Los Angeles County
Metropolitan Transportation Authority

West Santa Ana Branch Transit Corridor

Final Northern Alignment Alternatives and Concepts
Updated Screening Report

Metro

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ACRONYMS AND ABBREVIATIONS

AA	Alternatives Analysis
BRT	Bus Rapid Transit
Caltrans	California Department of Transportation
CHSRA	California High Speed Rail Authority
CEQA	California Environmental Quality Act
EJ	Environmental Justice
Environmental Study	West Santa Ana Branch Transit Corridor Environmental Study
FTA	Federal Transportation Administration
FRA	Federal Railroad Administration
JPA	Eco-Rapid Transit Joint Power Authority
LA County	Los Angeles County
LAUS	Los Angeles Union Station
LRT	light rail transit
LRTP	Long Range Transportation Plan
Metro	Los Angeles County Metropolitan Transportation Authority
MWD	Metropolitan Water District
NEPA	National Environmental Protection Act
PEROW/WSAB	Pacific Electric Right-of-Way/West Santa Ana Branch
P3	public-private-partnership
Project	West Santa Ana Branch Transit Corridor
RC	Regional Connector
ROM	Rough-Order-of-Magnitude
ROW	Right-of-Way
SCAG	Southern California Association of Governments
SIP	Strategic Implementation Plan
Study Area	West Santa Ana Branch Transit Corridor Study Area
TOC	Transit Oriented Community
TOD	Transit Oriented Development
TRS	Technical Refinement Study
UPRR	Union Pacific Railroad
VMT	Vehicle Miles Traveled
WSAB	West Santa Ana Branch

1 INTRODUCTION

1.1 Study Background

The West Santa Ana Branch (WSAB) Transit Corridor is a proposed light rail transit (LRT) line that would extend approximately 20 miles from downtown Los Angeles through southeast Los Angeles County (LA County), traversing densely populated, low-income and heavily transit-dependent communities. The Project would provide reliable, fixed guideway transit service that would increase mobility and connectivity for historically underserved, transit-dependent and environmental justice (EJ) communities; reduce travel times on local and regional transportation networks; and accommodate substantial future employment and population growth.

The Project is one of the many transit projects funded by LA County Measure R (approved in November 2008) and Measure M (approved in November 2016). The Project is identified in the Los Angeles County Metropolitan Transportation Authority's (Metro) 2009 Long-Range Transportation Plan.

Since 2010, the Project has included analysis as a part of numerous planning studies, stakeholder outreach and input, and technical evaluations to refine project alternatives. The following presents a brief history of the studies conducted for the WSAB Transit Corridor:

- **PEROW/WSAB Alternatives Analysis Study (2013) -** In March 2010, the Southern California Association of Governments (SCAG) initiated the Pacific Electric Right-of-Way (PEROW)/WSAB Alternatives Analysis (AA) Study in coordination with the cities along the proposed alignment, the Orangeline Development Authority (now known as Eco-Rapid Transit), the Gateway Cities Council of Governments, Metro, the Orange County Transportation Authority (OCTA), and the owners of the right-of-way (ROW). In February 2013, SCAG completed the PEROW/WSAB AA Study and recommended a LRT system with two northern alternatives for further study, the East Bank and the West Bank Option 3 (West Bank 3).
- **Technical Refinement Study (2015) -** In January 2014, Metro initiated the Technical Refinement Study (TRS) of the WSAB Transit Corridor. The TRS further analyzed alignment alternatives in addition to those recommended in the AA Study. Four additional northern alignments were identified, assessed and recommended between the City of Huntington Park and downtown Los Angeles. The alternatives included: 1) the Pacific/Alameda and 2) Pacific/Vignes alignment options that followed Pacific Boulevard through the cities of Huntington Park and Vernon, and 3) Alameda and 4) Alameda/Vignes alignment options that followed the existing Metro Blue Line ROW from Slauson Avenue to Washington Boulevard and north along Alameda Street.
- **Environmental Study (Initiated in 2016) -** In September 2016, Metro initiated the WSAB Transit Corridor Environmental Study (Environmental Study) with the goal of environmentally clearing the Project under the California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA).
- **Northern Alignment Options Screening Report (March 2017) -** In March 2017, a Northern Alignment Options Screening Report was prepared to evaluate the six northern alignment options (the portion of the alignment between downtown Los

Angeles and the City of Huntington Park) analyzed in the TRS. As a result of this screening, four northern alignment options were carried into Scoping for the environmental analysis: the Pacific/Alameda, Pacific/Vignes, Alameda, and Alameda/Vignes alignment options.

- **Agency and Public Scoping Meetings (June 2017) -** In June 2017, one Agency and five Public Scoping Meetings took place in the cities of Bellflower, Los Angeles (two on the same day), South Gate, and Huntington Park. The meetings provided project updates and information to stakeholders with the intent to receive comments and questions to support the environmental process through a comment period that ended in August 2017.

Several factors have emerged as part of the Environmental Study since August 2017 that required revisiting the Project alternatives. These include:

- **Scoping Comments Received** – 1,122 comments were received during the Public Scoping Period between June and August 2017. Comments related to the Northern Alignment Options identified some level of opposition, with the highest levels of concerns related to potential impacts to the Little Tokyo Community[1].Comments were also received from the California High-Speed Rail Authority (CHSRA), Metrolink and the Federal Railroad Administration (FRA) stating a preference for alignments that do not limit existing or planned capacity at Los Angeles Union Station (LAUS) for regional rail services. In response to the issues raised during the Public Scoping Period, new Northern Alignment Options were developed and evaluated.
- **Updates to the Long-Range Transportation Plan (LRTP)** – The passing of Measure M initiated the acceleration of major highway and transit projects within LA County. The updated LRTP Expenditure Plan would affect No Build project assumptions (with respect to the timeline of background projects), as well as an anticipated accelerated timeline for the WSAB Transit Corridor. As such, the WSAB Transit Corridor Options needed to be updated to be consistent with projects, programs and initiatives within the updated LRTP.
- **TOD/TOC Planning Initiatives** – Metro, in partnership with the City of South Gate and the Eco-Rapid Transit Joint Power Authority (JPA), received a grant from the Federal Transit Administration's (FTA's) Pilot Program for the WSAB Transit Corridor Transit Oriented Development (TOD) Strategic Implementation Plan (SIP). While the WSAB Transit Corridor TOD SIP does not directly influence the alternatives development process for the WSAB Transit Corridor, it is important to consider future development potentials when evaluating the Northern Alignment Alternatives and Concepts.
- **Advancing Engineering and Planning Phases** – Following approval of Measure M, several regional and long-term projects have advanced into further engineering and planning phases that would affect the Northern Alignment Alternatives and Concepts. These include Metro Blue Line upgrades, Bus Rapid Transit (BRT) initiatives and studies, and environmental studies progressing on the Division 20 Portal Widening and Turnback Facility, Regional Rail (Amtrak, Metrolink, and High Speed Rail), and Link US at LAUS. Given the advancement of these projects, it is important that the

[1] Approximately 400 comments were received by Little Tokyo stakeholders.

Northern Alignment Alternatives and Concepts consider these projects within its own development timeline.

- **Exploring a public-private partnership (P3)**, As an alternative strategy for delivering the WSAB Transit Corridor P3 is being considered as a Project delivery option. The design of the WSAB Transit Corridor needs to consider P3 best practices as a part of the evaluation process.

1.2 Report Purpose and Structure

Given the factors described above, additional concepts and planning analyses were initiated based on direction from the Metro Board (March 1, 2018). As a result, updated evaluations were conducted on the four Northern Alignment Options presented at the Public Scoping in June 2017:

A) Pacific/Alameda,

B) Pacific/Vignes,

C) Alameda (aerial), and

D) Alameda/Vignes.

To address concerns raised during the Public Scoping Period as well as other factors described above, four new Northern Alignment Concepts were also developed:

E) Alameda (underground),

F) Alameda/Center,

G) Downtown Transit Core, and

H) Arts District/6th Street.

The purpose of this study is to present the screening evaluation of all eight Northern Alignment Alternatives and Concepts (between downtown Los Angeles and the City of Huntington Park). Following completion of this report the Metro Board of Directors will determine (anticipated in May 2018) which Alternatives and/or Concepts shall be studied further as part of the NEPA/CEQA environmental analysis phase of the Project.

This report is organized as follows:

- Review of the screening process and methodology
- Overview of the Project's purpose and need, goals and objectives, and evaluation criteria
- Description of the updated Northern Alignment Alignments and Concepts
- Results of the screening process
- Community and Stakeholder Outreach
- Summary of findings to advance through the environmental process

2 EVALUATION PROCESS AND METHODOLOGY

2.1 Evaluation Process

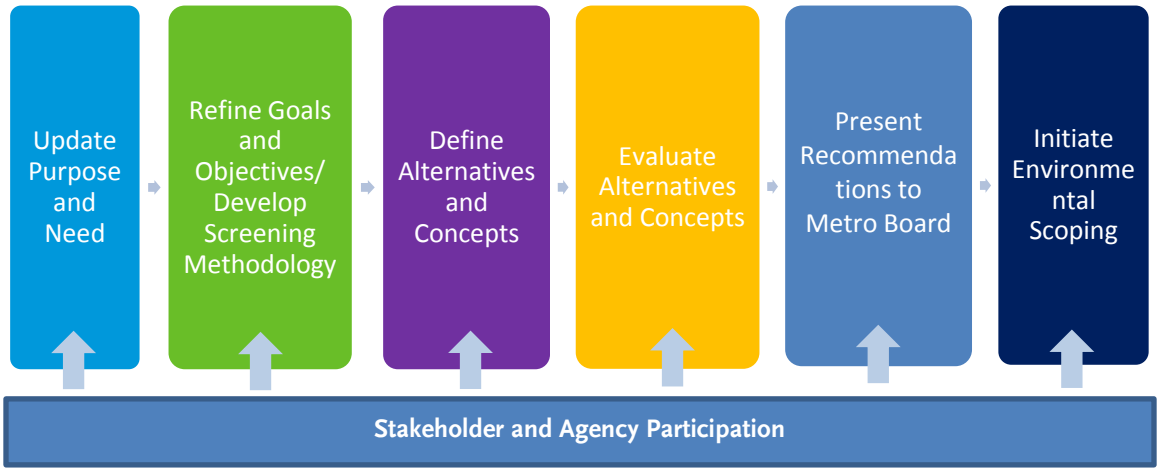
Consistent with earlier planning activities, the evaluation of the updated Northern Alignment Alternatives and Concepts generally follows a progressive six-step Alternatives Analysis process:

- Confirm purpose and need of the project
- Refine goals and objectives to develop screening methodology
- Define updated northern alignment options
- Evaluate alignment options and develop ratings
- Present ratings to Metro Board of Directors for approval to initiate environmental scoping
- Initiate environmental scoping for the recommended alternative(s)

During this process, stakeholders and agency participants were heavily involved with project coordination, meetings, and briefings through which they provided input and feedback on the alternatives and options. Stakeholder and agency participation has been critical in the screening process to reach informed ratings of the Alternatives and Concepts for the Metro Board's consideration.

Figure 2-1 presents a flow chart which represents the evaluation process used to identify the Alternatives and Concepts which best meet the project goals, objectives, and evaluation criteria established for this Project. Please note that the "Purpose and Need" and "Goals and Objectives" were defined in previous stages of this study. In response to the public comments received in June 2017, new alignment Concepts were developed, evaluated with the expectation that they will be forwarded to the Metro Board and that the Board will determine which alignments should be carried forward into environmental scoping.

Figure 2-1. Evaluation Process



2.2 Methodology

The goals and objectives in this Screening Report are assessed on their potential performance in qualitative and quantitative measures. A "high," "medium," or "low" rating was assigned based on the alignment option's ability to meet the Project's goals and objectives. Table 2-1 presents the typical rating methodology for each criterion.

Table 2-1. Rating Methodology

Rating		Description
●	High	A high rating indicates the alternative highly supports and satisfies the criterion, or has a low potential for negative impacts.
◑	Medium	A medium rating indicates the alternative moderately supports the criterion, or has a moderate potential for negative impacts.
○	Low	A low rating indicates that an alternative does not support or conflicts with the criterion, or has a high potential for negative impacts.

Findings of the screening evaluation were based on individual criteria analyzed for each of the Alternatives and Concepts, which were then summarized through ratings of the major objectives (high, medium, or low). Note that no weighting was applied to the results of the screening evaluation as each Goal was given equal consideration. The resulting evaluation demonstrates how each Alternative and Concept compares to the major goals of the WSAB Transit Corridor Project with an overall high, medium, or low rating.

It is typical in the screening process to have an alternative perform well for some goals and objectives but less satisfactory for others. This overall summary of the Alternative's and Concept's performance provides a clear understanding of benefits and tradeoffs so stakeholders and decision makers can interpret the results of the evaluation and reasoning for any rating.

3 PURPOSE AND NEED, GOALS AND OBJECTIVES, AND EVALUATION CRITERIA

3.1 Study Area

Stretching over 20 miles from Elysian Park in the north to the Los Angeles/Orange County line in the south, the WSAB Transit Corridor Study Area (Study Area) is approximately 98 square miles and incorporates 20 individual cities – the cities of Los Angeles, Vernon, Maywood, Huntington Park, Commerce, Bell, Cudahy, Bell Gardens, South Gate, Lynwood, Compton, Downey, Paramount, Bellflower, Long Beach, Lakewood, Norwalk, Artesia, Cerritos and Hawaiian Gardens – as well as portions of unincorporated LA County (see Figure 3-1). The Study Area includes some of LA County's most densely-developed and low-income residential neighborhoods, and encompasses major regional employment centers, including the industrial and manufacturing backbone of the County.

As population and employment continue to increase within the Study Area, daily travel is also projected to increase. Under current (2017) conditions, the Study Areas has approximately 6.39 million daily person trips. Over the next 25 years (by 2042), the daily person trips are projected to increase by 14 percent to approximately 7.26 million daily person trips. For both 2017 and 2042, approximately 31 percent of the trips stay within the Study Area, 33 percent are trips from the Study Area to destinations outside the Study Area, and 36 percent are trip into the Study Area from points outside the Study Area.

This increase of nearly 900,000 daily person trips between 2017 and 2042 may further burden the existing transportation network. Although auto travel is the predominant travel mode (with 86 percent of home-based work trips made by auto), there is considerable transit demand given the high proportion of transit-dependent populations.

Figure 3-2 presents the daily trip flows from the Study Area destinations (trips beginning in the Study Area) and the primary locations where these trips are traveling. The majority of trips beginning within the Study Area have destinations within the Study Area. Those with districts adjacent to the Study Area (Central Los Angeles, Gateway Cities East and West) have the next highest number of trips. Districts that are farther away from the Study Area (South Bay, Westside, and San Gabriel Valley) have the next level of trip destinations.

