



CENTRAL HARBOR BOULEVARD TRANSIT CORRIDOR STUDY



EXECUTIVE SUMMARY

DECEMBER 2017

Prepared by:



In association with:



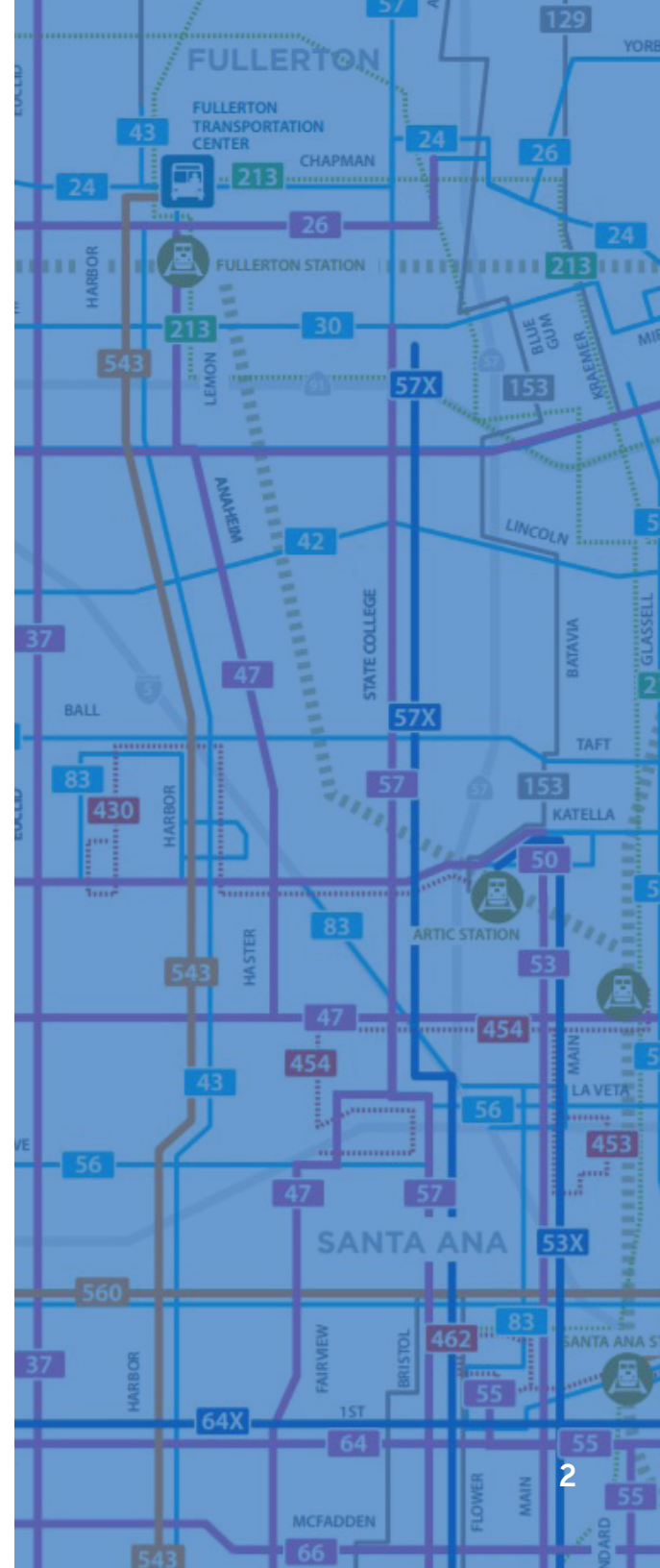
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1 Background

Harbor Boulevard is Orange County's busiest north-south transit corridor. On a typical weekday, OCTA buses average more than 12,800 boardings up and down Harbor Boulevard. OCTA buses operating on the parallel Anaheim Boulevard/Lemon Street corridor collect an additional 9,200 average weekday boardings between the cities of Fullerton and Newport Beach. Additionally, buses operating along Katella Avenue collect over 4,200 boardings on an average weekday. The three corridors combined account for a significant share of OCTA's total ridership.



Harbor Boulevard

This study focuses on an eight-mile segment of Harbor Boulevard from the Fullerton Transportation Center (FTC) in Downtown Fullerton, through the cities of Anaheim and Garden Grove to Westminster Avenue, on the border of Garden Grove and the City of Santa Ana.



Anaheim Boulevard/Lemon Street

This study also considers connections along a parallel five-mile segment of Lemon Street and Anaheim Boulevard from the FTC in Downtown Fullerton to Katella Avenue in Anaheim.



Katella Avenue

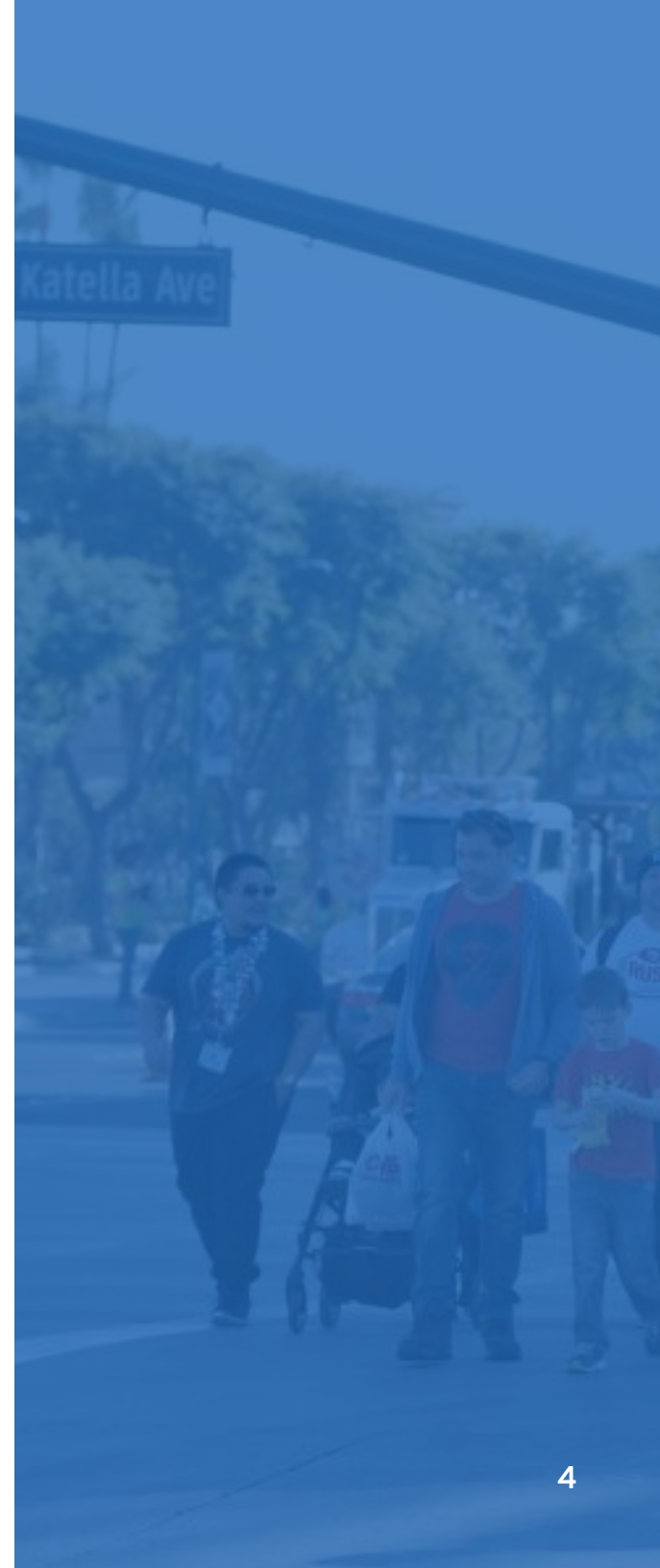
An additional 2.2-mile segment of Katella Avenue, from Harbor Boulevard to the Anaheim Regional Transportation Intermodal Center (ARTIC) in Anaheim's Platinum Triangle district has also been added for consideration in this study.



