

**Board Report**

File #: 2020-0613, **File Type:** Plan**Agenda Number:** 24.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
OCTOBER 15, 2020****SUBJECT: REGIONAL CONNECTOR SERVICE PLAN****ACTION: APPROVE RECOMMENDATION****RECOMMENDATION**

APPROVE Alternative A (Long Beach - APU/Citrus College and Santa Monica - Atlantic) as the opening day service plan for Regional Connector.

ISSUE

The Regional Connector is anticipated to open in the Summer of 2022. This project will connect the A Line (Blue), E Line (Expo) and L Line (Gold) into one integrated light rail network with all trains serving three new stations through downtown LA. The service plan described in the Locally Preferred Alternative (LPA) of the 2012 Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) described trains routed through downtown LA in a North/South and East/West configuration connecting Long Beach to APU/Citrus College and beyond and Santa Monica to Atlantic and beyond. This service plan has been referenced in public outreach and engagement through the EIS/EIR stage of the project as well as during construction. The Board action recommended in this report seeks to validate and approve the LPA as the service plan for operations starting opening day of the Regional Connector.

DISCUSSION

The Regional Connector Transit Project is a 1.9 mile Light Rail Transit extension that will connect the A Line (Blue) and E Line (Expo) with the L Line (Gold) through downtown LA. By connecting the three rail lines together, the L Line (Gold) would be severed at Little Tokyo Station. However, all lines will run through downtown LA and serve three new stations at:

- Little Tokyo/Arts District Station - 1st St/Central Av
- Historic Broadway Station - 2nd St/Broadway
- Grand Av Arts/Bunker Hill Station - 2nd Pl/Hope St

In addition, Regional Connector provides the opportunity to connect the A Line (Blue) and E Line (Expo) with L Line (Gold) giving customers direct service through downtown LA. The service plan described in the LPA of the EIS/EIR would connect the A Line (Blue) with the L Line (Gold) north from

Union station to APU/Citrus College and the E Line (Expo) with the L Line (Gold) east from Pico/Aliso to Atlantic Station. The purpose of this report is to validate and seek approval for the LPA service plan based on the following criteria:

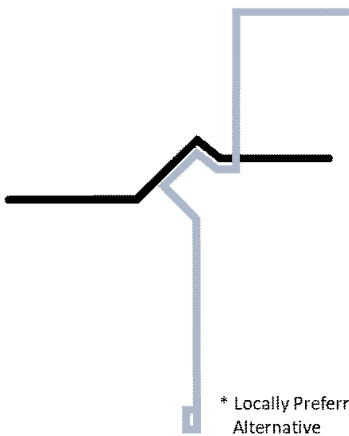
- Travel patterns to/from each segment
- Network simplicity
- Headway consistency
- On Time Performance
- Peak vehicle requirement
- Revenue vehicle hours

In addition, it is important to note that the project team has conducted a significant amount of public and stakeholder outreach and engagement referencing the LPA service plan throughout the project development. Over 100 stakeholder working group briefings were made during the EIS/EIR process as well as elected official briefings, community update meetings, and collateral materials disseminated. During the construction phase, outreach continues through additional elected official briefings, through the Community Leadership Council (CLC), monthly community meetings, pop up events, through print and digital collateral materials, and at the Little Tokyo Community Office. The service plan described in the LPA has been well received throughout the entire outreach and engagement process.

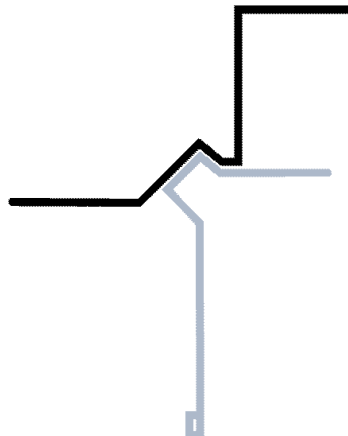
Alternative Evaluated

There are three primary alternative service plans that were evaluated, as follows:

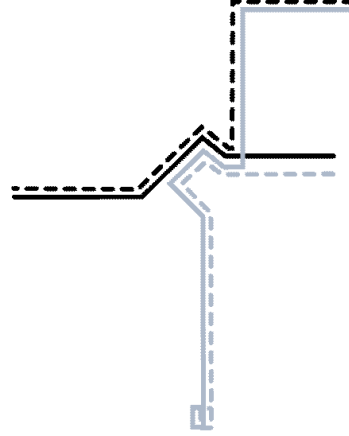
Alt A: Long Beach – Azusa,
Santa Monica – Atlantic*