Figure 3-3 shows daily trip flows by attractions to the WSAB Study Area. Similar to the productions, the majority of trips stay within the WSAB Transit Corridor Study Area, and the districts adjacent to the Study Area have a high number trips coming into the corridor. In terms of attractions, the Study Area has a high number of trips (approximately 289,000) from the San Gabriel Valley traveling to the Study Area.

As shown in these figures, about half of the daily travel begins and ends in the WSAB Transit Corridor, followed by a considerable travel demand between the Study Area and the Central LA District. There is also a considerable travel demand between the Study Area and the Gateway Cities and the South Bay.

Figure 3-1. WSAB Transit Corridor Study Area

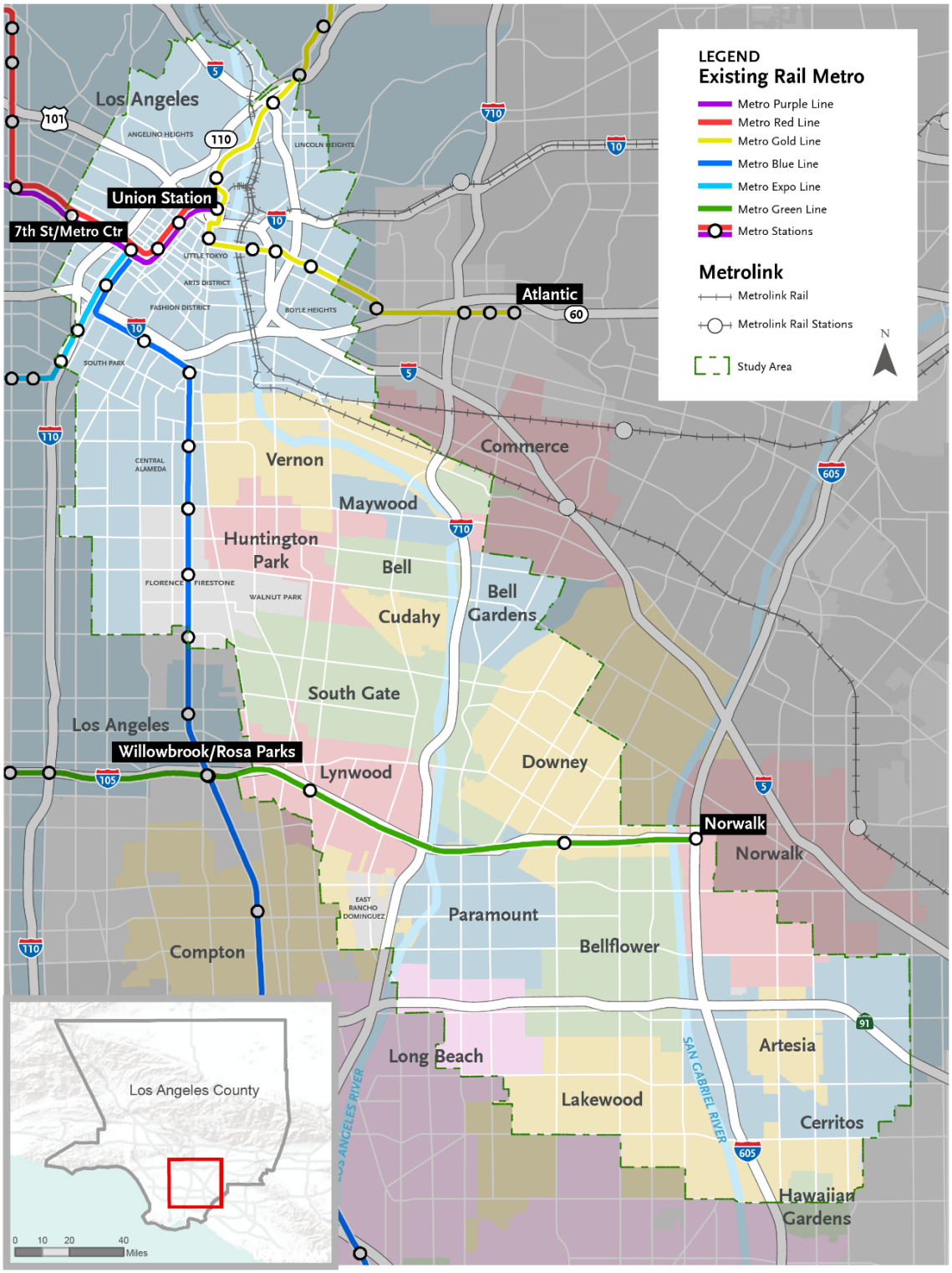


Figure 3-2. WSAB Transit Corridor Study Area Trip Destinations Maps

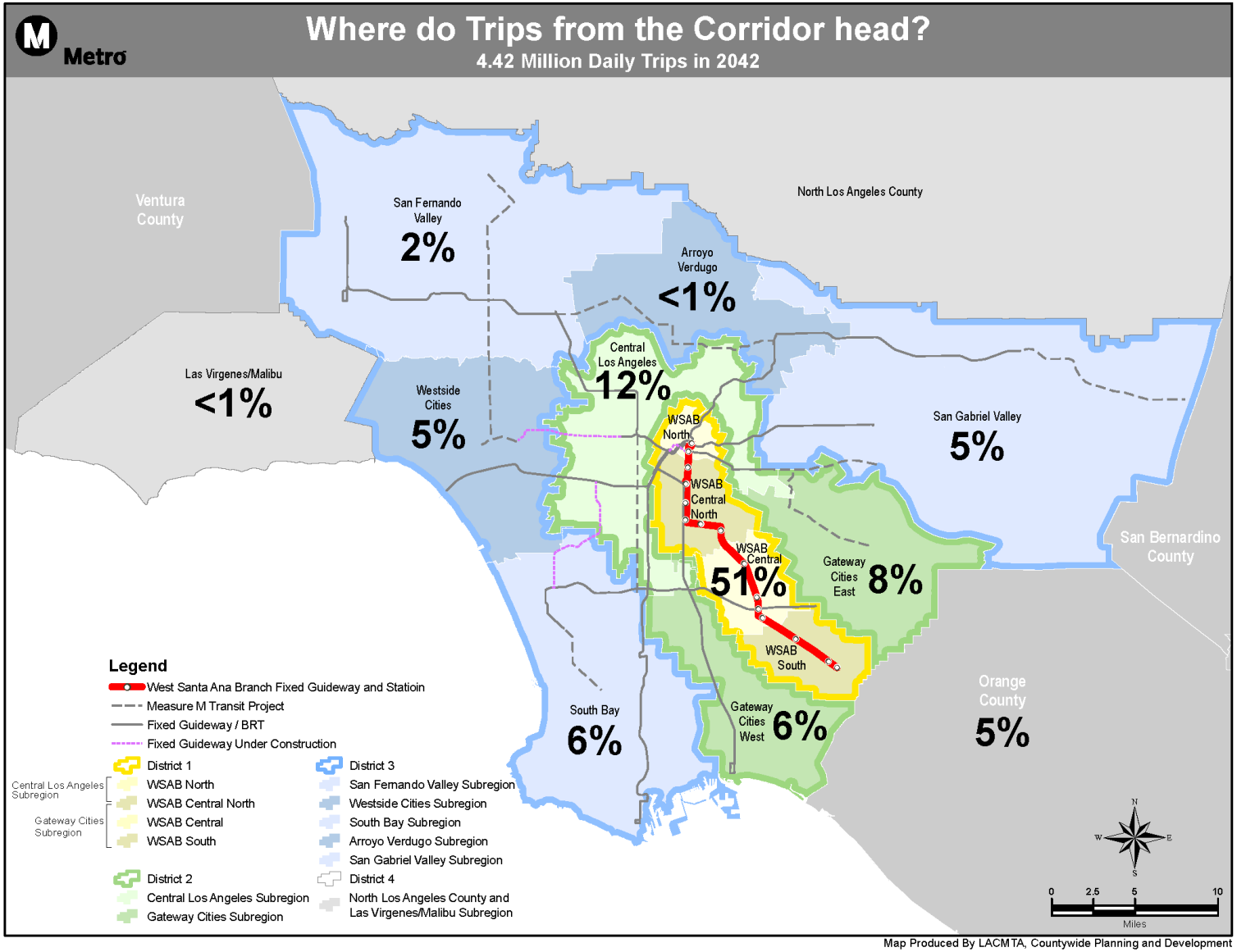
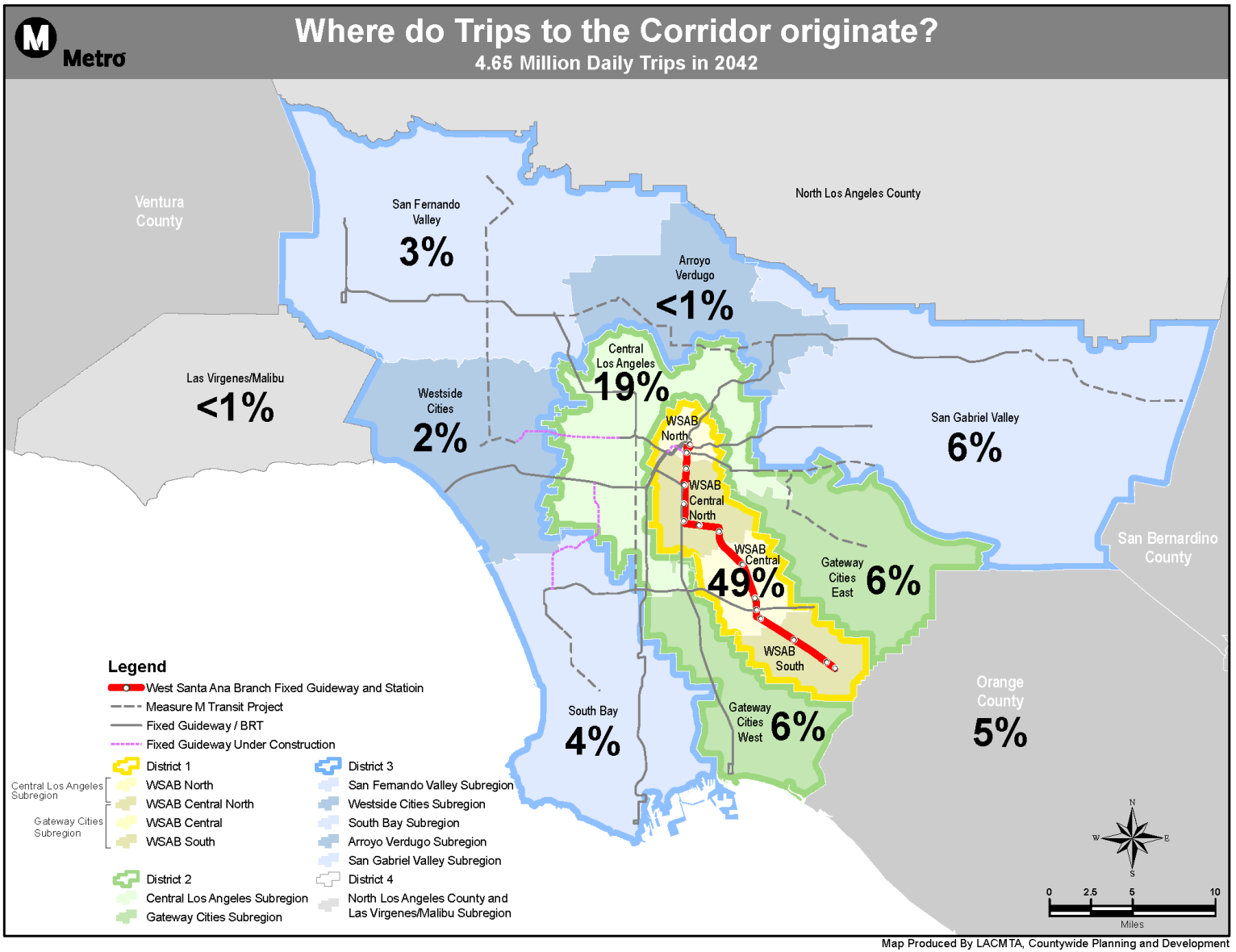


Figure 3-3. WSAB Transit Corridor Study Area Trip Origin Map



3.2 Purpose and Need Statement

As population and employment in the Study Area continues to grow, the already congested roadway network will become even more congested. This congestion affects not only automobiles but also the travel time, speeds, and reliability of the buses that operate in mixed-flow traffic. As the Study Area is home to communities that are heavily reliant on transit as their primary mode of travel to access jobs and other key destinations, this increasingly unreliable bus network will be insufficient to meet their mobility needs. Rail transit that operates in a dedicated ROW provides greater reliability and faster travel times during peak periods than buses because this service is not as affected by roadway congestion. However, the existing rail network only provides service along the periphery of the Study Area, thereby requiring transfers to reach the rail stations.

The purpose of the Project is to provide reliable transit service to meet the future mobility needs of residents, employees, and visitors who travel within the Study Area, which includes downtown Los Angeles, parts of southeast Los Angeles, and portions of the Gateway Cities sub-region. The Project will increase mobility and connectivity for historically underserved transit-dependent and EJ communities; reduce travel times on local and regional transportation networks; and accommodate substantial future employment and population growth.

More specifically, the Project's purpose and need is as follows:

- Establish a reliable transit service that will enhance the connectivity of the existing transit network and reduce transit travel times to local and regional destinations;
- Accommodate future travel demand, including the high number of transit trips made by Study Area residents;
- Improve access for the densely populated neighborhoods, major employment centers, and other key regional destinations where future growth is forecasted to occur within the Study Area; and
- Address mobility and access constraints faced by transit-dependent communities, thereby improving transit equity.

3.3 Goals, Objectives, Evaluation Criteria

Building on extensive stakeholder and agency outreach, the goals and objectives of the WSAB Transit Corridor were established through the development of the AA Study in 2010, where the goals and objectives were identified through a 24-month period of public meetings and work sessions with elected officials, stakeholders, advisory committee members, and communities. These goals were further confirmed in 2015 during the TRS through technical meetings with key stakeholders, including Eco-Rapid Transit, Study Area cities, and the California Department of Transportation (Caltrans); and were further discussed in 2017 as part of the WSAB Transit Corridor Scoping Meetings and in community update meetings in March 2018. Based on the planning and community involvement activities, the following five goals were developed for the Project:

- Goal 1: Provide Mobility Improvements
- Goal 2: Support Local and Regional Land Use Plans and Policies

- Goal 3: Minimize Environmental Impacts
- Goal 4: Ensure Cost Effectiveness and Financial Feasibility
- Goal 5: Ensure Equity

For this evaluation, the criterion was developed based on earlier studies and reports, updated model forecasting, cost estimates and engineering analysis for the four new Concepts, as well as discussions, reviews, and input received by various Metro departments. The Northern Alignment Alternatives and Concepts were evaluated based on how well each aligns with the project goals and advances the overall objectives of the Project.