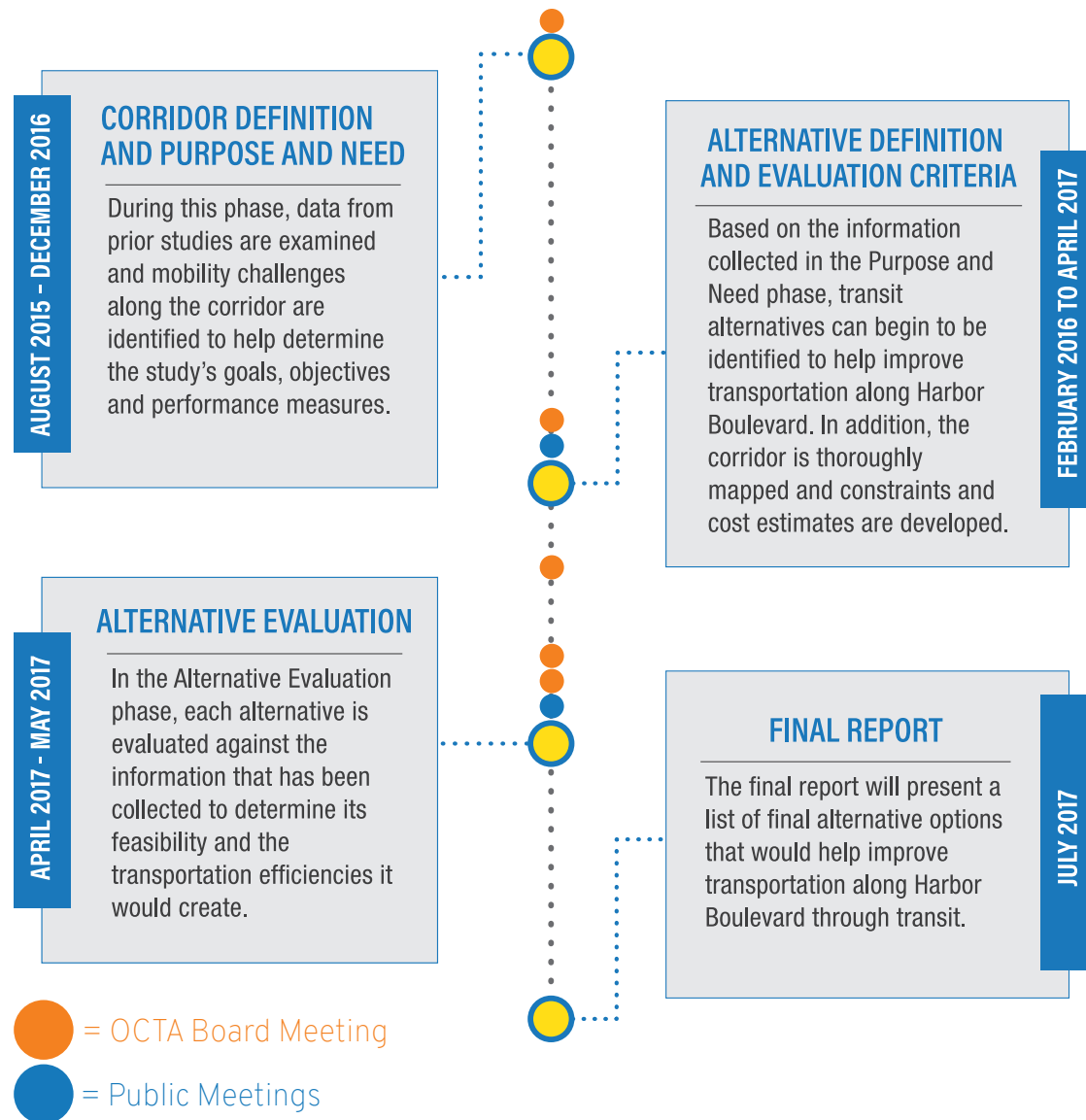
1.1 Study Goals

Since beginning the study in 2015, OCTA has worked in close coordination with the cities of Anaheim, Fullerton, Garden Grove, and Santa Ana to:

- 1. Analyze and develop strategies for improving transit along these important corridors.**
- 2. Establish goals, objectives, and evaluation criteria for evaluating transit improvements.**
- 3. Develop 12 project alternatives and evaluate each alternative against comprehensive criteria.**
- 4. Recommend next steps that serve OCTA's core mission of moving more people and supporting each corridor city's long-term plans.**



1.2 Study Timeline



In 2015, OCTA initiated the *Central Harbor Boulevard Transit Corridor Study* to analyze transit options along an eight-mile segment of Harbor Boulevard—Orange County's busiest north/south transit corridor.

The study was intended to analyze up to nine alternatives, including alignment, mode technology, stop locations, ridership/cost estimates, and feedback from stakeholders. This would allow OCTA and corridor cities to move forward and analyze a locally preferred alternative, prepare an environmental assessment, and seek further public participation during subsequent project phases.

In October 2016, the OCTA Board of Directors, per an agreement with the City of Anaheim, amended the scope of the *Central Harbor Boulevard Transit Corridor Study* to also evaluate three additional alternatives that provide connections between The Anaheim Resort® and the Anaheim Regional Transportation Intermodal Center (ARTIC).



2 Why Harbor?

2.1 Key Themes

Harbor Boulevard is an important north-south transit spine and is served by the highest-frequency bus service in the entire OCTA system.

Population densities and employment densities in the study area are double and triple the county averages.

Investments in the corridor ensure that resources are being placed where the demand is greatest.

