,447	-	0.0%	0.00%	0
Los Angeles	Lancaster city	40130	60,446	161,604	213,310	18,362	8.6%	0.18%	751
Orange	La Palma city	40256	1,154	15,820	16,089	803	5.0%	0.01%	33
Los Angeles	La Puente city	40340	2,222	40,795	41,601	18,797	45.2%	0.18%	769
Riverside	La Quinta city	40354	22,841	42,098	47,662	5,541	11.6%	0.05%	227

2045 City of Irvine Population for SCAG Identified High Quality Transit Areas (HQTAs) – Half Mile Radius of SCAG Identified HQTA

Irvine Transportation Center (Existing HQTA):

Irvine (ITAM) Traffic Analysis Zone (TAZ)	Orange County (OCTAM) Traffic Analysis Zone (TAZ)	Relationship to ½ mile radius of High Quality Transit Area	2045 Population[1] Not Prorated
971	1229	Population would need to be prorated	0
956	1229		0
936	1229		0
609	1229		0
975	1223	Population would need to be prorated	7,456
610	1223		-
926	1223		-
611	1223		-
947	1223		-
949	1223		-
386	1244	Population would need to be prorated	0
337	1249	Population would need to be prorated	0
339	1249		0
860	1249		0
338	1249		0
965	1261	Population would need to be prorated	0
925	1261		0
612	1261		0
613	1261		0
340	1261		0
322	1261		0
321	1261		0
343	1261		0
863	1261		0
864	1261		0
341	1264	Population would need to be prorated	0
859	1264		0
342	1264		0
920	1281	Population would need to be prorated	0

[1] Orange County Projections 2018

Future Alton Parkway Exit (State Route 55) (HQTA does NOT exist, SR 55 Bus Rapid Transit NOT a project in the adopted Connect SoCal Plan)

Irvine (ITAM) Traffic Analysis Zone (TAZ)	Orange County (OCTAM) Traffic Analysis Zone (TAZ)	Relationship to ½ mile radius of High Quality Transit Area	2045 Population[2]
396	1161	Population would need to be prorated	0
400	1161		0
408	1161		0
413	1161		0
404	1161		0
399	1161		0
395	1160	Population would need to be prorated	0
398	1160		0
402	1160		0
407	1169	Population would need to be prorated	0
412	1169		0
418	1169		0
415	1169		0
424	1169		0
423	1169		0
691	807	City of Santa Ana	
692	807		
690	807		
689	800	City of Santa Ana	

[2] Orange County Projections 2018

Jeffrey Park and Ride (Interstate 5): (HQTA does NOT exist, Interstate 5 Bus Rapid Transit NOT a project in the adopted Connect SoCal Plan)

Irvine (ITAM) Traffic Analysis Zone (TAZ)	Orange County (OCTAM) Traffic Analysis Zone (TAZ)	Relationship to ½ mile radius of High Quality Transit Area	2045 Population[3]
155	1200	Population would need to be prorated	0
156	1206	Population would need to be prorated	0
154	1190	Population would need to be prorated	0
824	1186	Population would need to be prorated	4,005
827	1186		-
826	1177	Population would need to be prorated	7,428
110	1177		-
109	1177		-
97	1165	Population would need to be prorated	3,544
96	1165		-
95	1165		-
98	1165		-
148	1174	Population would need to be prorated	1,991
142	1174		-
146	1174		-
149	1174		-
143	1170	Population would need to be prorated	2,808
152	1185	Population would need to be prorated	2,510
151	1185		-
150	1185		-

[3] Orange County Projections 2018

Spectrum Center (Interstate 5): (HQTA does NOT exist, Interstate 5 Bus Rapid Transit NOT a project in the adopted Connect SoCal Plan)

Irvine (ITAM) Traffic Analysis Zone (TAZ)	Orange County (OCTAM) Traffic Analysis Zone (TAZ)	Relationship to ½ mile radius of High Quality Transit Area	2045 Population[4]
342	1264	Population would need to be prorated	0
341	1264		0
363	1282	Population would need to be prorated	0
364	1282		0
856	1282		0
855	1282		0
358	1265	Population would need to be prorated	0
362	1265		0
359	1265		0
355	1265		0
558	1276	Population would need to be prorated	8,156
557	1276		-
349	1253	Population would need to be prorated	0
346	1253		0
338	1249	Population would need to be prorated	0
356	1262	Population would need to be prorated	5,821
354	1262		-