Table 3-1. Goals, Objectives and Evaluation Criteria

Goals	Objectives	Evaluation Criteria
1. Provide Mobility Improvements	1.1 Improves travel speeds and reduces travel times	▪ Daily hours of user benefits ▪ Minutes of travel time from southern to northern termini
	1.2 Supports other transit systems along the corridor	▪ Effects to other Metro Rail Lines ▪ Streamlines/improves customer experiences (number of daily one-seat rides)
	1.3 Connects with the greater transit network	▪ Connections to other Metro Rail Lines ▪ Direct access to regional rail (commuter rail) ▪ Potential for future extensions
	1.4 Provides an alternative to a congested freeway and arterial network. Serves local and regional trips	▪ Number of daily boardings ▪ Number of new transit trips ▪ Peak load points versus operational limits
	1.5 Supports active transportation and first/last mile connections	▪ Quality of the pedestrian environment and public realm near station areas ▪ Potential connections to bicycle facilities
2. Support Local and Regional Land Use Plans and Policies	2.1 Serves major employment centers and high-density residential neighborhoods	▪ 2042 population density within ½ mile of stations ▪ 2042 employment density within ½ mile of stations
	2.2 Encourages local economic development, projects, plans, and jobs	▪ Consistent with Plans and Metro's policies supporting Transit-Oriented Communities ▪ Supports land values and real estate market trends ▪ Potential Joint Use/Joint Development Opportunities within ¼ mile of stations
	2.3 Serves affordable housing developments	▪ Number of existing affordable housing units within ½ mile of stations
	2.4 Supports and is consistent with local plans	▪ Consistent with development patterns and land uses (scale/intensity of development) ▪ Consistent with ongoing planning efforts that update zoning/development standards

Goals	Objectives	Evaluation Criteria
3. Minimize Environmental Impacts	3.1 Minimizes environmental and community impacts	▪ Reduction in regional vehicle miles traveled ▪ Level of effects to sensitive uses (e.g., historic properties)
	3.2 Minimizes impacts to the transportation network	▪ Impacts to roadway travel lanes, parking, and truck movements ▪ Disruption to existing rail ROW
	3.3 Minimizes other environmental impacts	▪ Impacts to visual, noise, hazards and other environmental considerations
4. Ensure Cost Effectiveness and Financial Feasibility	4.1 Costs are financially feasible	▪ Rough-Order-of-Magnitude capital costs
	4.2 Provide a cost-effective project	▪ Capital cost compared to number of new riders per year
	4.3 Minimizes risk of cost increase	▪ Intensity of engineering challenges ▪ Amount of property acquisition
5. Ensure Equity	5.1 Provides benefits to transit-dependent and minority populations	▪ Percentage of transit-dependent persons within ½ mile of stations
	5.2 Minimizes adverse effects to an EJ community	▪ Potential adverse effects to EJ communities
	5.3 Provision of new reliable fixed service to underserved communities	▪ New fixed service to transit-dependent persons around station areas
	5.4 Serves low income riders	▪ Estimated number of low income riders

4 NORTHERN ALIGNMENT ALTERNATIVES AND CONCEPTS

4.1 Development of New Northern Alignment Concepts

As discussed above, in March 2018, the Metro Board authorized staff to examine new Northern Alignment Concepts in response to public and agency comments received as part of Public Scoping Meetings in June 2017. Several alignment and station concepts were considered based on variations of the original alternatives as well as new concepts to connect to other downtown Los Angeles termini. The concepts were further refined and shared with stakeholders in a series of public meetings held from March 12 through 17, 2018. Three additional public meetings are planned for early May 2018. Four new concepts emerged as the most promising to be further evaluated in the screening process:

- Concept E: Alameda (underground)
- Concept F: Alameda/Center
- Concept G: Downtown Transit Core
- Concept H: Arts District/6th Street

4.2 Alternatives and Concepts under Consideration for Screening

For the purpose of assessing the Northern Alignment Alternatives and Concepts, the northern section of the WSAB alignment is generally assumed to be the portion north of the Florence/Salt Lake Station in the City of Huntington Park[2]. The original four Northern Alignment Alternatives (A through D) were presented during the 2017 Public Scoping Meetings (Figure 4-1). The new Northern Alignment Concepts (E through H) were developed to address comments from the 2017 Public Scoping Period (Figure 4-2). Table 4-1 summarizes general alignment length and number of proposed stations. This is followed by a more detailed description of each Alternative and Concept.

[2] Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments

Figure 4-1. WSAB Transit Corridor Original Northern Alignment Alternatives

Figure 4-2. WSAB Transit Corridor New Northern Alignment Concepts

Table 4-1. Characteristics of the Northern Alignment Alternatives and Concepts

Northern Alignment Alternatives	Length[1]	Preliminary Proposed Configuration[1]	# of Proposed Stations[1]
A. Pacific/ Alameda	7.7 miles	3.6 miles aerial; 2.9 miles at-grade; 1.2 miles underground	5 stations: 3 aerial; 1 at-grade; 1 underground
B. Pacific/ Vignes	7.5 miles	3.0 miles aerial; 2.9 miles at-grade; 1.6 miles underground	4 stations: 2 aerial; 1 at-grade; 1 underground
C. Alameda (aerial)	8.3 miles	5.8 miles aerial; 2.5 miles at-grade	7 stations: 6 aerial; 1 at-grade
D. Alameda/ Vignes	8.3 miles	5.0 miles aerial; 2.5 miles at-grade; 0.8 miles underground	7 stations: 5 aerial; 1 at-grade; 1 underground
Northern Alignment Concepts	**Length[1]**	**Preliminary Proposed Configuration[1]**	**# of Proposed Stations[1]**
E. Alameda (underground)	8.1 miles	3.2 miles aerial; 2.5 miles at-grade; 2.4 miles underground	7 stations: 3 aerial; 1 at-grade; 3 underground
F. Alameda/ Center	8.2 miles	3.6 miles aerial; 2.4 miles at-grade; 2.2 miles underground	7 stations: 4 aerial; 1 at-grade; 2 underground
G. Downtown Transit Core	8.1 miles	2.8 miles aerial; 3.2 miles at-grade; 2.1 miles underground	7 stations: 3 aerial; 1 at-grade; 3 underground
H. Arts District/6th Street	7.6 miles	2.6 miles aerial; 2.4 miles at-grade; 2.6 miles underground	4 stations: 2 aerial; 1 at-grade; 1 underground

[1] Description is provided between the Northern Terminus station and the Florence/Salt Lake Station.

4.2.1 Alternative A: Pacific/Alameda

Alternative A was developed as part of the TRS Report and presented in the 2017 Public Scoping Meetings. This alignment runs between LAUS and Florence/Salt Lake Station along Alameda Street to the Pacific Boulevard/Santa Fe Avenue corridor (see Figure 4-3). The northern portion of this alignment is 7.7 miles in length from LAUS to the Florence/Salt Lake Station. This Alternative has five stations north of the Florence/Salt Lake Station: LAUS, Little Tokyo, Arts District, Pacific/Vernon, and Pacific/Randolph (see Figure 4-4 and Table 4-1).

Alternative A would be aerial or at-grade at LAUS with two possible station location options: either above the Metro Gold Line or at Platform 2. From LAUS, the alignment would be an aerial configuration adjacent to or above the existing Metro Gold Line. The alignment would cross over the US-101 Freeway and the Metro Gold Line structure then continue in an aerial configuration south on Alameda Street with a station above the existing Metro Gold Line Little Tokyo Station at 1st and Alameda Streets.

South of the Little Tokyo Station, the alignment would continue south along Alameda Street in an aerial configuration, turning southeast at the intersection of 3rd Street and Alameda Street to follow 4th Place. Southeast of Hewitt Street, the alignment would transition into an underground configuration with an underground Arts District Station just west of the intersection of 4th Street and Santa Fe Avenue (see Figure 4-7).

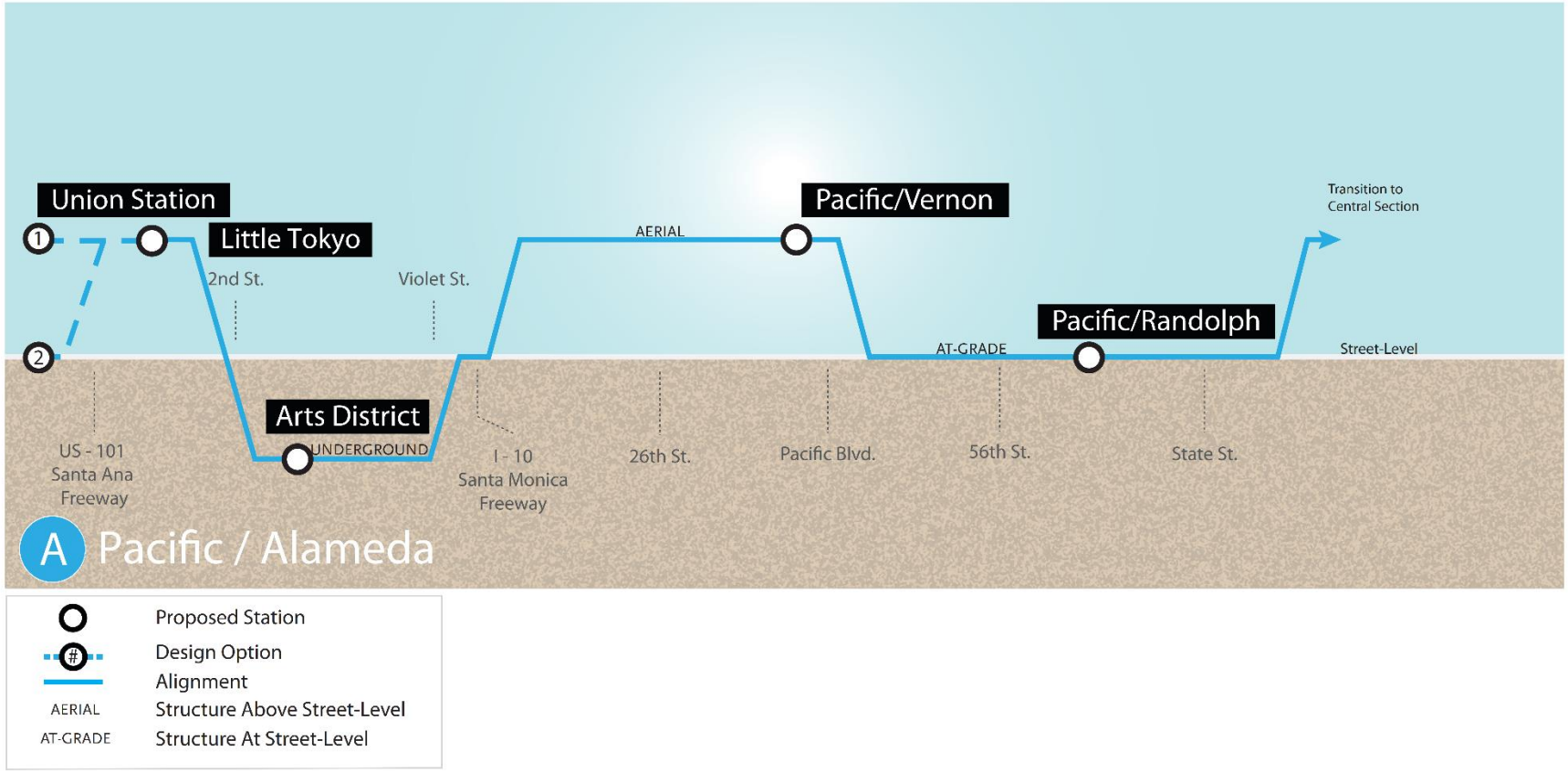
From the Arts District Station, the alignment would curve south and travel beneath Santa Fe Avenue. The alignment would follow Santa Fe Avenue until just south of the I-10 Freeway where it would transition to an aerial configuration. The aerial alignment would continue south on Santa Fe Avenue, turning east on 25th Street then south on Minerva Street, where it would transition to the Harbor Subdivision. The aerial alignment would run south along the Harbor Subdivision with an aerial station at Pacific Boulevard/Vernon Avenue.

From the Pacific/Vernon Station, the alignment would transition to at-grade and continue south along the median of Pacific Boulevard. At Randolph Street, the alignment would turn east to utilize the Union Pacific Railroad (UPRR) ROW (La Habra Subdivision) along Randolph Street with an at-grade station at Pacific Boulevard/Randolph Street.

From the Pacific/Randolph Station, the alignment would continue east along the UPRR ROW parallel to Randolph Street. Just east of Bissell Street, the alignment would rise to an aerial configuration to cross Randolph Street and enter the San Pedro Subdivision (in between Bissell Street and Maywood Avenue). The alignment would transition back to at-grade north of Gage Avenue and continue south along the San Pedro Subdivision to an at-grade station at Florence Avenue/Salt Lake Avenue.

Figure 4-3. Alternative A: Pacific/Alameda Northern Alignment Alternative

Figure 4-4. Alternative A Proposed Station Configuration



4.2.2 Alternative B: Pacific/Vignes

Alternative B was also developed as part of the TRS Report and presented in the 2017 Public Scoping Meetings. Alternative B's alignment runs between LAUS and Florence/Salt Lake Station along Vignes Street to the Santa Fe and Pacific Boulevard corridor (see Figure 4-5). The northern portion of this alignment is 7.5 miles in length from LAUS to the Florence/Salt Lake Station. This Alternative would provide four stations north of Florence/Salt Lake: LAUS, Arts District, Pacific/Vernon, and Pacific/Randolph (see Figure 4-6 and Table 4-1).

Alternative B would be aerial or at-grade at LAUS with two possible station location options: either above the Metro Gold Line or at Platform 2. From LAUS, the alignment would travel south over the US-101 Freeway in an aerial configuration adjacent to or above the existing Metro Gold Line. At Commercial Street, the alignment would turn southeast and cross Garey Street before turning south on to Vignes Street. The alignment would continue in an aerial configuration south along Vignes Street to Temple Street, where the alignment would transition to an underground configuration (see Figure 4-7). South of Banning Street, the alignment would turn southeast, crossing under 1st Street and 2nd Street, then turning south in between 2nd Street 3rd Street to travel under Santa Fe Avenue. An underground Arts District Station would be located south of 3rd Street beneath Santa Fe Avenue. From the Arts District Station, the alignment would continue below grade under Santa Fe Avenue and then follow the same alignment as Alternative A described in the preceding section.