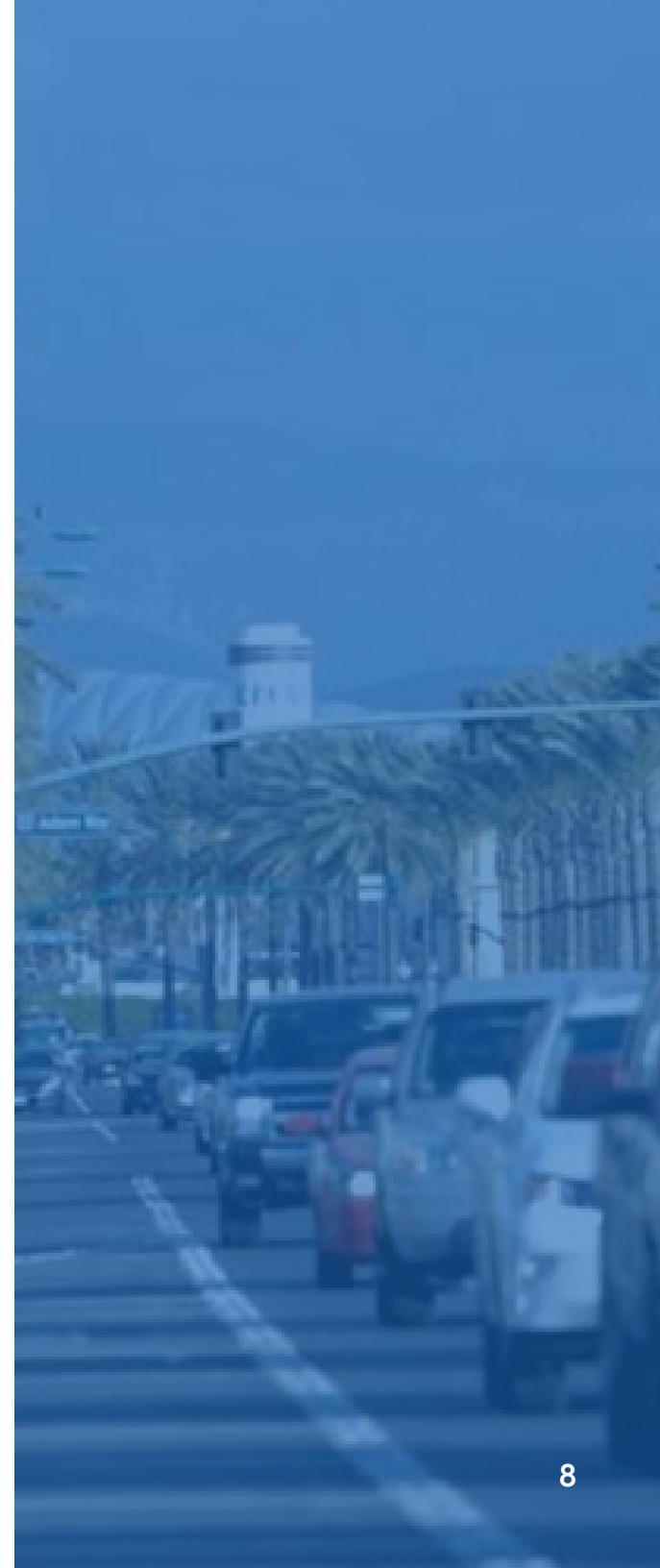
Improvements on the corridor coincide with improvements on other major corridors such as Westminster Avenue.

Improvements also enhance connections to regional rail hubs in Fullerton, Anaheim, and Santa Ana.



2.2 Key Challenges

- 1. Performance:** Current traffic conditions limit the speed and reliability of transit service.
- 2. Land Uses:** Some land uses prioritize automobile access over transit and pedestrian options.
- 3. Connectivity:** Connections to and from major activity centers are often inconvenient and time-consuming.
- 4. Infrastructure:** The built-out nature of Harbor Boulevard means that most roads cannot be expanded to meet increased demand.
- 5. Mode Choice & User Experience:** For many trips, few modes are competitive with the automobile.
- 6. Cost:** OCTA must balance benefits with overall project costs to ensure the best use of public funds.



3 Alternatives

The study analyzes 12 alternatives across a combination of four modes and corridor options.

Mode Options

Enhanced Bus



- Shares lanes with other cars
- Receives priority at traffic signals and uses bypass lanes at select intersections
- Includes state-of-the-art stops with ticket machines
- Carries up to 70 people per bus
- Project Cost: \$

Bus-Rapid Transit



- Includes all Enhanced Bus features, but travels on a dedicated bus-only lane
- Carries around 120 people in a longer, 60-foot bus
- Project Cost: \$\$

Streetcar



- Shares lanes with cars but travels on its own track embedded in the road
- Powered by overhead wires
- Includes modern stops with ticket machines
- Carries up to 150 people per streetcar (3x as much as regular buses)
- Project cost: \$\$\$

"Rapid" Streetcar



- Includes all Streetcar features, but uses a dedicated streetcar-only lane
- Faster than a regular streetcar or bus
- Project Cost: \$\$\$\$

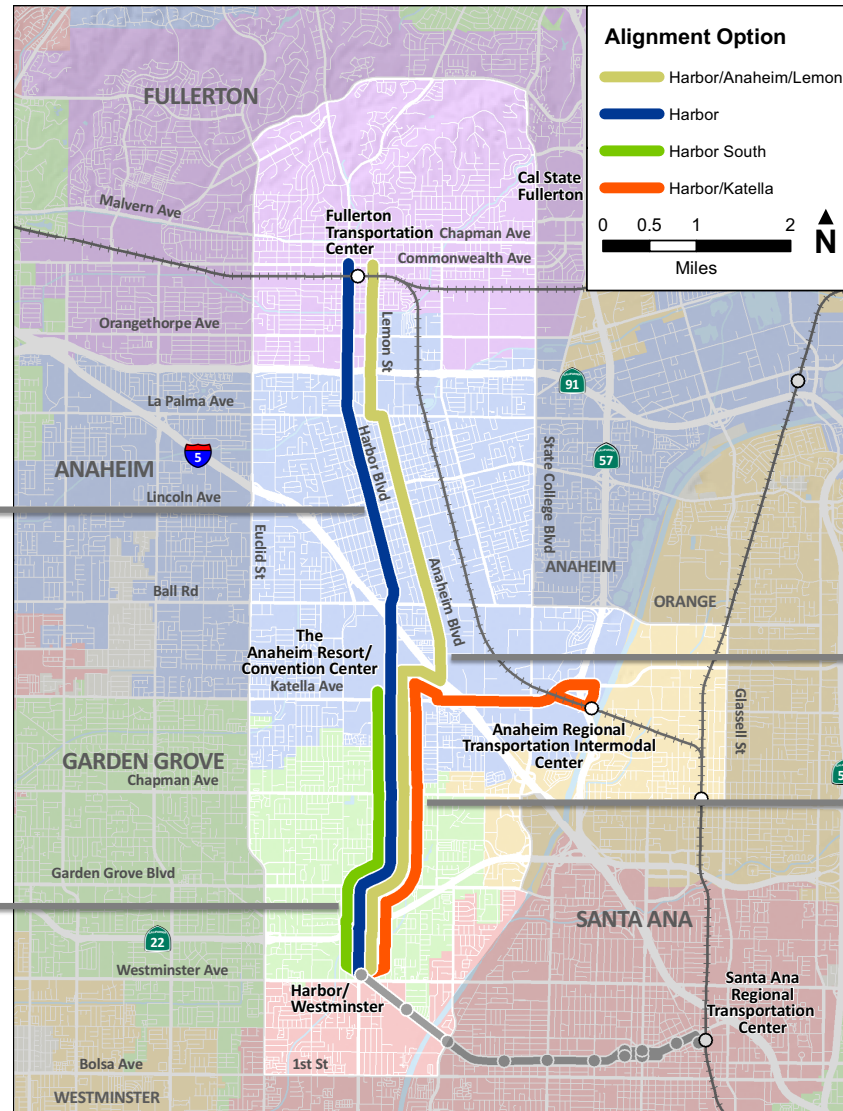
Four Alignment Options, Twelve Alternatives