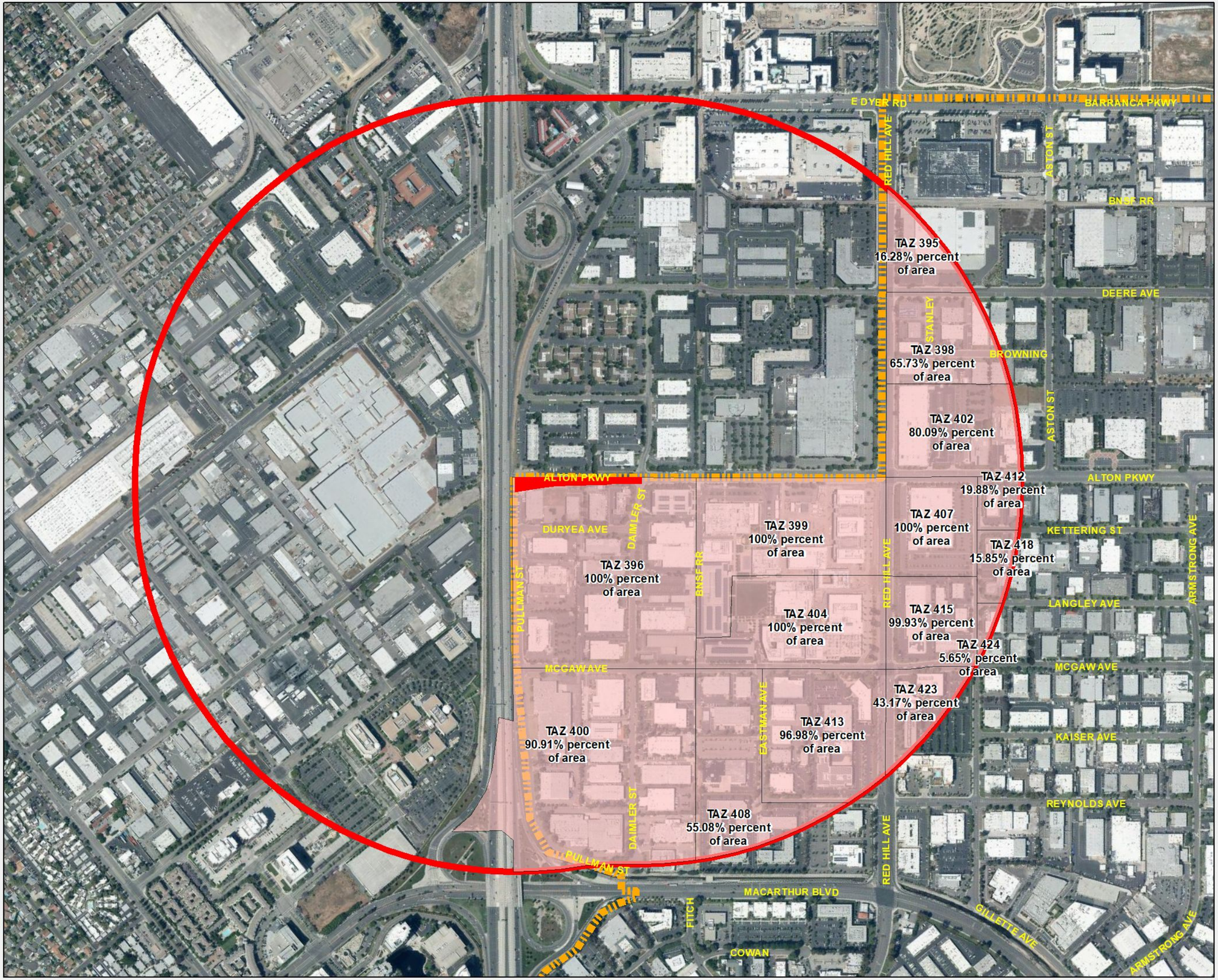
Total 2045 Population – HQTA ½ mile radius: Orange County Projections 2018 (Not Prorated to reflect population located within the HQTA)[5]	**43,719**
Total 2045 Population – HQTA ½ mile radius: SCAG RHNA Methodology Appendix Page 18[6]	**43,892**