Figure 4-5. Alternative B: Pacific/Vignes Northern Alignment Alternative

Figure 4-6. Alternative B Proposed Station Configuration

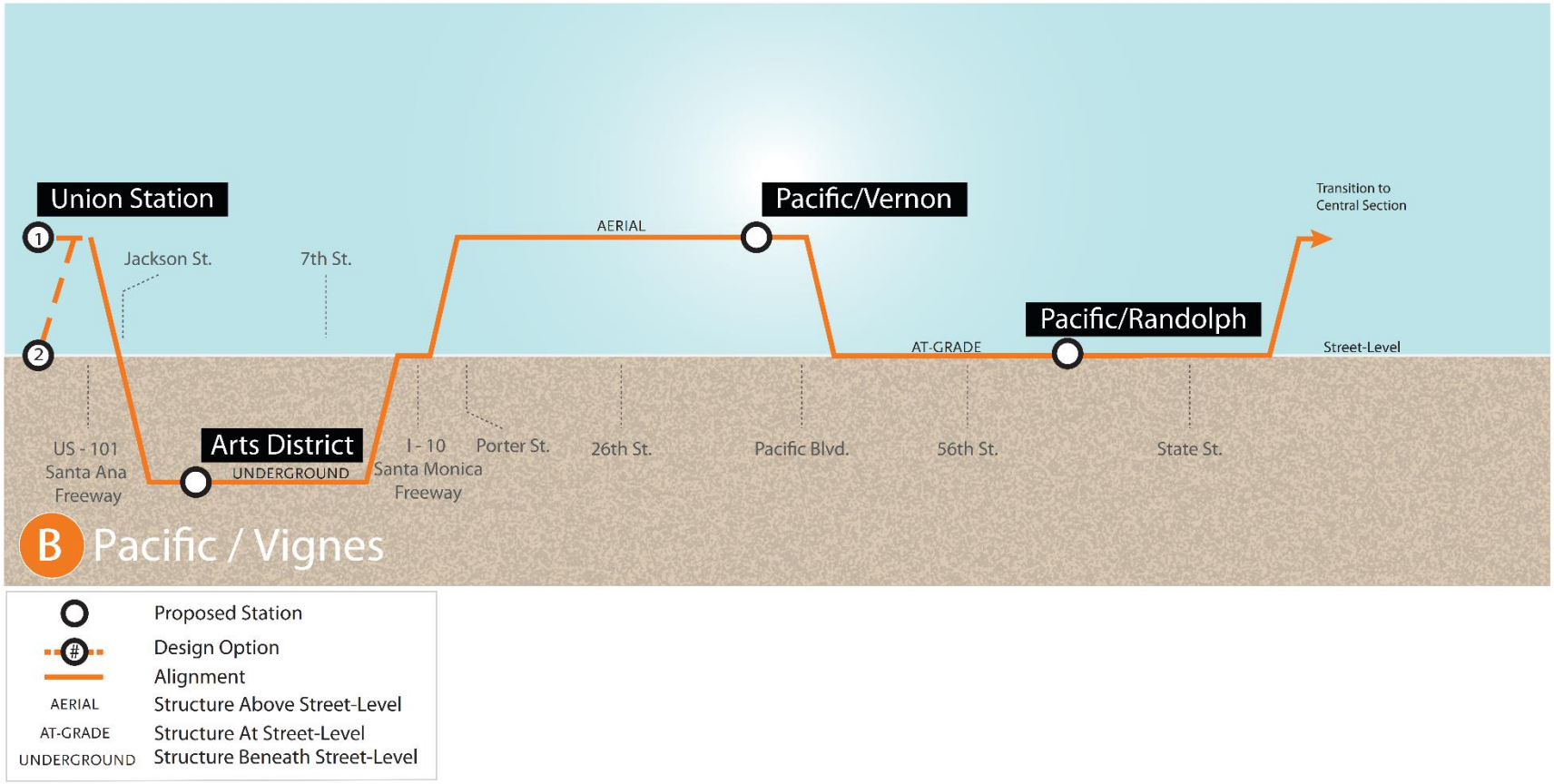
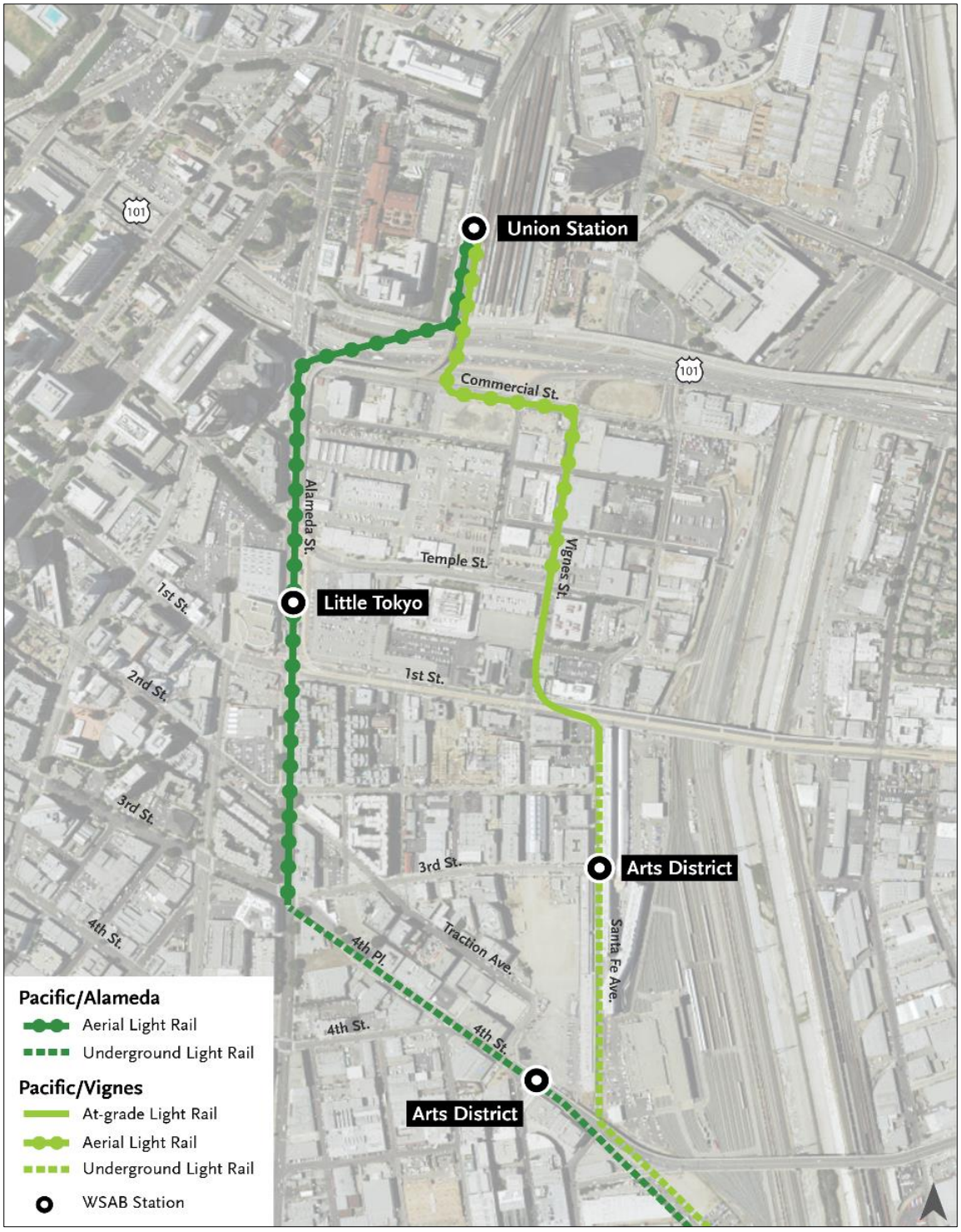


Figure 4-7. Connection into LAUS for Alternative A and Alternative B



4.2.3 Alternative C: Alameda (aerial)

Alternative C was developed and defined as part of the TRS Report and presented in the 2017 Public Scoping Meetings. This alignment runs between LAUS and Florence/Salt Lake Station along Alameda Street and Metro Blue Line corridor (see Figure 4-8). The northern portion of this alignment is 8.3 miles in length from LAUS to the Florence/Salt Lake Station. Alternative C has seven stations north of the Florence/Salt Lake Station: LAUS, Little Tokyo, 7th/Alameda, Washington, Vernon, Slauson, and Pacific/Randolph; parking is provided only at LAUS (see Figure 4-9 and Table 4-1).

Alternative C would be the same as Alternative A from LAUS to the Little Tokyo Station. South of the Little Tokyo Station, the alignment would differ from Alternative A by continuing south along Alameda Street in an aerial configuration with an aerial 7th/Alameda Station near the intersection of 7th Street and Alameda Street (see Figure 4-12).

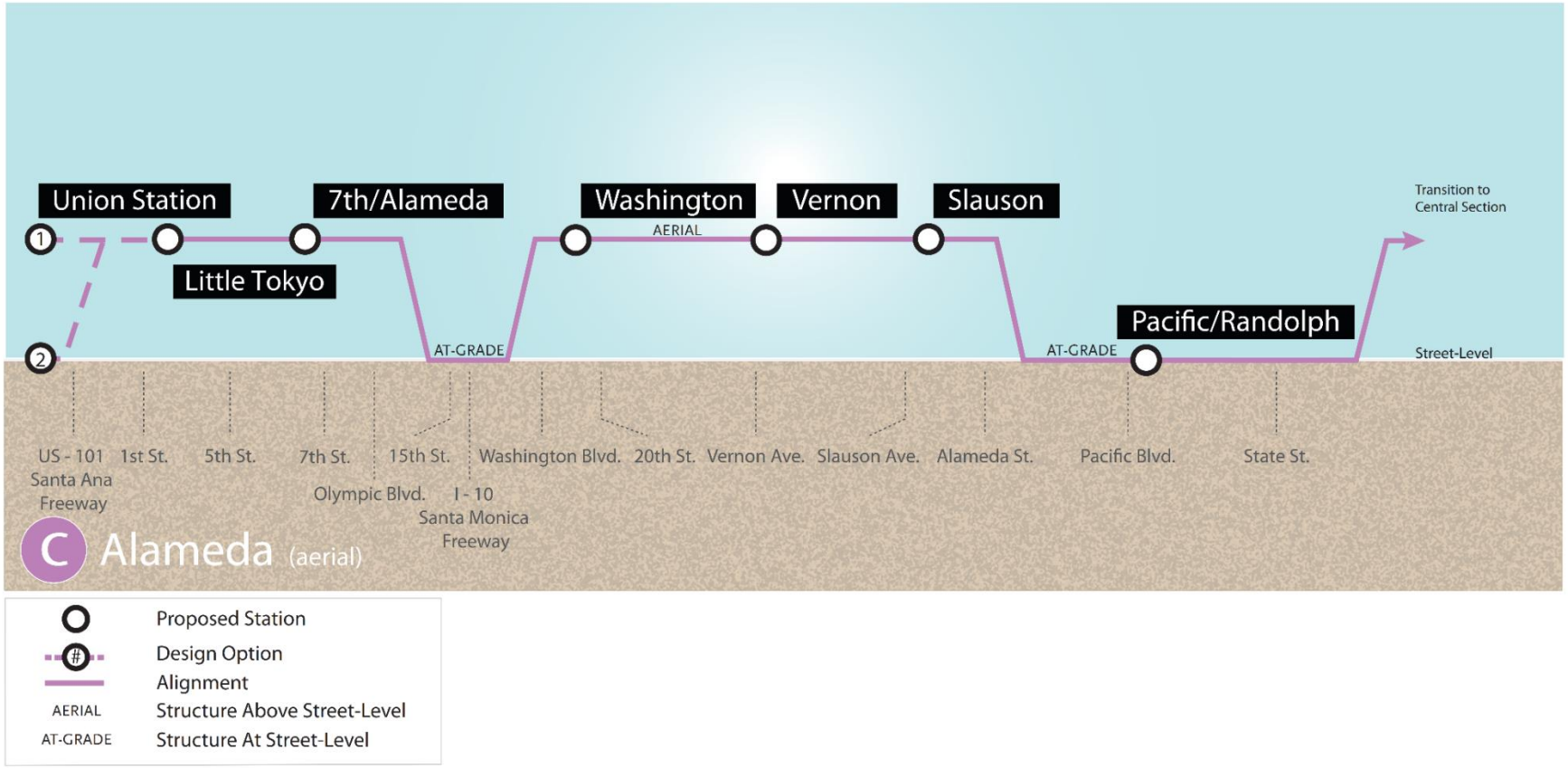
From the 7th/Alameda Station, the alignment would continue south in an aerial configuration along Alameda Street. South of 14th Street, the alignment would turn west and run parallel to the I-10 Freeway while transitioning from an aerial configuration to an at-grade configuration, and then cross under the I-10 Freeway on the west side of Long Beach Avenue. The alignment would cross 17th Street at-grade before transitioning back to an aerial structure along Long Beach Avenue adjacent to the existing Metro Blue Line. Three new aerial stations would provide a connection to the Metro Blue Line at Washington Station, Vernon Station, and Slauson Station.

From the Slauson Station, the alignment would turn east and merge with the UPRR ROW (La Habra Subdivision) along Randolph Street, transitioning to an at-grade configuration near Wilmington Avenue. The alignment would continue at-grade to the east with an at-grade station located east of the Pacific Boulevard/Randolph Street intersection.

From the Pacific/Randolph Station, the alignment would follow the same alignment as Alternative A described previously.

Figure 4-8. Alternative C: Alameda (aerial) Northern Alignment Alternative

Figure 4-9. Alternative C Proposed Station Configuration



4.2.4 Alternative D: Alameda/Vignes

Alternative D was also developed and defined as part of the TRS Report and presented in the 2017 Public Scoping Meetings. Like Alternative C, this alignment runs between LAUS and Florence/Salt Lake Station along Alameda Street and the Blue Line corridor (see Figure 4-10). The northern portion of this alignment is 8.3 miles in length from LAUS to the Florence/Salt Lake Station. Alternative D has seven stations north of the Florence/Salt Lake Station: LAUS, Arts District, 7th/Alameda, Washington, Vernon, Slauson, and Pacific/Randolph; parking is provided only at LAUS (see Figure 4-11 and Table 4-1).

Alternative D would be the same as Alternative B from LAUS to Temple Street. South of Temple Street, the alignment would transition to an underground configuration and curve southeast beneath the 1st Street Bridge before curving west to travel under 2nd Street and 3rd Street. An underground Arts District Station is proposed underneath 3rd Street near Traction Avenue.

From the Arts District Station, the alignment would continue west before turning south beneath Alameda Street. South of 5th Street, the alignment would transition from an underground configuration to an aerial configuration and follow the alignment of the Alternative C as described the preceding section (see Figure 4-12).