Alt B: Long Beach – Atlantic,
Santa Monica – Azusa



Alt C: Long Beach – Atlantic/Azusa
Expo – Atlantic/Azusa



- **Alternative A** is the LPA and connects A Line (Blue) with the L Line (Gold) north from Union station to APU/Citrus College and the E Line (Expo) with the L Line (Gold) east from Pico/Aliso

to Atlantic Station

- **Alternative B** connects A Line (Blue) with the L Line (Gold) east from Pico/Aliso to Atlantic Station and the E Line (Expo) with the L Line (Gold) north from Union station to APU/Citrus College
- **Alternative C** is a branch alternative that connects both A Line (Blue) and E Line (Expo) with alternating trips to the L Line (Gold) east from Pico/Aliso to Atlantic Station and the L Line (Gold) north from Union station to APU/Citrus College

Travel Patterns

All three alternatives provide service from their respective outer terminals to downtown LA. They all also share the same alignment through downtown LA via the Regional Connector. Therefore, the only travel pattern consideration is to identify if there is a distinct bias for customers travelling from one leg of the network through downtown LA to the other leg of the network.

Figure 1
Trips Distributions for Alternative A

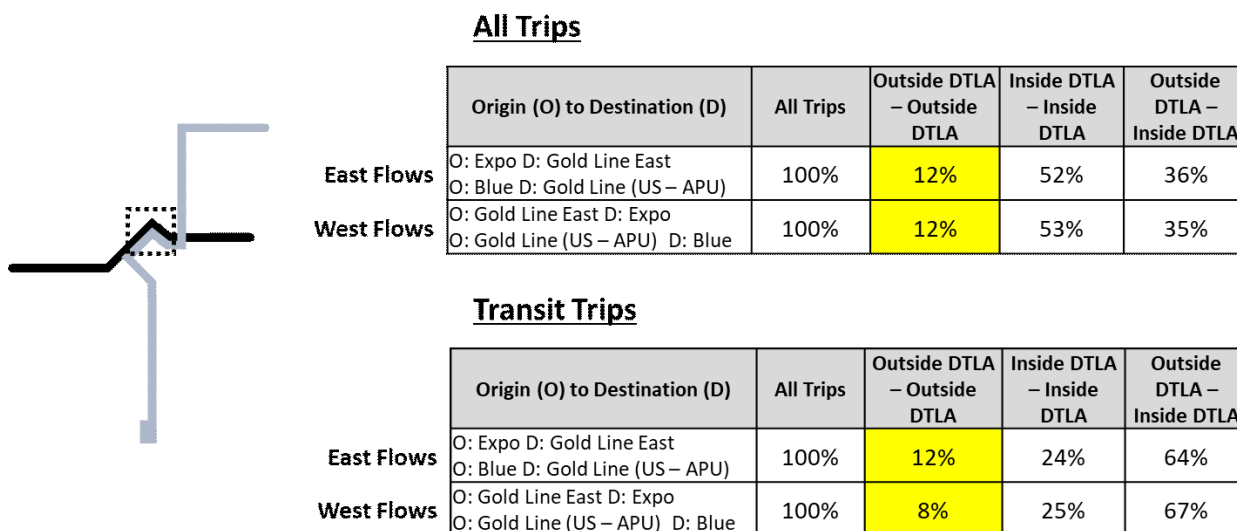
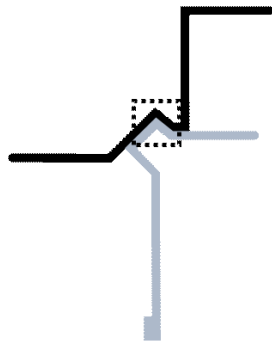


Figure 1 shows the distribution of trips originating within a one mile buffer of each leg of the network based on the Alternative A service plan. The “All Trips” table shows all travel using cell phone location data while the “Transit Trips” shows trips made by transit based on TAP data. About 88% of all trips and transit trips made are either destined for downtown (Outside DTLA - Inside DTLA) or within downtown (Inside DTLA-Inside DTLA). Therefore, only about 12% of customers travel through downtown from the A Line (Blue) to L Line (Gold) north to APU/Citrus College and E Line (Expo) to L Line (Gold) east from Pico/Aliso to Atlantic.