HARBOR LONG

- H-2: Harbor Long Streetcar
- H-3: Harbor Rapid Streetcar
- H-4: Harbor Enhanced Bus
- H-5: Harbor Bus Rapid Transit

HARBOR SHORT

- H-1: Harbor Short Streetcar



ANAHEIM/LEMON

- L-1: Anaheim/Lemon Streetcar
- L-2: Anaheim/Lemon Rapid Streetcar
- L-3: Anaheim/Lemon Enhanced Bus
- L-4: Anaheim/Lemon BRT

KATELLA

- K-1: Katella Streetcar
- K-2: Katella+ Anaheim/Lemon Enhanced Bus
- K-3: Katella + Harbor Hybrid

4 Results

4.1 Evaluation Criteria

OCTA evaluated each of the 12 alternatives according to the criteria below.

Transit Performance

- *How long does it take to get to my destination?*
- *Is the bus or streetcar usually on time?*
- *Does it encourage more people to ride?*

Land Use

- *Does project complement nearby land uses?*
- *Does it support the local economy and help create jobs?*
- *Is it environmentally-friendly?*

Connectivity

- *Does the bus or streetcar take me to major destinations?*
- *Can I reach my destination within one transfer?*
- *Can I walk or ride my bike to/from a station?*

Corridor Constraints

- *Does the project affect our roads and traffic?*
- *Does it make our streets safer?*
- *Does it complement my neighborhood?*

Mode Choice/User Experience

- *Does the project encourage more people to ride transit and drive less?*
- *Does it benefit people without cars?*
- *Are stops/stations safe and attractive?*

Cost Effectiveness

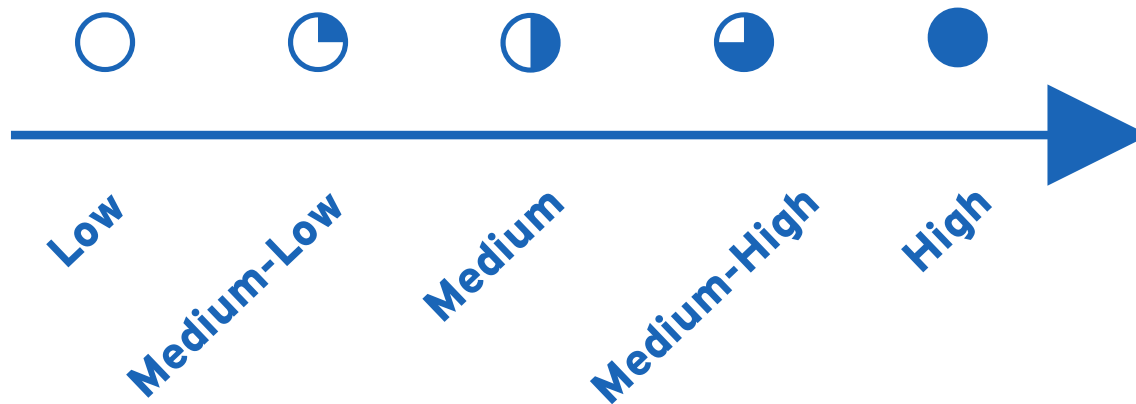
- *Is the project a good use of local public funds?*
- *Does it do a good job of balancing costs and benefits?*
- *Are there other sources of funding available?*

Community Support

OCTA will pursue a project that has broad support from public and all stakeholders.

4.2 Scoring Methodology

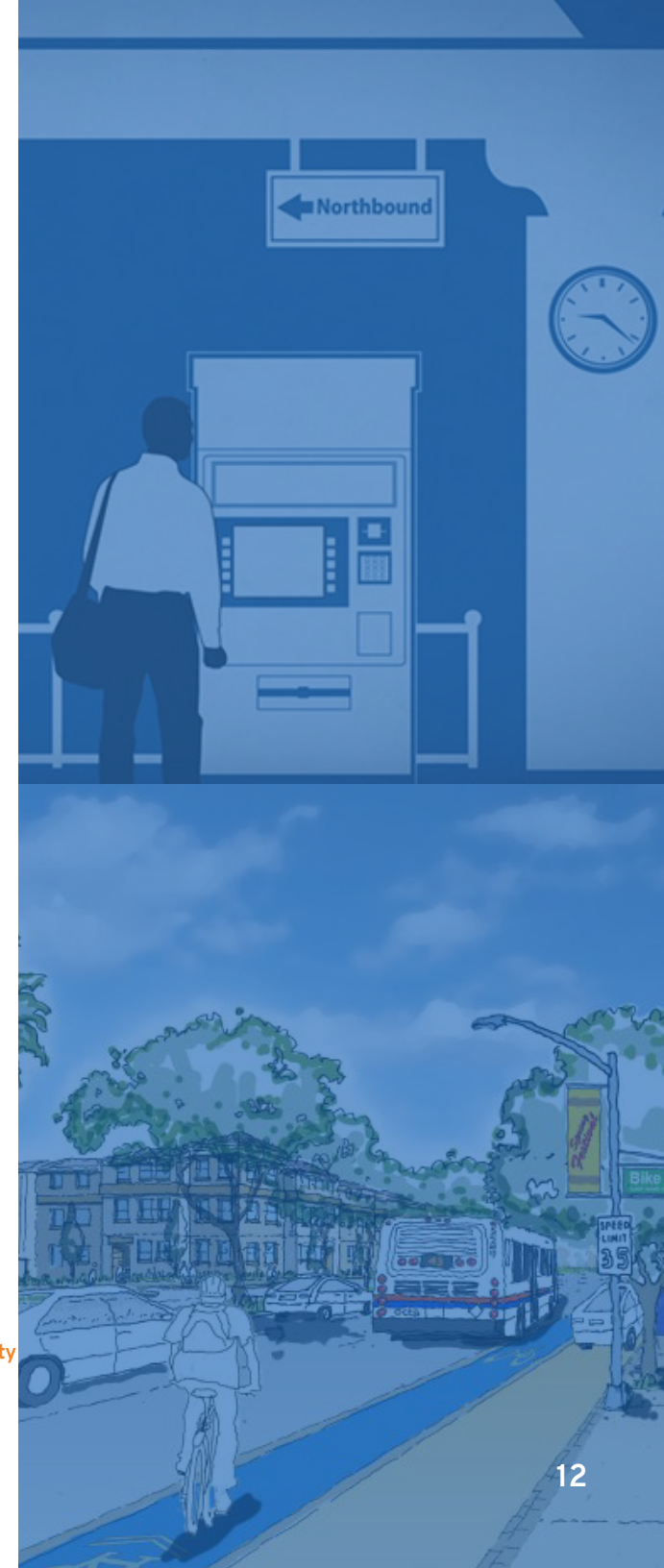
Each alternative received an overall score between 0 and 100, according to four qualitative and quantitative measures under the criterion on page 11.¹ The four scores under each criterion were aggregated on a scale from low to high, where "low" = 0 and "high" = 5.