Figure 4-10. Alternative D: Alameda/Vignes Northern Alignment Alternative

Figure 4-11. Alternative D Proposed Station Configuration

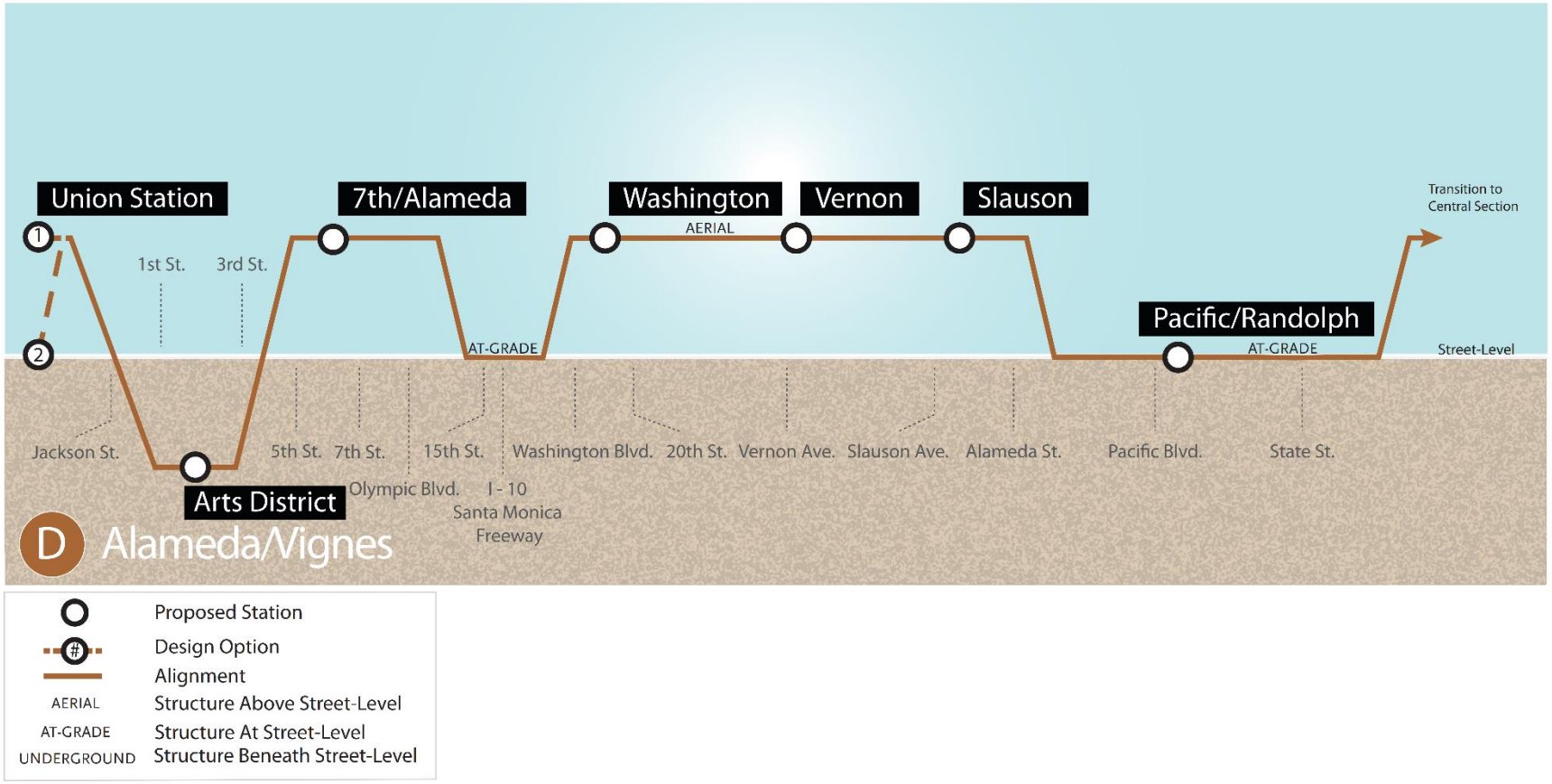
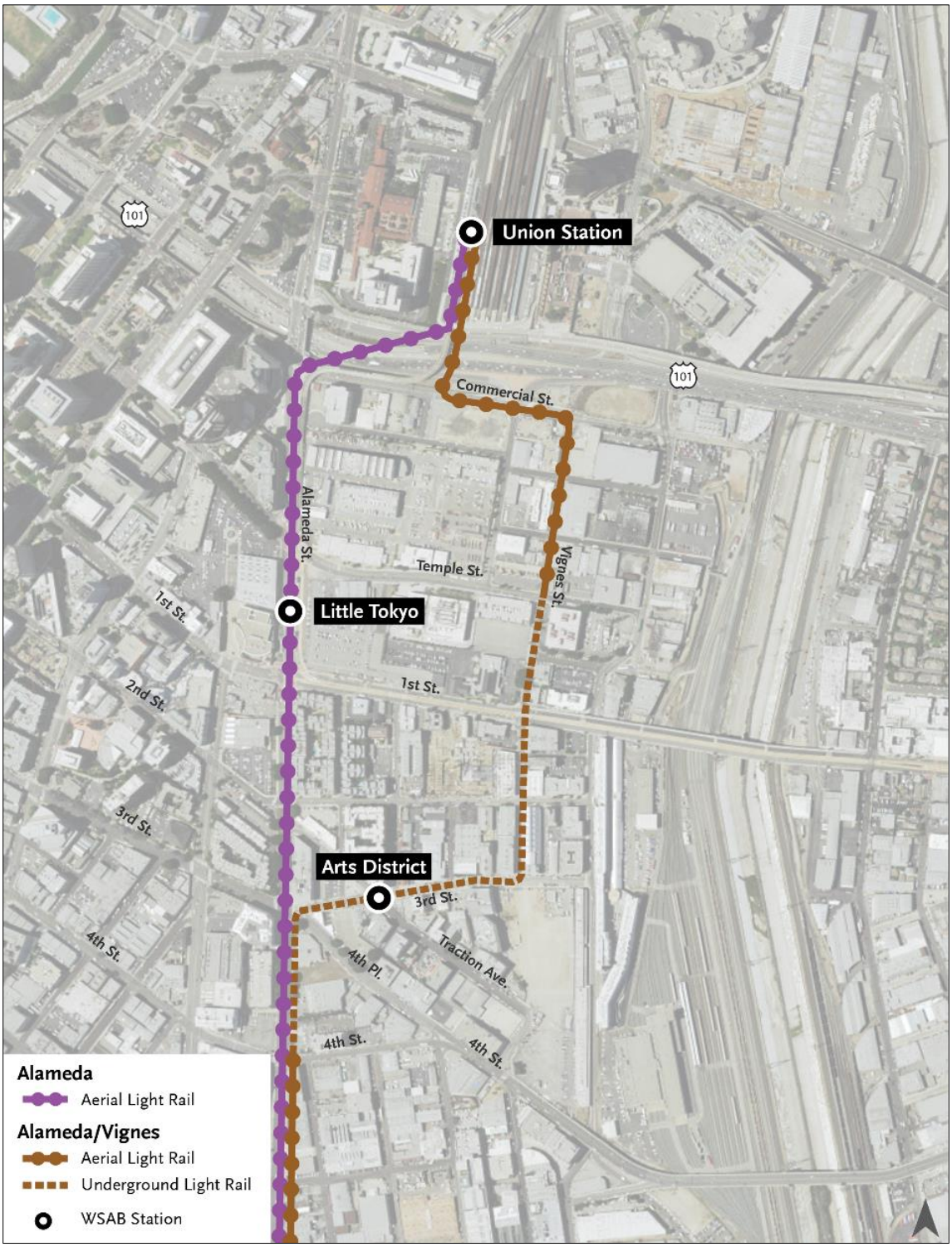


Figure 4-12. Connection into LAUS for Alternative C and Alternative D



4.3.1 Concept E: Alameda (underground)

Concept E was developed in response to public comments from the Public Scoping Meetings held in June 2017. Similar to Alternative C, the northern portion of Concept E's alignment extends approximately 8.1 miles between LAUS and Florence/Salt Lake Station along the Metro Blue Line corridor and Alameda Street (see Figure 4-13). The northern portion of Concept E would have seven stations north of the Florence/Salt Lake Station: LAUS, Little Tokyo, Arts District South, Washington, Vernon, Slauson, and Pacific/Randolph (see Figure 4-14 and Table 4-1).

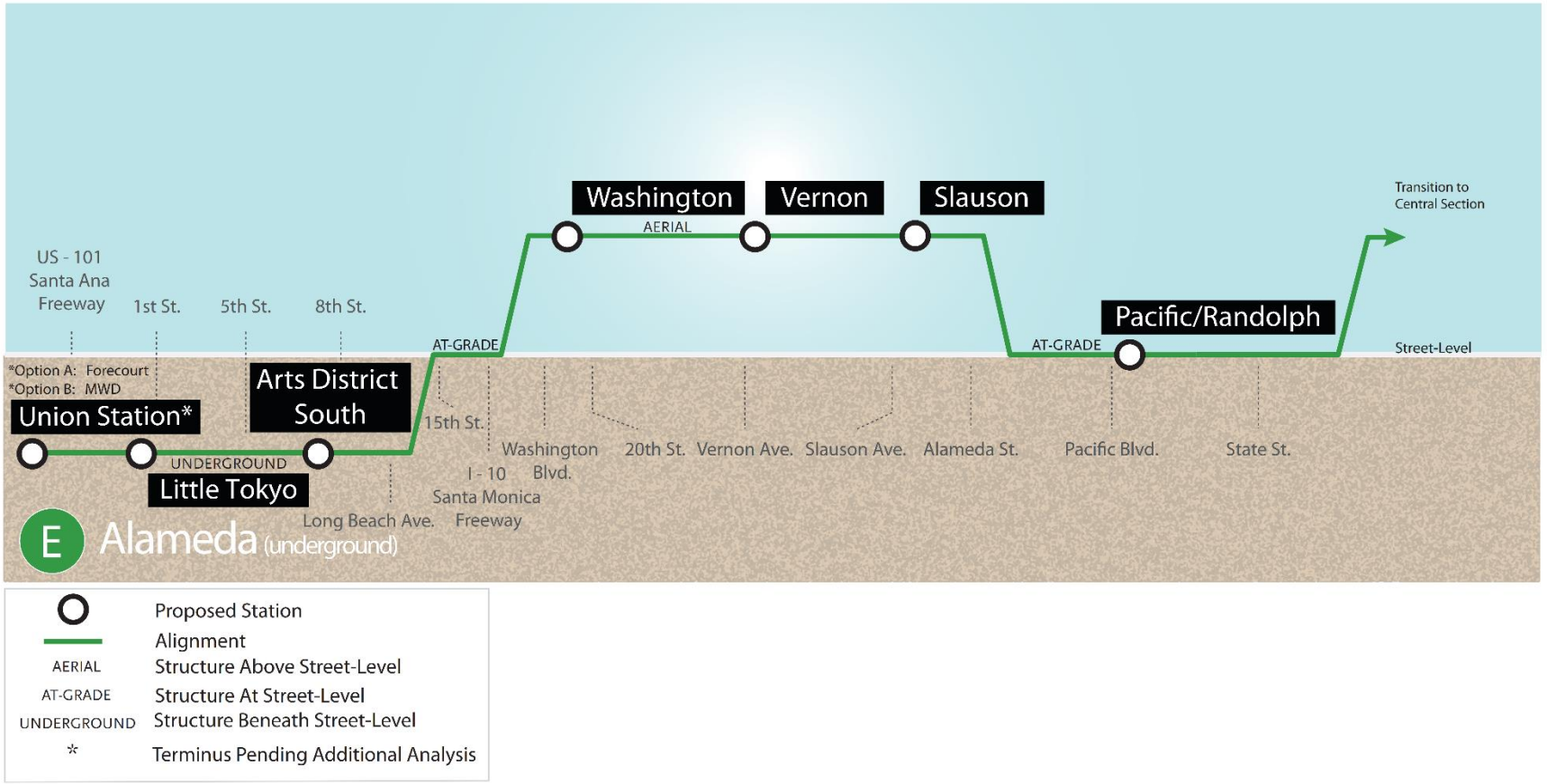
Concept E would be underground at LAUS with two possible station location options: either underground in front of Union Station or behind the existing Metropolitan Water District (MWD) building below the baggage area parking lot. South of LAUS, the alignment would cross underneath the US-101 Freeway and continue underground south of Commercial Street beneath Alameda Street.

The Little Tokyo Station for Concept E would be an optional underground station between Traction Ave and 1st Street. The alignment then continues underground on Alameda Street to the Arts District South Station which would be a under Alameda between 6th Street and 7th Street. Concept E would then continue south under Alameda Street to 8th Street where the alignment would curve to the west under the Alameda Tower property between 8th Street and Olympic Boulevard. South of Olympic Boulevard the alignment transitions to street level just north of 15th Street.

At 15th Street, the alignment crosses at-grade and continues at-grade beneath the I-10 Freeway and across 16th Street to enter the former PEROW currently owned by Metro (near Long Beach Avenue). Concept E would then transition to an aerial structure before crossing Washington Boulevard. The alignment would then continue south above Long Beach Avenue following the alignment of Alternatives C and D as described the preceding section.

Figure 4-13. Concept E: Alameda (underground) Northern Alignment Alternative

Figure 4-14. Concept E Proposed Station Configuration



4.3.2 Concept F: Alameda/Center

Concept F was developed as a response to public comments from the Public Scoping Meetings held in June 2017. The northern portion of Concept F's alignment extends approximately 8.2 miles between LAUS and Florence/Salt Lake Station along the Metro Blue Line corridor and Alameda Street (see Figure 4-15). The northern portion of Concept F would have seven stations north of the Florence/Salt Lake Station: LAUS, Arts District North, Arts District South, Washington, Vernon, Slauson, and Pacific/Randolph (see Figure 4-16 and Table 4-1).

Concept F would be aerial or at-grade at LAUS with two possible station location options: either above the Metro Gold Line or at Platform 2. At LAUS, Concept F's alignment would be an aerial configuration adjacent to or above the existing Metro Gold Line. The alignment would then cross over the US-101 Freeway and turn southeast along Commercial Street. The alignment would continue southeast, transitioning from an aerial configuration to underground after crossing Garey Street before reaching Banning Street. After crossing Banning Street, Concept F would turn southwest, crossing under the 1st Street Bridge, 2nd Street and 3rd Street, heading towards Alameda Street. An Arts District North underground station is proposed on Hewitt Street near Traction Avenue and 4th Place (see Figure 4-15).

