

## 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<sup>1</sup>. 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
- **17<sup>th</sup> 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.

<sup>1</sup> Amtrak and Metrolink provide intercity and commuter rail service in Orange County.

Figure 5-1 Transit Opportunity Corridors

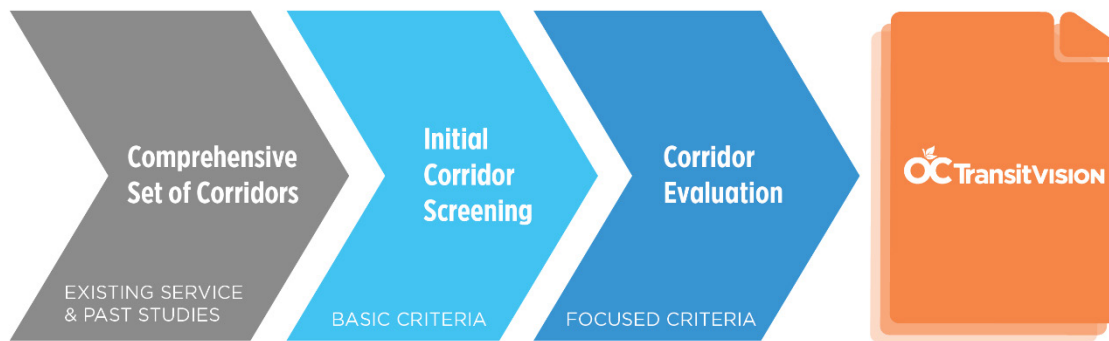


## TOC PROCESS

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
 <p>Speed &amp; Reliability</p>	% 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
 <p>Ridership/Mode Shift/VMT Reduction</p>	New Transit Trips	--	Forecast project ridership per mile (from model)
	Vehicle Miles Traveled/CO2 Emissions	--	Based on ridership
 <p>Density/Connections to Activity Centers</p>	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
 <b>Multimodal Connectivity</b>	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
 <b>Capacity</b>	Person Throughput	--	Analysis based on vehicle capacity, conceptual service plan, and roadway capacity
	Traffic Impact	--	Change in volume/capacity ratio along TOC Line
 <b>Safety</b>	Potential for Reduction in Collision Rates and Collision Severity	--	Based on ridership and existing rates of severe collisions
 <b>Passenger Comfort/Amenities</b>	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
 <p data-bbox="233 537 443 597">Cost-Effectiveness/ Productivity</p>	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