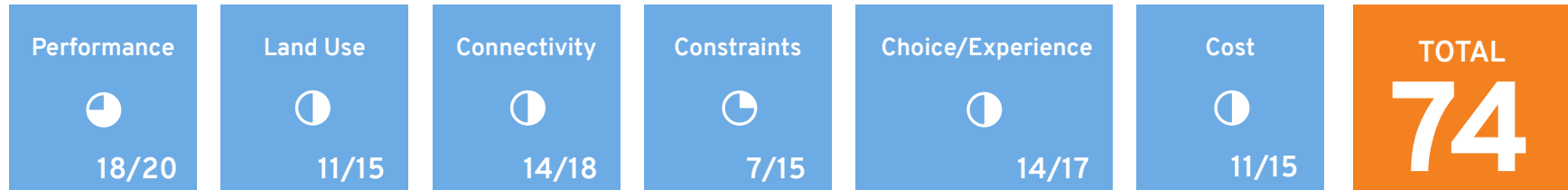
Each criteria was then weighted according to established preferences of the the corridor cities.

The following pages show a detailed scoring breakdown for each alternative ranked by their overall total score.

¹ Community support was factored in separately into the evaluation of alternatives. See next section for results from community surveys.



H-3: HARBOR RAPID STREETCAR



Capital Cost

\$690M

Net Operations &
Maintenance Cost

\$1.9M

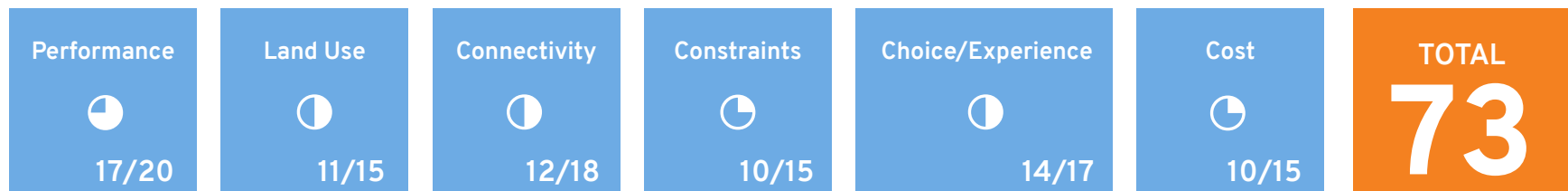
Boardings

15,200

Travel Time Savings

15%

H-2: HARBOR LONG STREETCAR



Capital Cost

\$610M

Net Operations &
Maintenance Cost

\$3M

Boardings

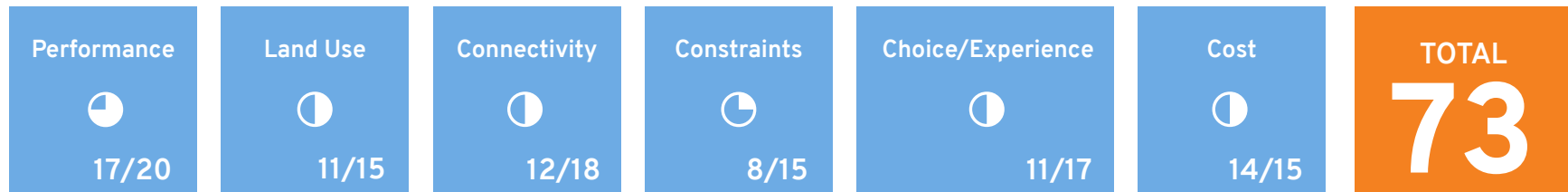
14,700

Travel Time Savings

9%

*Total scores and Harvey Ball ratings may vary slightly across alternative and criteria due to rounding and weighting.
** Net Operations & Maintenance costs per year.

H-5: HARBOR BUS RAPID TRANSIT



Capital Cost

\$230M

Net Operations & Maintenance Cost

\$1.1M

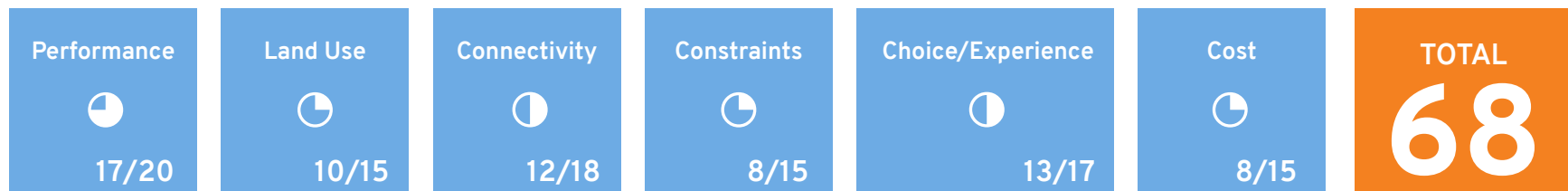
Boardings

14,600

Travel Time Savings

17%

L-1: ANAHEIM/LEMON STREETCAR



Capital Cost

\$660M

Net Operations & Maintenance Cost

\$4M

Boardings

11,300

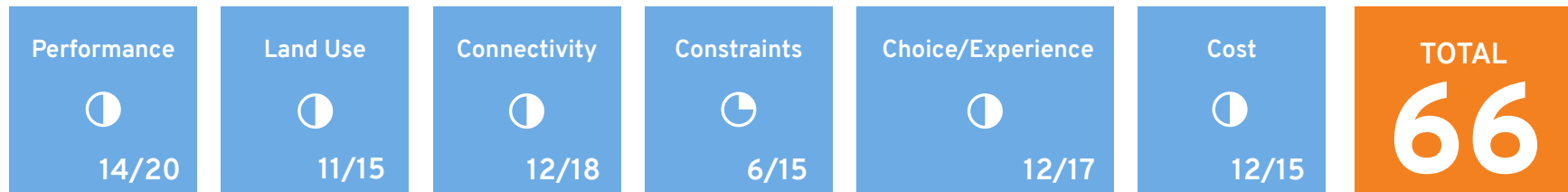
Travel Time Savings

2%

*Total scores and Harvey Ball ratings may vary slightly across alternative and criteria due to rounding and weighting.