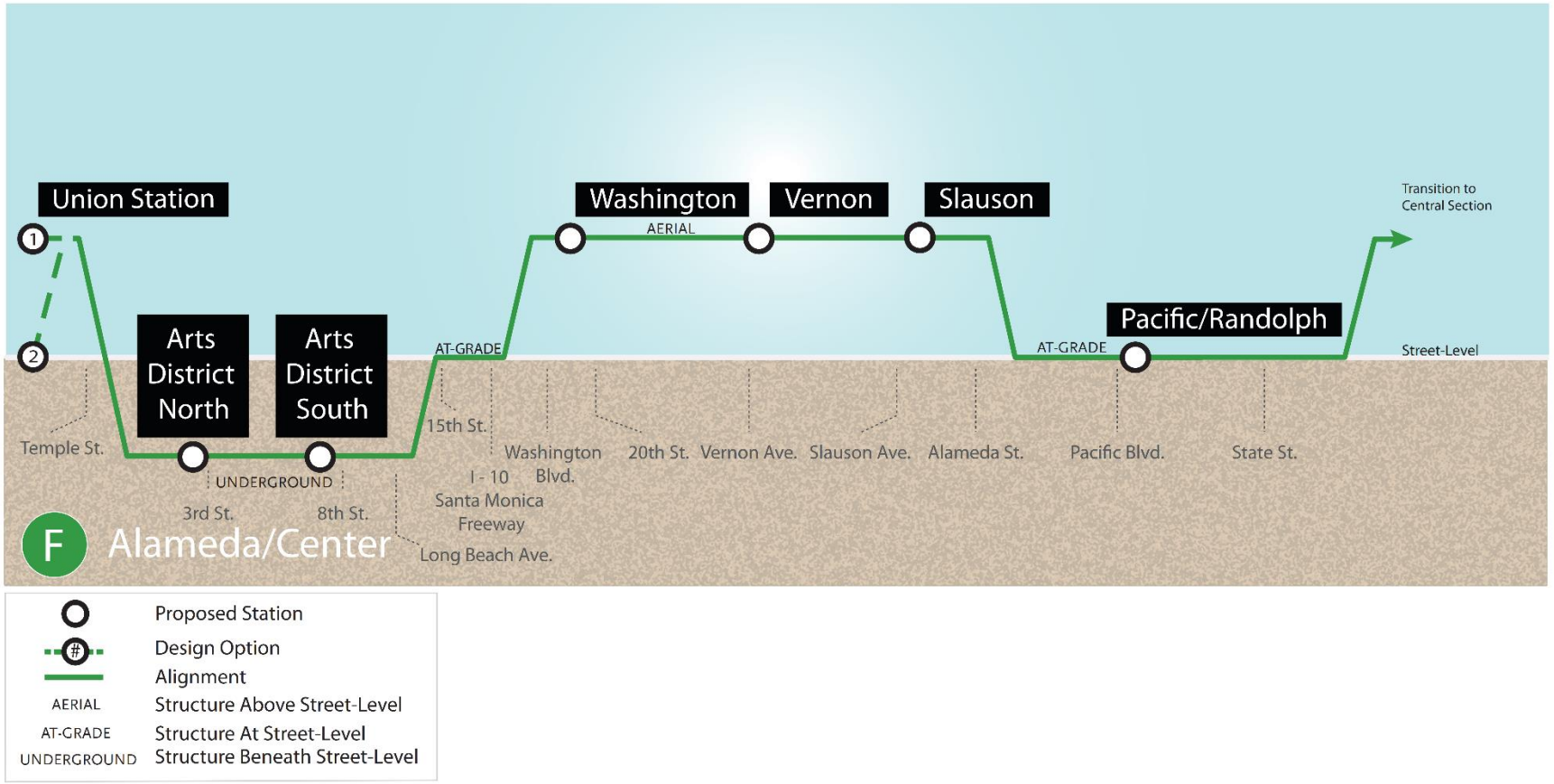
From the Arts District North station, Concept F would continue underground towards Alameda Street, turning south below 5th Street and continuing south under Alameda Street to the Arts District South Station.

The Arts District South station would be an underground station beneath Alameda Street between 6th Street and 7th Street. From that station the alignment would continue south under Alameda Street to 8th Street where the alignment would curve to the west passing under the Alameda Tower property between 8th Street and Olympic Boulevard. South of Olympic Boulevard the alignment transitions to street level just north of 15th Street.

At 15th Street, the alignment crosses at-grade and continues at-grade beneath the I-10 Freeway and across 16th Street to enter the former PEROW currently owned by Metro (near Long Beach Avenue). Concept E would then transition to an aerial structure before crossing Washington Boulevard. The alignment would then continue south above Long Beach Avenue following the alignment of the Alternatives C and D as previously described.

Figure 4-15. Concept F: Alameda/Center Northern Alignment Alternative

Figure 4-16. Concept F Proposed Station Configuration



4.3.3 Concept G: Downtown Transit Core

Concept G was developed as a response to public comments from the Public Scoping Meetings held in June 2017. The northern portion of Concept G's alignment extends approximately 8.1 miles between LA's Downtown Transit Core area and Florence/Salt Lake Station (see Figure 4-17). The northern portion of Concept G would have seven stations north of the Florence/Salt Lake Station: Downtown Transit Core, South Park/Fashion District, Arts District South, Washington, Vernon, Slauson, and Pacific/Randolph (see Figure 4-18 and Table 4-1).

Concept G's northern terminus would be underground near the Downtown Transit Core area with the following two possible station location options.

An underground station at 8th and Flower Streets with an underground pedestrian connection to the existing 7th Street/Metro Center Station. Southeast of the Option A terminus, the alignment would be underground along 8th Street then connect to a South Park/Fashion District Station below 8th Street between Los Angeles and Santee Streets.

A station under Broadway between 4th and 5th Streets with an underground pedestrian connection to the existing Pershing Square Station. From the Option B terminus, the alignment would be underground along Broadway curving towards 8th Street to connect to a South Park/Fashion District Station below 8th Street between Los Angeles and Santee Streets (see Figure 4-19).

Concept G would then continue underneath 8th Street to San Pedro Street, where the alignment would swing north towards 7th Street underneath privately owned properties. At 7th Street, the alignment turns south to the Arts District South Station beneath Alameda Street between 7th and 8th Streets. Concept G would then continue under the Alameda Tower property between 8th Street and Olympic Boulevard. South of Olympic Boulevard the alignment transitions to street level just north of 15th Street.

The alignment would cross 15th Street at-grade and continue beneath the I-10 Freeway and across 16th Street to enter the former PEROW (near Long Beach Avenue) then transition to an aerial structure before crossing Washington Boulevard. The alignment would then continue south above Long Beach Avenue following the alignment of the Alternatives C and D as previously described.

Figure 4-17. Concept G: Downtown Transit Core Northern Alignment Alternative

Figure 4-18. Concept G Proposed Station Configuration

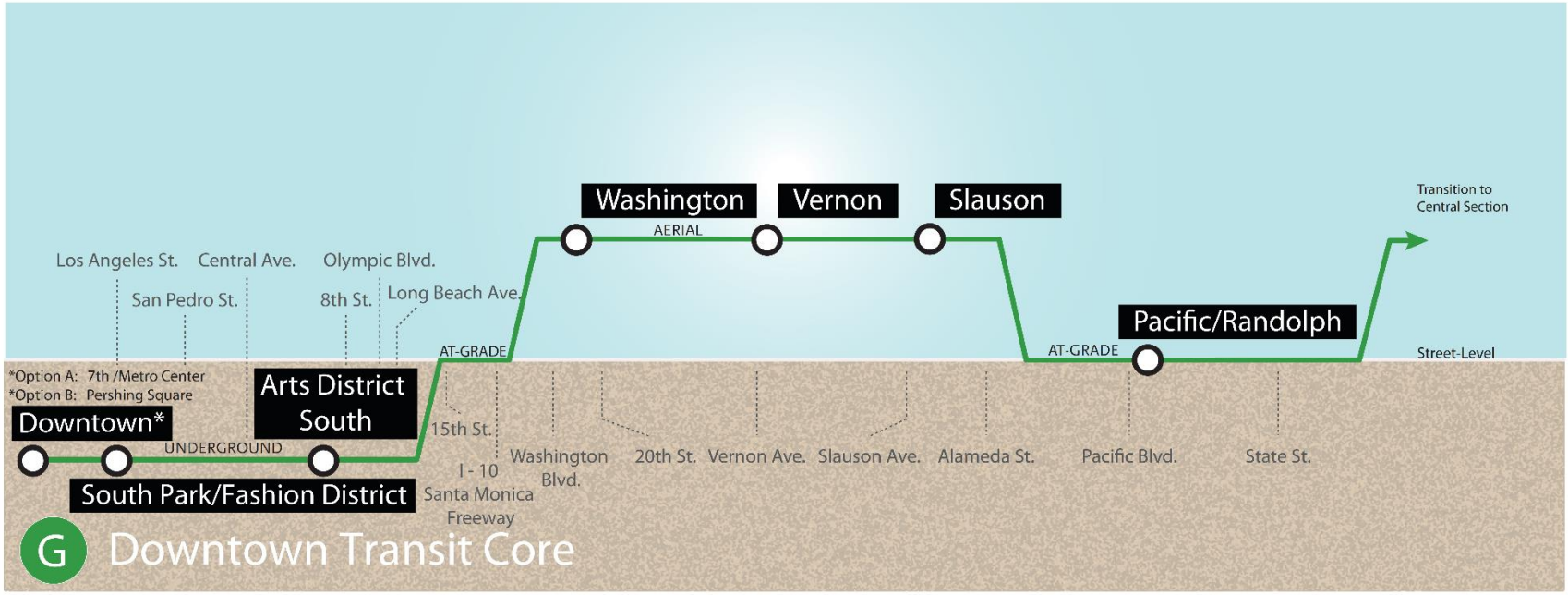


Figure 4-19. Terminus Options for Concept G

4.3.4 Concept H: Arts District/6th Street

Concept H was developed as a response to public comments from the Public Scoping Meetings held in June 2017. The northern portion Concept H's alignment extends approximately 7.6 miles between a new northern terminus near 6th and Mesquite Streets and Florence/Salt Lake Station (see Figure 4-20). The northern portion of Concept H would have four stations north of the Florence/Salt Lake Station: Arts District/6th Street, Vernon, Slauson, and Pacific/Randolph (see Figure 4-21 and Table 4-1).

Concept H would terminate in downtown Los Angeles with an underground Arts District/6th Street Station near 6th and Mesquite Streets. Passengers would be able to transfer at that station to a new Red/Purple Line station which would be constructed as a part of Concept H south of the existing Metro Division 20 Rail Yard. The alignment would continue underground beneath the I-10 Freeway towards the Redondo Junction. At the Redondo Junction, the alignment turns southwest along the existing Alameda Corridor tracks, transitioning from underground to an aerial configuration prior to entering the Metro Blue Line corridor. Concept H would have a new aerial station near the existing Blue Line's Vernon Station, south of which the alignment would continue above Long Beach Avenue following the alignment of the Alternatives C and D as previously described.

Figure 4-20. Concept H: Arts District/6th Street Northern Alignment Alternative

Figure 4-21. Concept H Proposed Station Configuration

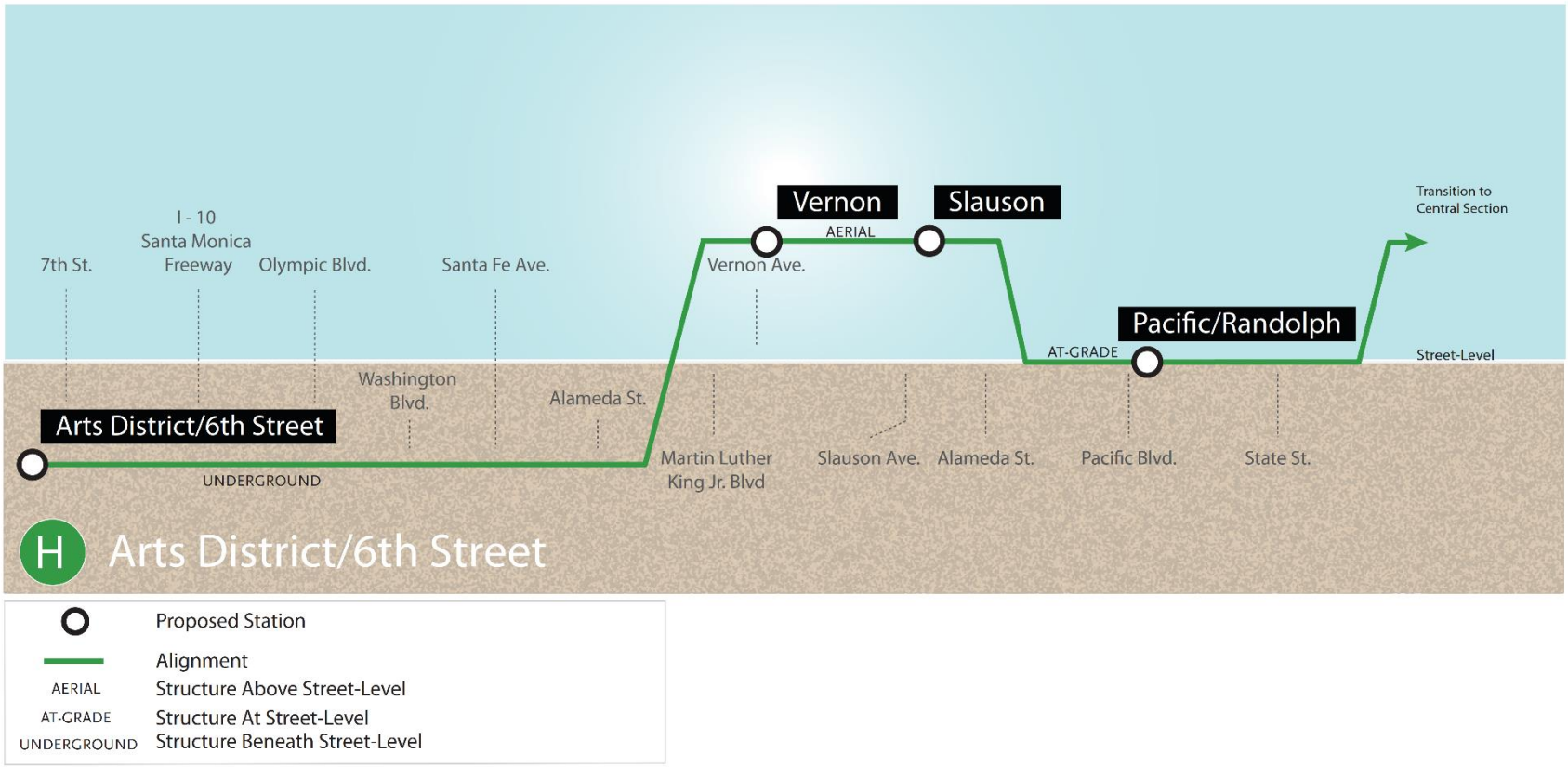


Figure 4-22. Terminus Concept H

5 SCREENING RESULTS

The screening evaluation was conducted to determine how well each of the Northern Alignment Alternatives and Concepts met the goals and objectives of the Project as described in Section 3.3.