OCP-2018 and SCAG RHNA Methodology are consistent with TOTAL 2045 population of 327,664

[4] Orange County Projections 2018
[5] Orange County Projections 2018
[6] SCAG Adopted RHNA Methodology Data Appendix

Alton ROW

- Alton ROW at the 55
- .5 Miles from Alton ROW
- Alton ROW TAZ
- City Boundary



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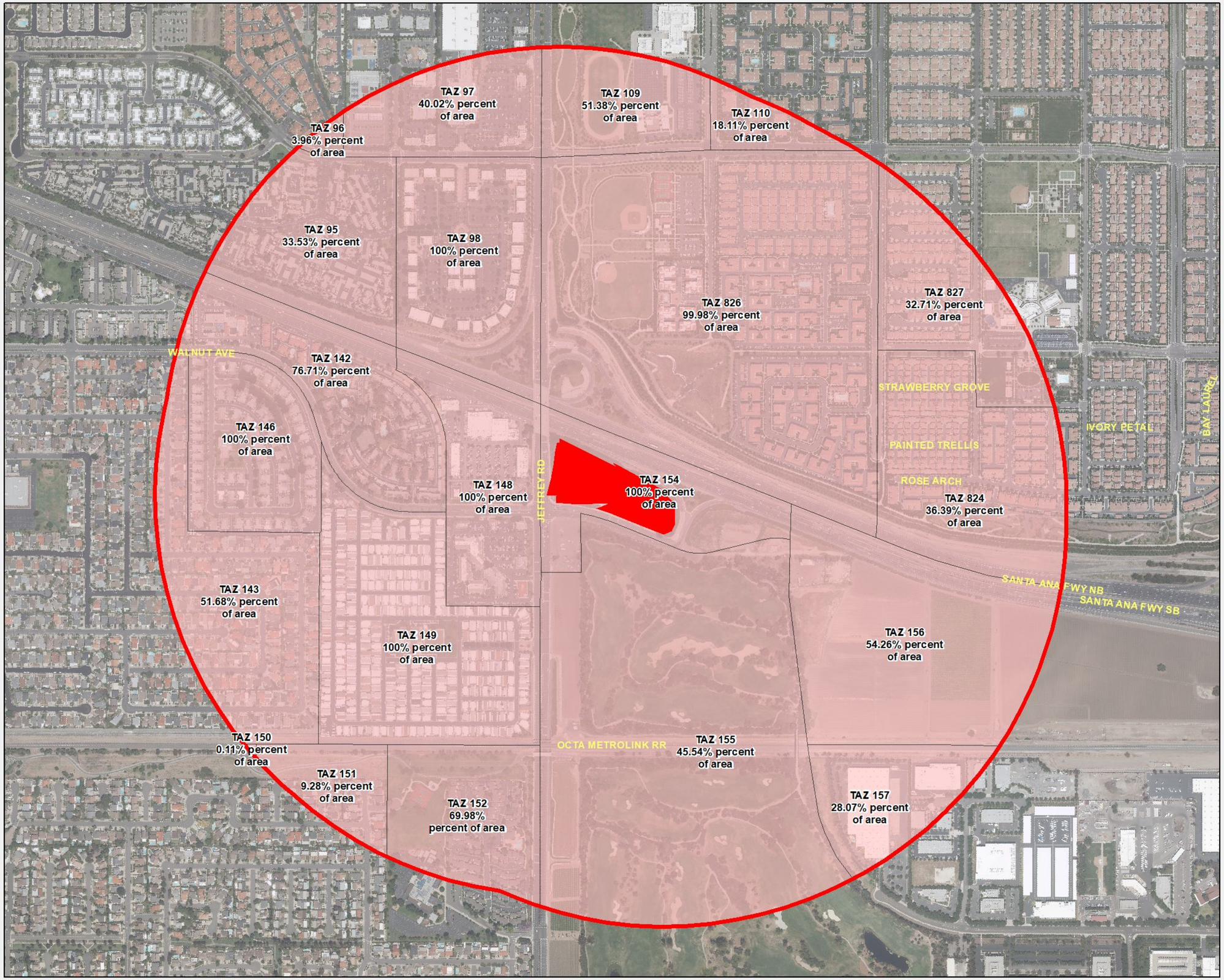
Jeffrey
Park & Ride