Figure 2

Trips Distributions for Alternative B

All Trips



	Origin (O) to Destination (D)	All Trips	Outside DTLA – Outside DTLA	Inside DTLA – Inside DTLA	Outside DTLA – Inside DTLA
East Flows	O: Expo D: Gold Line (US – APU)	100%	14%	51%	35%
	O: Blue D: Gold Line East				
West Flows	O: Gold Line (US – APU) D: Expo	100%	14%	51%	34%
	O: Gold Line East D: Blue				

Transit Trips

	Origin (O) to Destination (D)	All Trips	Outside DTLA – Outside DTLA	Inside DTLA – Inside DTLA	Outside DTLA – Inside DTLA
East Flows	O: Expo D: Gold Line (US – APU)	100%	14%	24%	62%
	O: Blue D: Gold Line East				
West Flows	O: Gold Line (US – APU) D: Expo	100%	9%	25%	66%
	O: Gold Line East D: Blue				

Figure 2 shows a similar analysis based on the Alternative B service plan. Again, most trips are destined for Downtown LA or within downtown LA. Therefore, since neither routing shows significant advantages as only a small percentage of trips travel through downtown LA, travel pattern is not a major factor in validating the LPA.

Network Simplicity

Figure 3
Peak Hour Wait and Transfer Times (min)

Alternative	Route	Initial Wait	Transfer	Total
	Santa Monica - Atlantic	3	0	3
	Santa Monica - APU/CC	3	3	6
	Long Beach - Atlantic	3	3	6
	Long Beach - APU/CC	3	0	3
	Santa Monica - Atlantic	3	3	6
	Santa Monica - APU/CC	3	0	3
	Long Beach - Atlantic	3	0	3
	Long Beach - APU/CC	3	3	6
	Santa Monica - Atlantic	6	0	6
	Santa Monica - APU/CC	6	0	6
	Long Beach - Atlantic	6	0	6
	Long Beach - APU/CC	6	0	6

Figure 3 shows the average wait + transfer times for customers navigating the three service alternatives based on a 6 minute peak hour headway. This analysis applies to trips that travel through downtown LA.

For Alternative A, all trips would begin with a 3 minute wait time (half the headway). Since A Line (Blue) would be connected to L Line (Gold) north to APU/Citrus College and E Line (Expo) would be connected to L Line (Gold) east to Atlantic, those trips would not require a transfer. Therefore, their total wait + transfer time would be 3 minutes. Going from the A Line (Blue) to L Line (Gold) east to Atlantic or E Line (Expo) to L Line (Gold) north to APU/Citrus College would require a transfer of 3 minutes in this alternative. Therefore their total wait + transfer time would be 6 minutes.

For Alternative B, the opposite would occur with A Line (Blue) to L Line (Gold) east to Atlantic and E Line (Expo) to L Line (Gold) north to APU/Citrus College only incurring a 3 minute wait time, while the remaining two travel patterns would require a transfer.

For Alternative C, the initial wait time from any origin would be 6 minutes since every other train would directly connect to their destination outside of downtown LA. Therefore, all trip patterns would require a total of 6 minutes wait + transfer times. In addition, Alternative C would result in significant operational complexity as peak hour trains would need to pull into different satellite divisions during the middle of the day given the different route lengths and proximity to home divisions from the four different branches. This complexity results in extreme difficulty in keeping track of trains and operators during the midday and adds to the revenue hour and costs due to transferring operators and trains back to their home divisions after the PM peak period.

Headway Consistency

Figure 4
Percent of Trips within Headway Adherence Levels

Alternative	Percent of Scheduled Headway (NB/EB)						
	100%	110%	120%	130%	140%	150%	Greater
A	55%	73%	82%	87%	90%	92%	8%
B	57%	71%	78%	82%	85%	87%	13%
C	53%	67%	75%	81%	85%	88%	12%
Current	69%	81%	87%	92%	95%	97%	3%
Recovery	58%	82%	90%	94%	96%	97%	3%

Figure 4 shows the percentage of trips under each alternative that would be compliant with the headways at each adherence level. Trips at 100% adherence would be spaced exactly 6 minutes apart on a 6 minute headway. At 150%, trips would be spaced between 6 and 9 minutes (6*150%) apart. Greater than 150% would result in lost service.