The Northern Alignment Alternatives and Concepts were assessed on their potential performance in qualitative and quantitative measures. A "high," "medium," or "low" rating was assigned based on the Alternative's or Concept's ability to meet the Project's goals and objectives (see Methodology Section 2.2).

5.1 Mobility Improvements

The purpose of the mobility improvements goal is to advance a Project that meets the following objectives:

- 1.1 - Improves travel speeds and reduces travel times
- 1.2 - Supports other transit systems along the corridor
- 1.3 - Connects with the greater transit network
- 1.4 - Provides an alternative to the congested freeway and arterial network. Serves local and regional trips.
- 1.5 - Supports active transportation and first/last mile connections

The following subsections evaluate each Northern Alignment Alternative and Concept against the criteria developed for the mobility improvements goal's objectives.

5.1.1 Improves Travel Speeds and Reduces Travel Times

Criteria: Estimated Daily Hours of User Benefits

User benefits is similar to travel time savings. User benefits are estimated from the Metro Travel Forecasting Model (2018) and input to FTA's Summit program for each of the Alternatives or Concepts versus a No Build scenario.[3] User benefits are assumed to arise from changes in mobility for individual travelers that result from implementation of a project and are measured in hours of benefits, aggregated over all travelers. In the case of the WSAB Transit Corridor Project, each Alternative or Concept would provide user benefits in terms of faster and more reliable service compared to that provided by bus or autos.

The daily hours of user benefits were evaluated for the full length of the Project (from northern terminus to Artesia). Table 5-1 describes the rating system of "high," "medium," or "low" daily user benefit hours. Table 5-2 presents the daily user benefits (in hours) for each of the Alternatives and Concepts under consideration, and the corresponding ratings.

The daily user benefit hours for each Alternative and Concept ranges from 18,600 hours to 24,900 hours. Concept E provides the greatest daily user benefits, followed by Concept F and Concept G. In contrast, Concept H provides the least daily user benefit hours, likely due to the transfer required to reach LAUS.

Table 5-1. Daily Hours of User Benefits Rating Thresholds

Rating	Description
High	More than 23,000 hours of daily user benefits
Medium	Between 20,000 and 22,999 hours of daily user benefits
Low	Less than 20,000 hours of daily user benefits

Table 5-2. Daily Hours of User Benefits Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Estimated daily user benefits (in hours)	22,200 hours	22,700 hours	24,000 hours	23,500 hours	24,900 hours	24,100 hours	24,100 hours	18,600 hours
Overall Rating	Medium	Medium	High	High	High	High	High	Low

[3] An updated Metro Travel Demand Model run was performed based on Measure M (updated LRTP) No Build assumptions.

Criteria: Minutes of Travel Time

Under mobility considerations, travel times are evaluated for the full length of each Alternative and Concept from Artesia to the northern terminus. The travel time model runs are inclusive of train acceleration, deceleration, and a 20-second dwell time at each station.

Table 5-3 summarizes the rating thresholds for "high," "medium," or "low" travel time in minutes. Table 5-4 provides the end-to-end travel time for each Alternative and Concept and its respective ratings.

The minutes of travel time by Alternative and Concept range from 33.5 minutes to 37.5 minutes. Concept E provides the fastest travel time (33.5 minutes) for the full length of the alignment followed by Concept G with 33.6 minutes of travel time. In contrast, Concept H: has the slowest travel time at 37.5 minutes, which also includes the time required to transfer from the WSAB to the Red or Purple Line at the Arts District/6th Street Station and to then travel to LAUS.

Table 5-3. Minutes of Travel Time Rating Thresholds

Rating	Description
High	34 or less minutes of travel time from Artesia to Northern Terminus
Medium	Between 34 and 36 minutes of travel time from Artesia to Northern Terminus
Low	Greater than 36 minutes of travel time from Artesia to Northern Terminus

Table 5-4. Minutes of Travel Time Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Minutes of Travel	36.6 minutes	34.5 minutes	35.5 minutes	35.5 minutes	33.5 minutes	34.0 minutes	33.6 minutes	37.5 minutes
Overall Ratings	Low	Medium	Medium	Medium	High	High	High	Low

Note: Travel time presented for full length of the WSAB alignment (Artesia to northern terminus).

5.1.2 Supports Other Transit Systems

Criteria: Effects to other Metro Lines

From a system-wide perspective, the Project has the potential to relieve parallel north-south high use transit systems that are already near operational capacity and are anticipated to be overcrowded during peak periods in the future. With the opening of the Regional Connector, the current Metro Blue Line and Metro Gold Line will operate as a single north-south line from Claremont to Long Beach (the North-South Line). Boardings along this North-South Line are anticipated to approach 210,000 boardings per day in 2042. By providing parallel north-south service, the Project could alleviate some of this ridership by serving similar origins/destinations.

Relief of the North-South Line is measured by comparing the daily boardings on the North-South Line under a No Build scenario (209,700) against daily boardings under each of the alignment options to determine any decreases in daily boarding along the North-South Line. Table 5-5 describes the rating system for the "high," "medium," or "low" findings. Table 5-6 presents the forecast number of boardings on the North-South Line (Blue Line) under each Alternative and Concept and the corresponding rating.

All of the Alternatives and Concepts would reduce boardings on the North-South Line (Blue Line) by at least 4.6%. The reduction in Boardings for all of the Alternatives and Concepts, except Concept G, are within 1.2% of the others (i.e. too close to differentiate). However, Concept G is forecast to reduce boardings on the North-South Line (Blue Line) by nearly 10%.

Table 5-5. Relieves Overcrowded Existing Rail Line Rating Thresholds

Rating	Description
High	Less than 190,000 North-South Line (Blue Line) Boardings
Medium	Between 190,000 and 200,000 North-South Line (Blue Line) Boardings
Low	More than 200,000 North-South Line (Blue Line) Boardings

Table 5-6. Relieves Overcrowded Existing Rail Line Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
North-South Line Boardings	198,400	199,000	198,000	200,000	197,700	199,800	188,900	199,300
Boarding relief on North-South Line	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

Criteria: Improves and Streamlines Customer Service and Experiences (Daily One Seat Rides versus Rides with Transfers)

Generally, a one seat ride or a transfer-free train trip is more desirable than a trip that requires a transfer. Figure 5-1 shows the forecasted number of total daily boardings on the Project for each of the Alternatives and Concepts and the percentage of those that would be one-seat rides.

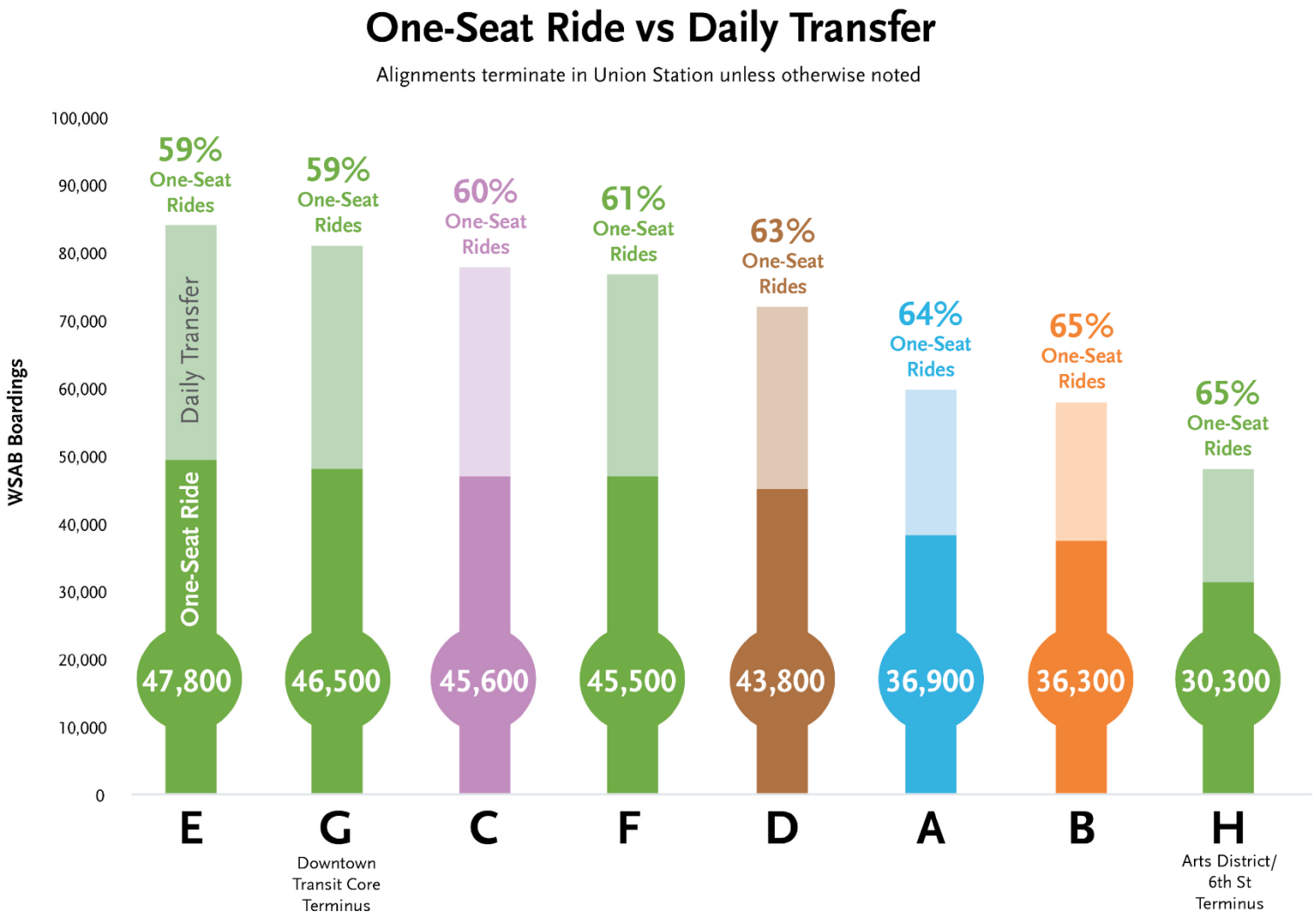
Concept E and Concept G both have not only the most daily boardings but also the most one-seat rides. At the other end of the spectrum is Concept H which carries the least number of riders overall and has the least number of one-seat rides.

However, it must be noted that there are also riders who might benefit from transferring between the Blue Line and the WSAB Line in order to get to their destination faster. For example, (depending upon the Alternative/Concept), a rider from Long Beach going to LAUS might have a slightly faster trip by transferring to the WSAB Line. As a result, the percentage of one-seat rides is not necessarily a predictor of higher-quality service.

Table 5-7. Improves and Streamlines Customer Service and Experiences Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Number of daily one seat rides	36,900 one-seat rides	36,300 one-seat rides	45,600 one-seat rides	43,800 one-seat rides	47,800 one-seat rides	45,500 one-seat rides	46,500 one-seat rides	30,300 one-seat rides

Figure 5-1. WSAB Transit Corridor Study Area One Seat Ride versus Transfers



5.1.3 Connects with the Greater Transit Network

Criteria: Connections to other Metro Rail Lines, Access to Regional Rail, and Future Extensions

Providing direct linkages to other planned and existing Metro Rail lines is important to enhance mobility and regional connectivity. This criterion reviews the opportunities to connect to other transit services, taking into consideration direct transfers to/from planned or existing Metro Rail lines with the Alternatives' and Concepts' proposed stations.

The evaluation criteria have been assessed based on the design of each Alternative's and Concept's connection to other Metro and regional rail systems. A "high" rating would constitute a high level of connectivity or potential, followed by a "medium" rating, then a "low" rating having the least amount of connectivity. The following is a description of each Alternative's and Concept's connectivity to other existing or planned transit services and the respective rating.

Alternative A would provide connections for riders to directly transfer to the Purple, Red, Gold, and Regional Rail Lines at LAUS. Transfers to the Regional Connector (RC) at Little Tokyo Station would allow riders to transfer to east/west destinations. With transfers to major Metro LRT lines, this Alternative received a "**medium**" rating.

Alternative B would provide connections for riders to directly transfer to the Purple, Red, Gold, and Regional Rail Lines at LAUS. However, this Alternative would not provide a convenient connection to the East-West Line in Little Tokyo. With limited transfers to major transit services, this Alternative received a "**low**" rating.

Alternative C would provide connections for riders to Red, Purple, Gold and Regional Rail Lines at LAUS. There would also be convenient connections to the proposed East-West and North-South lines at Little Tokyo and to the Blue Line at the three stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as the 7th/Metro Center. With so many connections to major transit services as well as numerous bus lines, this Alternative received a "**high**" rating.

Alternative D would provide connection for riders to directly transfer to Red, Purple, Gold and Regional Rail Lines at LAUS. Transfers at the Blue Line would be provided at the three stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as the 7th/Metro Center. Transfers to Gold and Regional Connector Lines would not be as direct as Alternative C since riders would need to travel to LAUS before transferring. With transfers to major transit services as well as numerous bus lines, this Alternative received a "**medium**" rating.

Concept E would provide direct connections to Metro's Red, Purple, Gold and Regional Rail Lines at LAUS, as well as provide connections to the proposed East-West and North-South lines at Little Tokyo. Transfers at the Blue Line would also be provided at the three stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as the 7th/Metro Center. With transfers to major Metro LRT and Bus lines, this Concept received a "**high**" rating.

Concept F would provide connection for riders to directly transfer to the Purple, Red, Gold, and Regional Rail Lines at LAUS. Transfers at the Blue Line would be provided at the three stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as and 7th/Metro Center. However, this Alternative would not provide convenient

connections to the East-West Lines as there would be no direct connection in Little Tokyo, therefore this Concept received a "**medium**" rating.

Concept G would provide connection for riders to directly transfer to the Purple, Red, Blue, Expo, and Regional Connector Lines near 7th/Metro Center or Purple and Red Lines at Pershing Square. Transfers at the Blue Line would also be provided at the three stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as the 7th/Metro Center. However, this Alternative would not provide convenient connections to the Regional Rail Lines at LAUS, therefore this Concept received a "**medium**" rating.

Concept H would provide a connection for riders to directly transfer to either the Purple or Red Lines at the new station proposed as a part of this Concept south of the Metro Division 20 Yard. Transfers to the Blue Line would also be provided at the southern two stations along Long Beach Avenue, which would allow riders to transfer to destinations in the west such as the 7th/Metro Center. However, no other direct connections would be provided along the East-West or North-South Lines. With these limited transfers to major transit services, this Concept received a "**low**" rating.