** Net Operations & Maintenance costs per year.

L-4: ANAHEIM/LEMON BRT



Capital Cost

\$250M

Net Operations & Maintenance Cost

\$1.8M

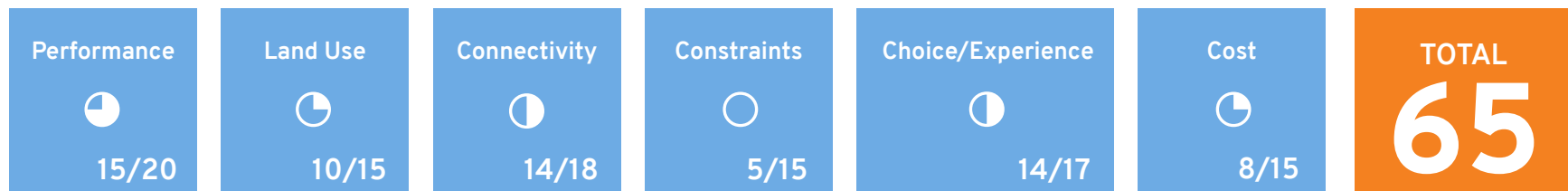
Boardings

12,000

Travel Time Savings

13%

L-2: ANAHEIM/LEMON RAPID STREETCAR



Capital Cost

\$740M

Net Operations & Maintenance Cost

\$3M

Boardings

12,500

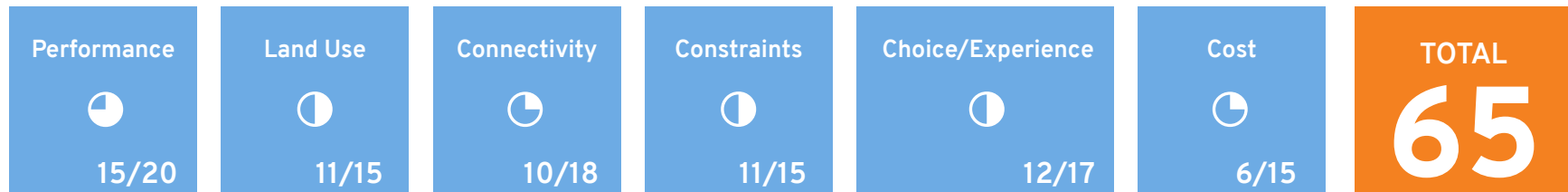
Travel Time Savings

9%

*Total scores and Harvey Ball ratings may vary slightly across alternative and criteria due to rounding and weighting.

**Net Operations & Maintenance costs per year.

K-1: KATELLA STREETCAR



Capital Cost

\$450M

Net Operations & Maintenance Cost

\$5.2M

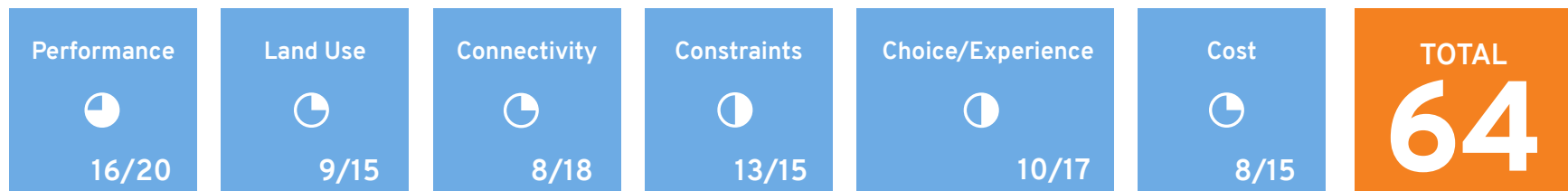
Boardings

5,500

Travel Time Savings

3%

H-1: HARBOR SHORT STREETCAR



Capital Cost

\$260M

Net Operations & Maintenance Cost

\$3.1M

Boardings

3,700

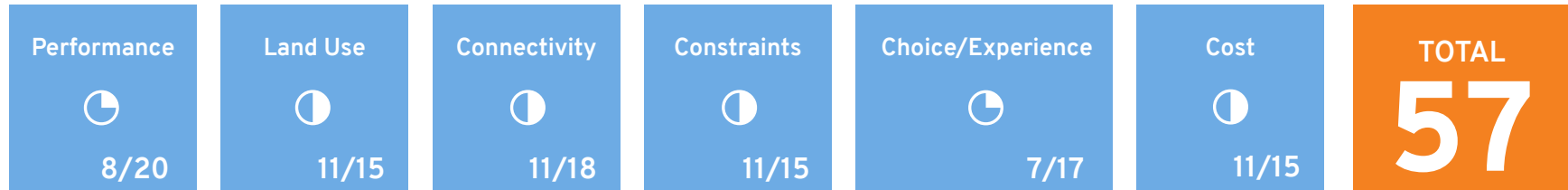
Travel Time Savings

3%

*Total scores and Harvey Ball ratings may vary slightly across alternative and criteria due to rounding and weighting.

** Net Operations & Maintenance costs per year.

K-2: KATELLA+ANAHEIM/LEMON ENHANCED BUS



Capital Cost

\$60M

Net Operations &
Maintenance Cost

\$1.7M

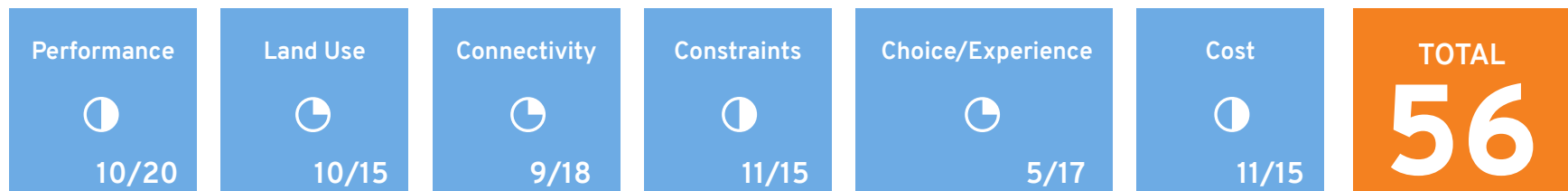
Boardings

4,900

Travel Time Savings

6%

L-3: ANAHEIM/LEMON ENHANCED BUS



Capital Cost

\$67M

Net Operations &
Maintenance Cost

\$1M

Boardings

5,400

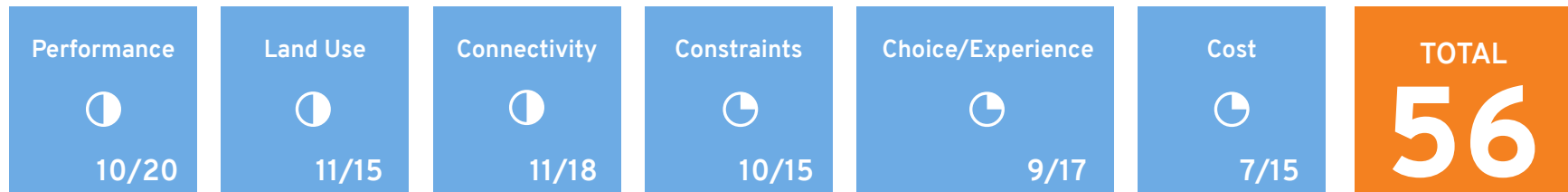
Travel Time Savings

7%

*Total scores and Harvey Ball ratings may vary slightly across alternative and criteria due to rounding and weighting.