Based on this analysis, Alternative A performs the best in headway consistency with 92% of trips adhering to a 6 to 9 min headway. However, the street running delays currently incurred on the A Line (Blue) and E Line (Expo) as it approaches the Washington/Flower junction spread to the L Line (Gold). As a result, none of the alternatives perform as well as the current network. Therefore, to ensure trains are properly spaced and sequenced going through the Regional Connector, faster

trains must be slowed down to meet the travel time of slower trains, or slower trains must be sped up to meet the travel times of faster trains. The former can be accomplished by adding in-line schedule recovery at stations near the junction. This would require faster trains to wait between one and two minutes at stations approaching the junction. The latter would require improvements to LADOT traffic signal systems to provide more transit signal priority for the A Line (Blue) and E Line (Expo) in the LA street running segments of the lines. Metro continues to work with LADOT on this effort.

Resource Requirements

Figure 5
Resource Requirements

Alternative	Total Peak Vehicles	With 20% Spares	Weekday Revenue Car Hours	Annual Revenue Car Hours	Annual Operating Cost
A	208	250	2,835	961,558	\$461,547,8
B	205	246	2,799	949,221	\$455,626,2
C	208	250	2,936	995,820	\$477,993,8

*Assume \$480 per revenue car hour

Figure 5 presents the number of vehicles, revenue car hours, and estimated operating cost for each alternative. While Alternative B is the least expensive to operate, it is worth noting that spending one percent more per year for Alternative A would yield much better headway consistency, which is critical to the successful operations of the Regional Connector.

Recommendation

Based on the analysis presented above, Alternative A (A Line (Blue) to L Line (Gold) north to APU/Citrus College and E Line (Expo) to L Line (Gold) east to Atlantic) is the recommended Regional Connector service plan. Specifically:

- This is the Locally Preferred Alternative
- Significant outreach and support for Alternative A
- Simple to understand (and operate) network that minimizes wait and transfer times
- Performs best in headway regularity
- Second least costly operations

FINANCIAL IMPACT

Adoption of Alternative A would require \$462 million per year to operate. However, the current A Line (Blue), E Line (Expo), and L Line (Gold) costs roughly \$344 million per year to operate. Therefore, the net increase in operating cost is \$118 million per year.

Impact to Budget

Operation of the Regional Connector is not included in the FY21 budget as it is currently still under construction. The staffing plan to support pre-revenue service and revenue service activities for the Regional Connector is under development. The Operations department will seek budget amendment authorization for the agency-wide FTEs needed in the upcoming months. Upon turnover to revenue service operations, labor and expenses will be include future fiscal year budgets.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports strategic plan Goal 1: Provide high-quality mobility options that enable people to spend less time travelling by expanding the Metro transit network, increase mobility options, and provide new connections to key destinations.

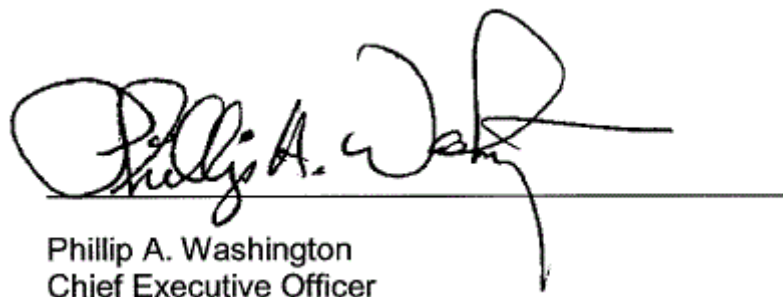
NEXT STEPS

Should the Board approve Alternative A as the Regional Connector service plan, staff will:

- 1) Implement Alternative A (Long Beach - Azusa, Santa Monica - Atlantic) which is the Locally Preferred Alternative (LPA).
- 2) Initially implement in-line schedule recovery before the junction to improve the headway regularity of service running through the Regional Connector.
- 3) Continue to work with LADOT to reduce street signal delays on the Blue and Expo Lines near Downtown LA so that in-line schedule recovery can be minimized or eliminated.