Jeffery Park & Ride

.5 Miles from Jeffery Park & Ride

Jeffery TAZ



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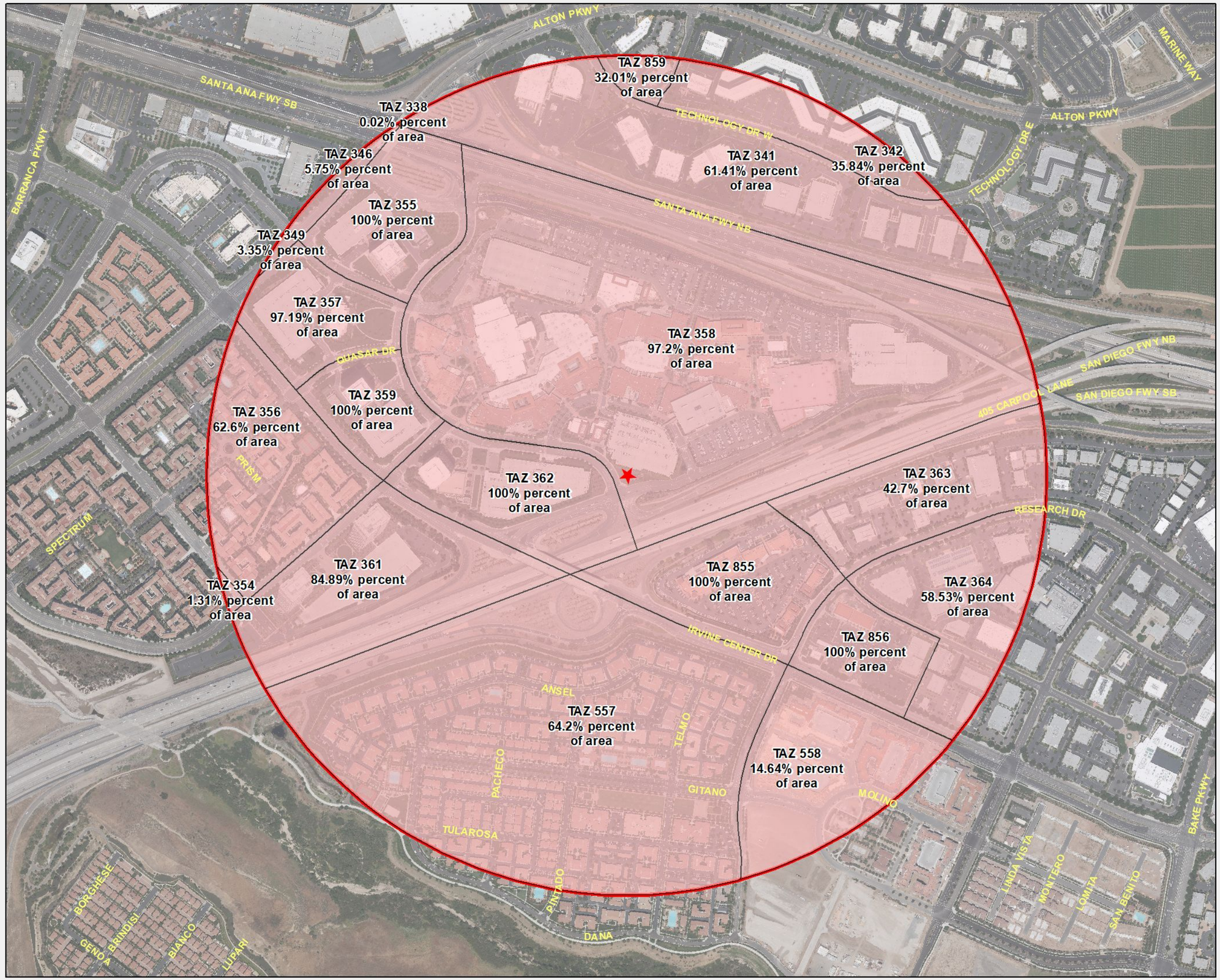
Spectrum Bus Stop