**Net Operations & Maintenance costs per year.

K-3: KATELLA+HARBOR HYBRID



Capital Cost

\$300M

Net Operations & Maintenance Cost

\$3M

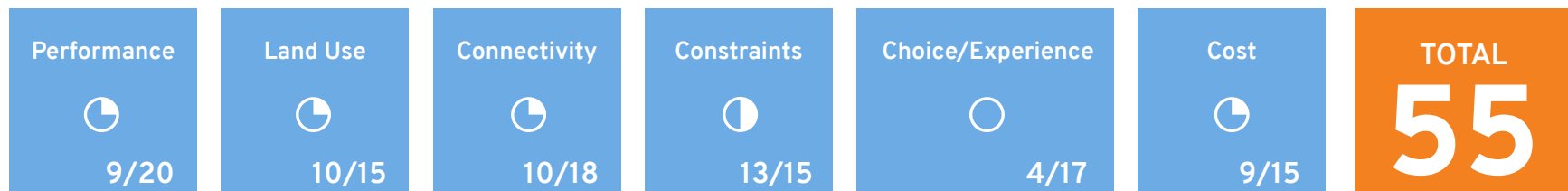
Boardings

7,000

Travel Time Savings

N/A

H-4: HARBOR ENHANCED BUS



Capital Cost

\$64M

Net Operations & Maintenance Cost

\$1M

Boardings

5,200

Travel Time Savings

12%

* Total scores may vary slightly from sum of listed category scores due to weighting and rounding calculations.

** Net Operations & Maintenance costs per year.

Evaluation Results Summary

Alternative	Mode	Description	Transit Performance	Land Use	Connectivity	Constraints	Mode Choice/User Experience	Cost	Weighted Total
H-3	Rapid Streetcar	Harbor Rapid Streetcar from Harbor Blvd/Westminster Ave to FTC	18	11	14	7	14	11	74
H-2	Streetcar	Harbor Long Streetcar from Harbor Blvd/Westminster Ave to FTC	17	11	12	10	14	10	73
H-5	BRT	Harbor Bus Rapid Transit from Harbor Blvd/MacArthur Blvd to FTC	17	11	12	8	11	14	73
L-1	Streetcar	Anaheim/Lemon Streetcar from Harbor Blvd/Westminster Ave to FTC	17	10	12	8	13	8	68
L-4	BRT	Anaheim/Lemon Bus Rapid Transit from Harbor Blvd/MacArthur Blvd to FTC	14	11	12	6	12	12	66
L-2	Rapid Streetcar	Anaheim/Lemon Rapid Streetcar from Harbor Blvd/Westminster Ave to FTC	15	10	14	5	14	8	65
K-1	Streetcar	Katella Streetcar from Harbor Blvd/Westminster Ave to ARTIC	15	11	10	11	12	6	65
H-1	Streetcar	Harbor Short Streetcar from Harbor Blvd/Westminster Ave to Anaheim Resort	16	9	8	13	10	8	64
K-2	Bus	Katella + Anaheim/Lemon Enhanced Bus from Harbor Blvd/Westminster Ave to FTC, every other trip to ARTIC	8	11	11	11	7	11	57
L-3	Bus	Anaheim/Lemon Enhanced Bus from Harbor Blvd/MacArthur Blvd to FTC	10	10	9	11	5	11	56
K-3	Hybrid	Harbor Short Streetcar from Harbor Blvd/Westminster Ave to Anaheim Resort + Enhanced Bus from FTC to ARTIC via Anaheim/Lemon	10	11	11	10	9	7	56
H-4	Bus	Harbor Enhanced Bus from Harbor Blvd/MacArthur Blvd to FTC	9	10	10	13	4	9	55

Note: Individual subtotals may not equal weighted total due to rounding.

Harbor Short
 Harbor Long
 Anaheim/Lemon
 Katella

4 Outreach

4.1 Outreach Activities



Open Houses: OCTA held two open houses each in February 2016 and March/April 2017, respectively. Approximately 50 stakeholders attended the open houses.

Stakeholder Workshops: OCTA held two stakeholder workshops, in January 2016 and March 2017. The workshops provided an opportunity for community leaders to provide early feedback. Approximately 40 leaders participated in both workshops.

OCTA Board of Directors: The OCTA Board of Directors provided input on the study during five regular monthly board meetings: Jul 2015, Jan 2016, Oct 2016, Feb 2017, and Mar 2017.

4.2 Public Feedback

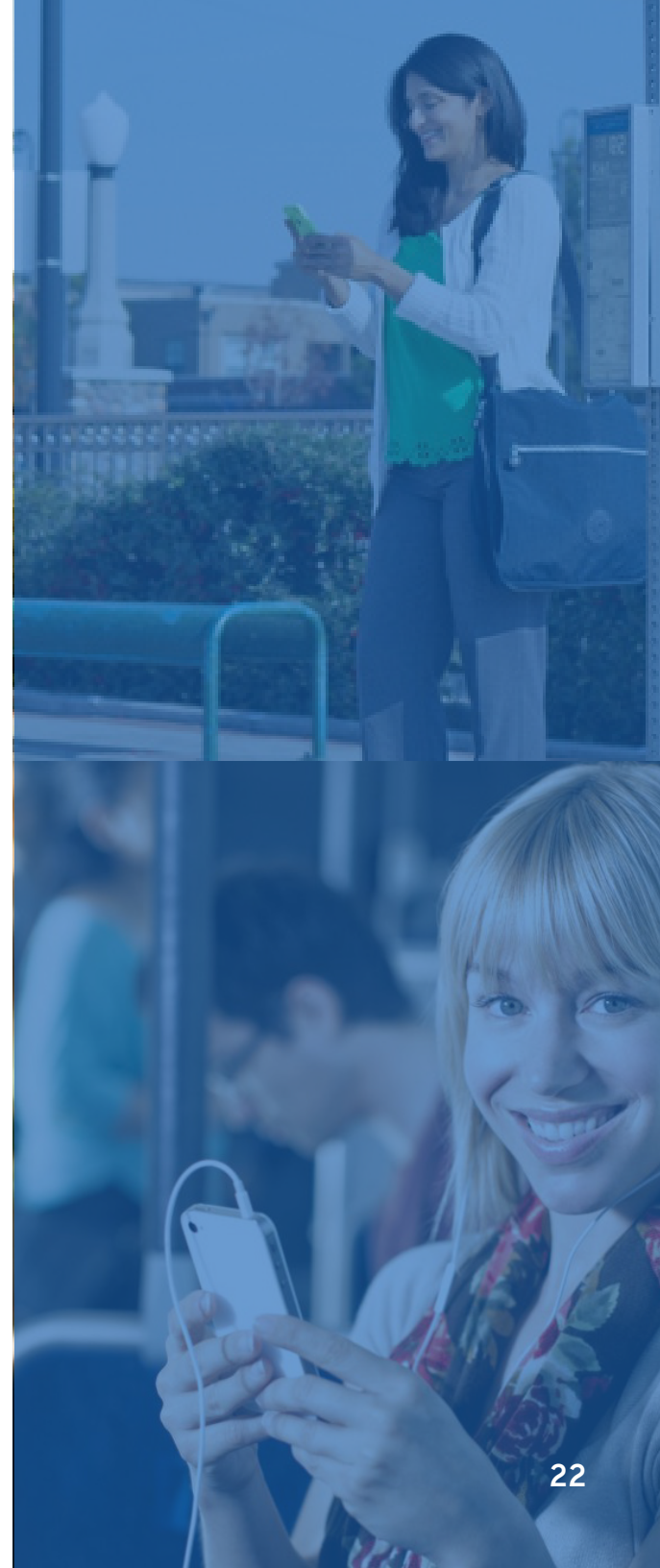
OCTA conducted two rounds of surveys in Winter 2016 and Spring 2017 to gauge the community's thoughts on the study. Surveys were conducted onboard OCTA buses and administered online. Respondents were asked to express a preference for mode and corridor. Over 1,000 responses were recorded. Below is a summary of results from the survey.