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Regional Connector Service Plan

October 2020



Metro

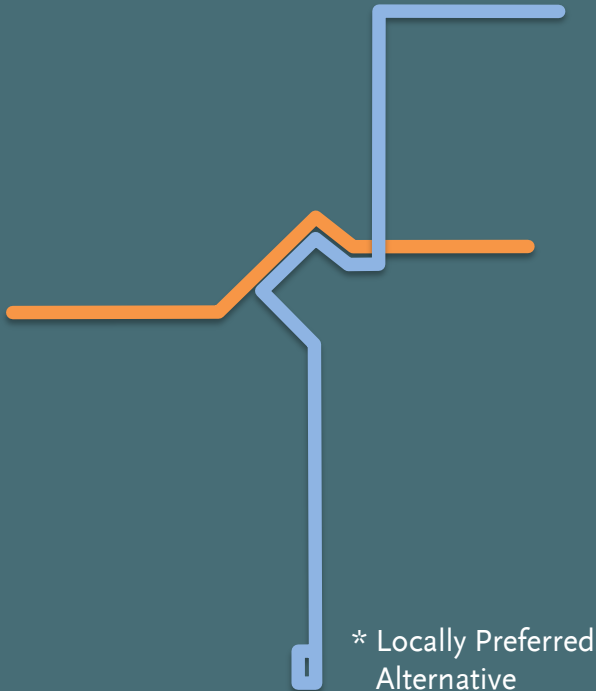
Purpose

- Purpose – Validate Locally Preferred Alternative (LPA) as continued to be supported by stakeholders and the community through the environmental and construction phases.
- Criteria for validating alternatives include:
 - Travel patterns to/from each segment
 - Network simplicity
 - Headway consistency
 - On Time Performance
 - Peak vehicle requirement
 - Revenue vehicle hours

Service Scenarios

Three primary service scenarios being evaluated:

Alt A: Long Beach – Azusa,
Santa Monica – Atlantic*






Alt B: Long Beach – Atlantic,
Santa Monica – Azusa



Alt C: Long Beach – Atlantic/Azusa
Expo – Atlantic/Azusa



Network Simplicity: Wait and Transfers

Alternative	Route	Initial Wait	Transfer	Total
A 	Santa Monica - Atlantic	3	0	3
	Santa Monica - APU/CC	3	3	6
	Long Beach - Atlantic	3	3	6
	Long Beach - APU/CC	3	0	3
B 	Santa Monica - Atlantic	3	3	6
	Santa Monica - APU/CC	3	0	3
	Long Beach - Atlantic	3	0	3
	Long Beach - APU/CC	3	3	6
C 	Santa Monica - Atlantic	6	0	6
	Santa Monica - APU/CC	6	0	6
	Long Beach - Atlantic	6	0	6
	Long Beach - APU/CC	6	0	6

Headway Regularity

Alternative	Percent of Scheduled Headway (NB/EB)						
	100%	110%	120%	130%	140%	150%	Greater
A	55%	73%	82%	87%	90%	92%	8%
B	57%	71%	78%	82%	85%	87%	13%
C	53%	67%	75%	81%	85%	88%	12%
Current	69%	81%	87%	92%	95%	97%	3%

Alternative	Percent of Scheduled Headway (SB/WB)						
	100%	110%	120%	130%	140%	150%	Greater
A	60%	75%	83%	87%	90%	92%	8%
B	59%	73%	79%	83%	86%	88%	12%
C	57%	71%	79%	84%	87%	89%	11%
Current	67%	78%	85%	90%	93%	96%	4%

- Alternative A performs the best for regularity of headways
- No alternative performs as well as current because traffic signal delays on Blue and Expo will spread to Gold Line

Service Plan Recommendation

Alternative A (Long Beach – Azusa, Santa Monica – Atlantic)

- Approved as Locally Preferred Alternative
- Significant outreach and support for Alt A
- Simple to understand (and operate) network that minimizes wait and transfer times
- Performs best in headway regularity
- Second least costly operations
- Opportunities to improve upon Alternative A with train delay mitigations

Implementation Recommendation

- Implement Alternative A (Long Beach – Azusa, Santa Monica – Atlantic) which is the Locally Preferred Alternative (LPA).
- Initially implement in-line schedule recovery before the junction to improve the headway regularity of service running through the Regional Connector.
- Continue to work with LADOT to reduce street signal delays on the Blue and Expo Lines near Downtown LA so that in-line schedule recovery can be minimized or eliminated.

Questions?