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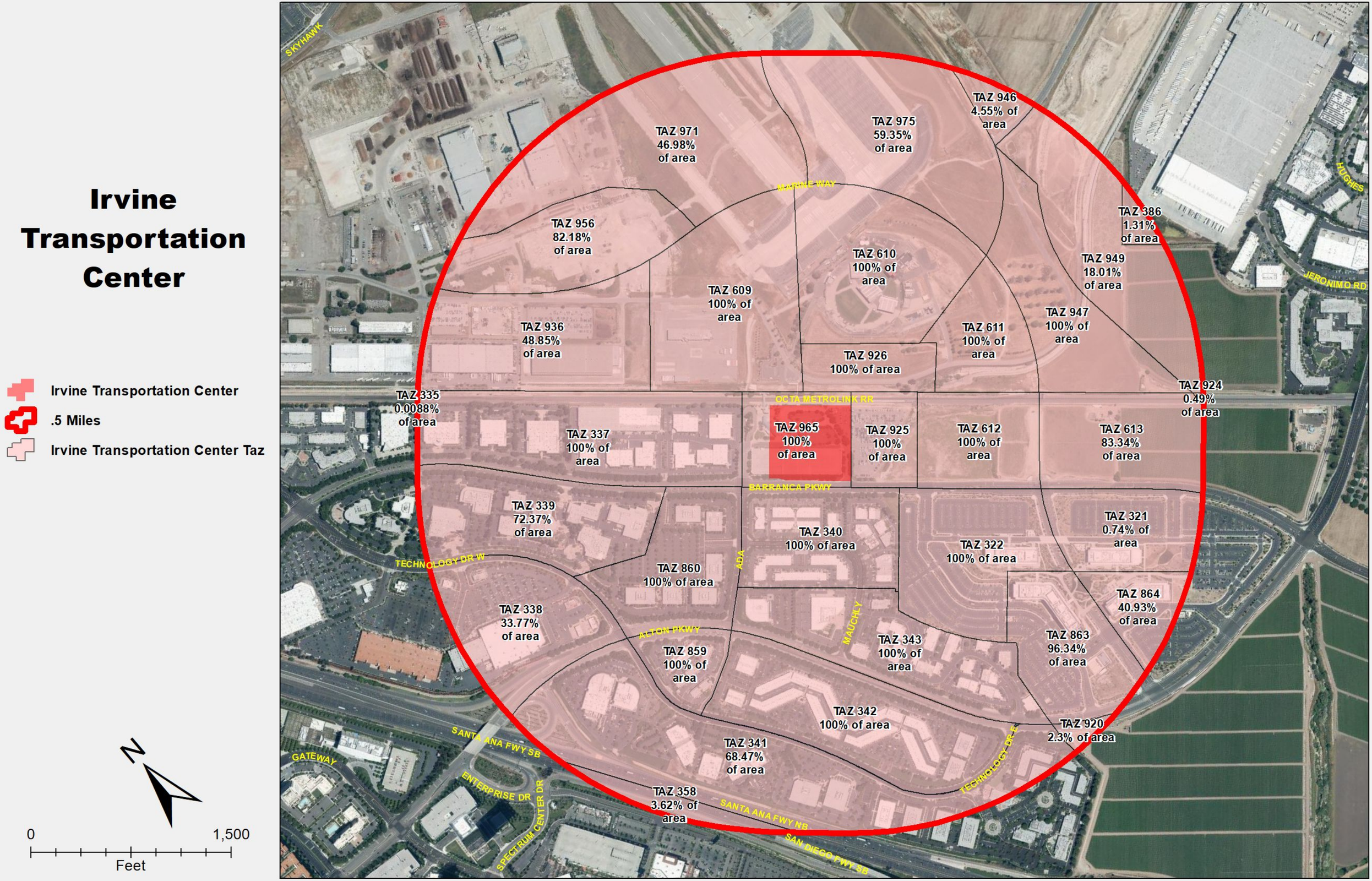
Irvine Transportation Center



Irvine Transportation Center

.5 Miles

Irvine Transportation Center Taz

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