Mode Preference

- 24%** Rapid Streetcar
- 20%** Enhanced Bus
- 17%** BRT
- 13%** Streetcar
- 10%** Bus/Streetcar Hybrid

Corridor Preference

- 37%** Harbor "Long"
- 23%** Katella
- 20%** Anaheim-Lemon
- 2%** Harbor "Short"



5 NEXT STEPS

This Executive Summary presents the performance evaluation results for the *Central Harbor Boulevard Transit Corridor Study*. A total of twelve conceptual transit alternatives were evaluated against 24 evaluation criteria to help determine which alignments, modes, and features best met the study objectives. These results will be considered along with the city and community input received during the course of the study. This information will help inform decisions about potential advancement of a small group of alternatives into a subsequent study phase. The next study phase would likely include a detailed environmental review, public engagement, and selection of a preferred alternative.

A final round of outreach is proposed in early 2018, to present the evaluation results to each of the cities in the study area and to receive their comments. The study reports will also be available on the study webpage for public review and comment. The input received from the cities, public, and stakeholders will be incorporated into the Final Report and inform the study recommendations.

Study webpage: ***octa.net/harborgetinvolved***



Westminster Avenue looking south

Image Sources

All images are OCTA property unless listed below.

Inside Cover: City of Garden Grove. September 2015. www.ci.garden-grove.ca.us/econdev/grove-district-new-website

Table of Contents: The Hornet. Fullerton College. 2013. <http://hornet.fullcoll.edu/new-bravo-buses-zip-through-harbor-blvd/>

Page 2, left to right:

Flickr user Jonathan Riley. January 2015. www.flickr.com/photos/125733295@N07/15820452853/in/photostream

Yiu, Chaffee. www.chaffeeyiu.com/photo/octa/octa-5634-47.jpg

CPTDB user "RagingRapid," October 2016. http://farm9.staticflickr.com/8577/29534197413_7c314c57ae_b.jpg

Page 3, bottom: Blogspot user "Gorgim," May 2011. <http://gorgim.blogspot.com/2011/05/>

Page 4: Marroquin, Art. OC Register. December, 2015. www.ocreger.com/2015/12/10/octa-to-consider-derailing-anaheim-streetcar/

Page 7: top to bottom:

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Page 8: Marroquin, Art. OC Register. December, 2015. www.ocreger.com/2015/12/10/octa-to-consider-derailing-anaheim-streetcar/

Page 9, left to right:

Flickr user "crown426," July 2013. www.flickr.com/photos/crown426/9281634508/

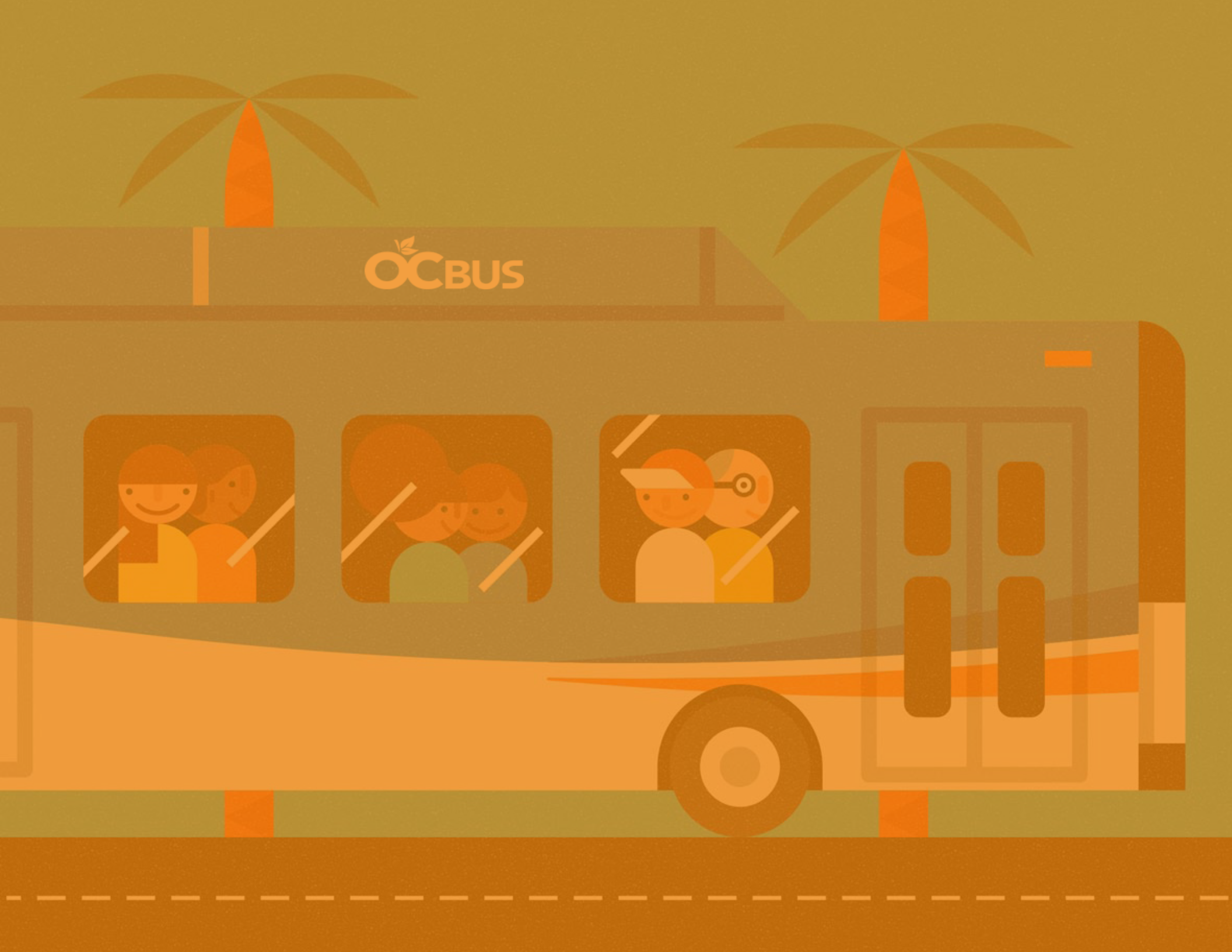
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Harrison, Mark. The Seattle Times. August 2015. http://static.seattletimes.com/wp-content/uploads/2015/08/145595_Trolley_mh372-1024x1024.jpg

Flickr user "Garrett," August 2011. www.flickr.com/photos/33970903@N02/6024098878

Page 12, bottom: City of Santa Ana, *Harbor Mixed Use Transit Corridor Specific Plan*. October 2014. www.santa-ana.org/harborplan/documents/web_HCP_Adopted-Oct2014.pdf

Page 22: City of Santa Ana, *Harbor Mixed Use Transit Corridor Specific Plan*. October 2014. www.santa-ana.org/harborplan/documents/web_HCP_Adopted-Oct2014.pdf



OCBUS