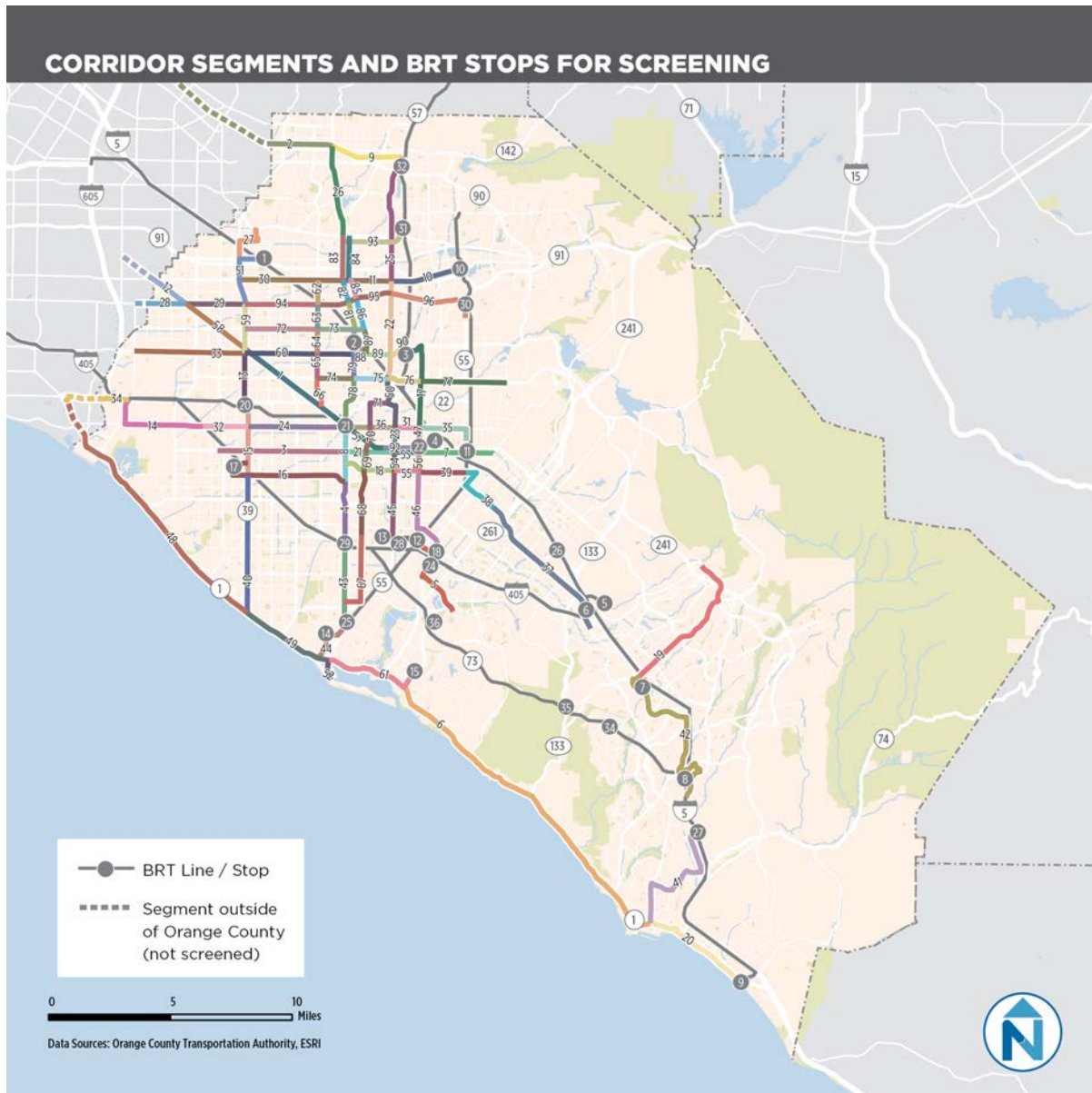
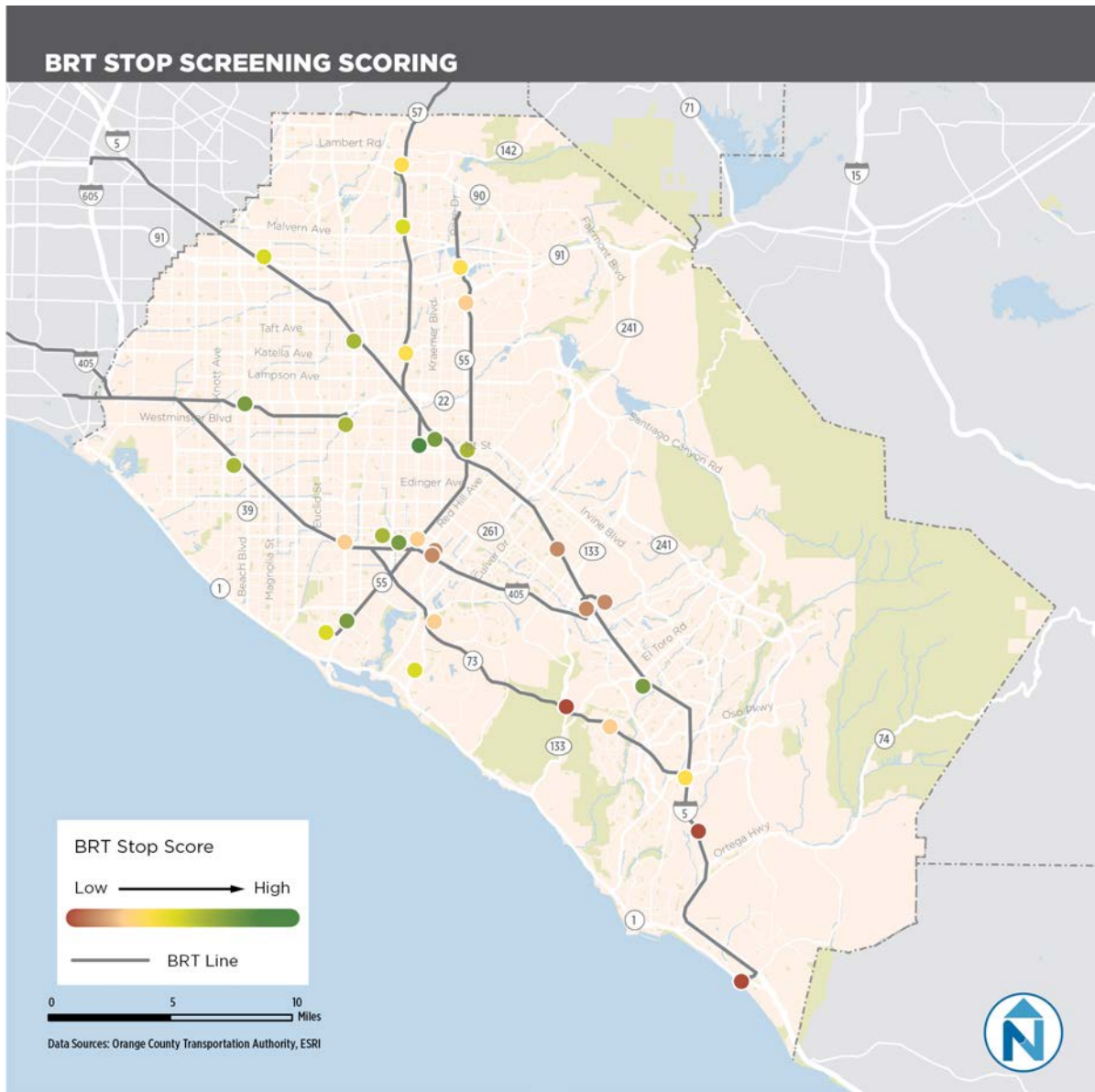


Figure 5-5 and Figure 5-6 show results of the initial screening. In general, segments and station locations in the more densely populated and lower-income north-central part of Orange County performed best. This is generally consistent with existing patterns of OC Bus ridership.



Figure 5-6 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 17<sup>th</sup>/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 17<sup>th</sup>/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.