Table 5-8. Connects with the Greater Transit Network

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Connects to major Metro North/ South and East/West Lines; access to regional rail; potential future extensions	LAUS and RC	LAUS	Blue Line, LAUS, and RC	Blue Line and LAUS	Blue Line, LAUS, and RC	Blue Line and LAUS	Red/ Purple Lines, and potential for Expo and RC	Blue Line and Red or Purple Line
Overall rating	Medium	Low	High	Medium	High	Medium	Medium	Low

5.1.4 Provides an Alternative to Congested Freeway and Arterial Networks and Serves Local and Regional Trips

Criteria: Number of Daily Boardings

Each time a transit passenger boards a transit vehicle is counted as a boarding (a trip that requires one transfer to reach a destination equates to two boardings). The daily boardings for each Alternative or Concept is based on Metro Model runs that were conducted in 2018.

Table 5-9 summarizes the rating system for the "high," "medium," or "low" rating for the daily boardings category. Table 5-10 provides the number of daily boardings for Alternatives and Concepts and their respective ratings.

Table 5-9. Number of Daily Boardings Rating Thresholds

Rating	Description
High	Over 70,000 daily boardings
Medium	Between 60,000 and 70,000 daily boardings
Low	Less than 60,0000 daily boardings

Table 5-10. Number of Daily Boardings Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Estimated number of Daily Boardings	58,000 boardings	56,000 boardings	75,500 boardings	69,500 boardings	81,500 boardings	74,500 boardings	78,500 boardings	46,500 boardings
Overall rating	Low	Low	High	Medium	High	High	High	Low

The estimated number of daily boardings for each Alternative or Concept range from 46,500 to 81,500. Concept E is the only Concept or Alternative with over 81,000 daily boardings, followed by Concept G with 78,500 boardings, Alternative C with 75,500 boardings and Concept F with 74,500 boardings. As such, all four rated "high" with over 70,000 daily boardings. Concept D with 69,500 daily boardings rated "medium". Alternatives A and B and Concept H rated "low" with less than 60,000 boardings per day.

All Alternatives and Concepts (except Alternatives A and B) parallel the Metro Blue Line and allow riders to transfer between the two lines and in some cases, get to their destination more quickly. For example, Concept E had the most boardings, in part due to passengers transferring from the Metro Blue Line to the WSAB Corridor for a more direct and faster connection to LAUS, where some riders then transfer to the North-South line going north. Without the WSAB Transit Line, passengers would take the Metro Blue Line (North-South Line) to the 7th Street/Metro Center Station, and then continue through the Regional Connector to LAUS. As such, this trip to LAUS without the WSAB Transit Line would take longer. The travel time from the Metro Blue Line's Slauson Station to LAUS without the Project is approximately 27 minutes. In contrast, the travel time from the Slauson Station to LAUS on Concept E would be approximately ten minutes due to the more direct alignment.

Criteria: Number of New Transit Trips

Daily new transit trips are the number of person trips that switch from other modes of travel (e.g., automobile) to transit. New transit trips are an important measurement because they represent people who would likely take transit rather than drive a car to reach their destination if a convenient, reliable transit option were available to them.

Table 5-11 summarizes the rating system for the "high", "medium", or "low" thresholds for new transit trips. Table 5-12 provides the number of new transit trips for each Alternative and Concept and their respective rating.

The number of new transit trips per day ranges from 19,500 trips to 27,000 for the Alternatives and Concepts. Alternative C and Concepts E and F all attract over 26,000 new transit trips, rating "high" compared to other Alternatives and Concepts. All three connect directly into LAUS and both Alternative C and Concept E have a station at Little Tokyo which provides a direct transfer to both the North-South and East-West Lines. Alternatives A, B and D and Concepts F and G also have significant (over 20,000) new trips and received a "medium" rating. Concept H, with a forced transfer to get to LAUS, has 19,500 new trips and is therefore given a rating of "low".

Table 5-11. Daily New Transit Trips Rating Thresholds

Rating	Description
High	More than 26,000 new transit trips
Medium	Between 20,000 and 26,000 new transit trips
Low	Less than 20,000 new transit trips

Table 5-12. Daily New Transit Trips Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Estimated number of New Transit Trips	24,500 new trips	25,000 new trips	26,000 new trips	25,500 new trips	27,000 new trips	26,000 new trips	25,000 new trips	19,500 new trips
Overall rating	Medium	Medium	High	Medium	High	High	Medium	Low

Criteria: Peak Load Points versus Operational Limits

The peak-load point is the busiest segment in the peak direction for a selected transit route. Reviewing the peak load for the Project and other impacted rail lines helps to ensure the operational feasibility of the Project (i.e. can the required capacity be provided by the selected mode). This criterion reviews the peak load on the WSAB Line, the North-South Line and the Red/Purple Lines for the AM peak hour, and compares the peak load volumes (passengers) with the train capacity to ensure the peak hour volume does not exceed the operation limit.

Table 5-13 shows the location and volume of the peak-load point on the WSAB Line during the AM peak hour. For the AM peak hour, the northbound direction is the peak direction for all Alternatives and Concepts. The peak-load points mostly occur when the WSAB Line is approaching major activity centers, which occurs at the northern end of the WSAB Line. The peak load volume on the WSAB Line ranges from 1,900 to 4,100 passengers per hour.

Table 5-13. WSAB Peak Load Segment and Hourly Volume

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Peak Load Segment (between 2 stations)	Pacific/ Vernon to Arts District North	Pacific/ Vernon to Arts District North	Vernon to Washing-ton	Vernon to Washing-ton	Washing-ton to Arts District South	Washing-ton to Arts District South	Washing-ton to Arts District South	Slauson to Vernon
Peak Hour Load Volume (passengers)	2,460	2,420	3,760	3,390	4,050	3,570	4,100	1,900
Over or Under Capacity	Under	Under	Under	Under	Under	Under	Under	Under

Assuming a 3-car train with a capacity of approximately 133 passengers per car, the capacity for the Light Rail train is approximately 400, with a 5-minute headway (12 trains) in the peak hour, the maximum peak hour capacity on WSAB Line will be 4,800 passengers. This indicates the peak load volume on the WSAB Line across all Alternatives and Concepts will be within the available capacity, with the highest peak load volume in Concept G reaching about 86 percent of the maximum hourly capacity. It should be noted that the "crush-load" capacity of a 3 car LRT set is approximately 650, and as a result the ultimate capacity would be as much as 16,000/hour with crush-loads at 2 ½ minute headways.

To evaluate this criterion, there are only two ratings - over capacity or under capacity. None of the Alternatives or Concepts would exceed the capacity on the WSAB Line therefore, they all rate positively at under capacity.

Because of the synergy of the urban rail system, the addition of the Project may impact the boardings on the other Urban Rail lines. The travel forecast results shows the North-South Line has the most interaction with the WSAB Line, as it crosses the corridor and runs parallel with the WSAB Line (for Alternatives C and D and all Concepts). Compared with the No Build Scenario, the addition of the WSAB Line reduces the daily boardings on the North-South Line for these Alternatives and Concepts. This relief primarily occurs on the southern portion of the line (south of LAUS and 7th/Metro Center) where the WSAB Line runs parallel with the North-South Line. Compared to the No Build Scenario (dashed line in the chart), all the WSAB Alternatives and Concepts provide relief to the North-South Line during the peak-hour in the peak direction (northbound), especially south of the 7th/Metro Center Station. Concept G from the WSAB Line to the North-South Line near Pico Boulevard and Flower Street, provides a spike in the peak load point, but this Concept still provides a high-level relief to the North-South Line boardings south of the 7th/Metro Center Station or Pershing Square Station.

Because of the high number of transfers from the North-South Line to the Pasadena Bus Rapid Transit (BRT), which extends Metro's Orange Line from North Hollywood to Pasadena Del Mar via State Route 134 (SR-134), the peak hour maximum load point on the North-South Line occurs in the northern portion between Fillmore and Del Mar (which is the segment before the North-South Line connects to the Pasadena BRT) for all Alternatives and Concepts. The maximum load volume ranges between 4,570 and 4,880 passengers, with the lowest by Concept G and highest by Alternatives A and B. However, the analysis shows that in the northern portion of the North-South Line, most of the demand is a function of the Pasadena BRT, not the WSAB Line. Although the WSAB Line contributes to the load, the impact is minimal for this area.

Another potential impact the WSAB Line will make to the urban rail system is on the Red/Purple Line. All the Alternatives and Concepts connect directly to the Red/Purple Lines at either: LAUS, 7th/Metro Center/Pershing Square Station, or the Arts District/6th Street Station. The analysis shows for all Alternatives and Concepts, the peak hour direction on the Red Line would be in the southbound direction; and the maximum peak load volume would be around 3,000 passengers, which is far below the peak hour capacity of around 12,000 passengers for the Red Line (assuming 15 trains per hour with 6 car trains and approximately 133 passengers per car). Therefore, the WSAB Line impact on the Red Line peak hour volume is minimal.

For the Purple Line, the peak direction is westbound, with the maximum load point between La Brea and Fairfax. The maximum peak hour volume would be approximately 9,300 passengers in the No Build Scenario. By adding the WSAB Line, the maximum peak hour volume on the Purple Line increases by about 400 to 600 passengers in the AM peak hour, ranging from a volume of 9,740 passengers (in Alterative A) to a volume of 9,860 passengers (in Concept E), which are all with in the capacity of 12,000 passengers per hour. In addition, although the boarding and alighting patterns on the Purple Line varies slightly when the WSAB Line's transferring passengers board the Purple Line, the maximum peak-load point remains at La Brea and Fairfax for all Alternatives and Concepts. This shows that the WSAB Line impact on the Purple Line peak hour volume would not be significant.

5.1.5 Supports Active Transportation and First/Last-Mile Connections

The various Alternatives and Concepts were rated based on how well the active transportation network would be supported by each of the proposed station areas. Table 5-14 presents a matrix of which stations are proposed by each Alternative or Concept.

Table 5-14. Northern Alignment Stations Evaluated by Each Alternative and Concept

Station Names	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Down-town Transit Core	Concept H Arts District/6th Street
LAUS Yard (above Gold Line or Platform 2)	✓	✓	✓	✓		✓		
LAUS Forecourt or East of MWD (underground)					✓			
Little Tokyo	✓		✓		✓			
Arts District North	✓	✓		✓		✓		
Arts District South/7th Alameda			✓	✓	✓	✓	✓	
Downtown Transit Core							✓	
South Park/ Fashion District							✓	
Arts District/ 6th Street								✓

Note: Stations evaluated in this assessment are located within downtown Los Angeles (north of the I-10 Freeway).

Criteria: Quality of the Pedestrian Environment near Station Areas

The quality of the pedestrian environment evaluation is similar to those cited in Metro's First/Last Mile Strategic Plan (e.g. street grid, street walkability, points of interest). Within a half-mile of each proposed station area for the Alternatives and Concepts, the pedestrian environment and public realm were rated for 1) access to existing networks, 2) quality of existing pedestrian experience, and 3) potential for pedestrian conditions to improve. Each of these considerations were assigned an overall rating of "low," "medium," or "high."

The existing network and access rated "high" if the street grid and block sizes were walkable, had a high number of intersections (more places to cross the street), and if most sidewalks were 10 feet wide or greater. The number of major points of interest within a half-mile of a station was also considered and included for reference. The Street Grid graphics show existing block sizes and the street network for every station (some station areas apply to several Alternatives or Concepts).

The quality of the pedestrian experience (walkability) considered prevalence of transparent street frontages, frequency of driveway conflicts, and presence of sidewalk buffers (e.g. parkways, curbside parking or bike lanes). The potential for pedestrian conditions to improve considered opportunities for new development that may provide public realm improvements (e.g. setbacks for wider sidewalks, new pathways, lighting and pedestrian amenities).

The following is a qualitative assessment of the pedestrian environment for each downtown Los Angeles station (proposed stations located north of the I-10 Freeway). The Street Walkability graphics illustrate overall walkability ratings of each street within the station area. Photo examples are included for reference.

Union Station and Terminus - There are four platform location potentials depending on the Alternative or Concept: underground at LAUS Forecourt, underground east of the MWD Building, aerial over existing Gold Line platforms, or at-grade on Platform 2. LAUS will connect WSAB riders to LA County's regional and local rail system (Metrolink, Amtrak) and Metro Gold Line, Red Line, Purple Line and Regional Connector. The I-101 Freeway to the south, and several large public facilities east and north of LAUS are access barriers. There are notably fewer intersections (61) and a less walkable network with poor pedestrian conditions on most streets near LAUS. Given these major infrastructure barriers, connection to the existing pedestrian network can be restricted and therefore this station would rate "**low**." The quality of pedestrian network would also rate "**low**" as most streets near LAUS need higher visibility crossings and sidewalk improvements.

Community-based plans to improve the pedestrian experience (e.g., Connect US) represent future potential to improve walkability. This station area encompasses many publicly-owned parcels that could translate into opportunities for improving walkability if significantly redeveloped for office, mixed or residential uses. There are also large public facilities (e.g. Department of Water and Power, Piper Technical Center, LA County Jail) that are currently unfriendly to pedestrians but may improve if additional accessibility is needed for first/last mile station connectivity. The potential for pedestrian conditions to improve rates "**high**" (see Figure 5-2 and Figure 5-3).

Figure 5-2. LAUS Pedestrian Analysis (½ Mile Radius)

Figure 5-3. LAUS Pedestrian Analysis by Adjacent Streets

HIGH

Main Street

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Frequent pedestrian lighting
- High street-level transparency
- Narrow roadway with low vehicular speeds

MEDIUM

E. Cesar Chavez Ave

- Pathway (sidewalks) 5-20'
- No traffic calming/street buffer
- Frequent landscape or shade
- Infrequent street lighting
- Some street-level transparency
- Narrow roadway with low vehicular speeds

Los Angeles St

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer (both sides)
- Frequent landscape or shade
- Frequent street lighting
- No street-level transparency
- Narrow roadway with low vehicular speeds

LOW

Alameda Street

- Pathway (sidewalks) 5'-20'
- No traffic calming/street buffer
- No landscape or shade
- No pedestrian lighting
- No street-level transparency
- Wide roadway with high vehicular speeds

Commercial Street

- Pathway (sidewalks) < 5'
- No traffic calming/street buffer
- No landscape or shade
- No pedestrian lighting
- No street-level transparency
- Wide roadway with high vehicular speeds

Little Tokyo Station – Depending on the Alternative or Concept, this station could connect to the Regional Connector Little Tokyo/Arts District Station a few different ways. If an underground station is proposed connection would take place via a pedestrian tunnel or outside via stairs or elevators. If an aerial station is proposed, connection would take place via sidewalks. Through Regional Connector, this station would provide riders connection to and from Gold or Expo Line destinations. Given the transfer needed to access the pedestrian network, this station would rate "**medium**."

The quality of pedestrian network would rate "**high**" since this station provides access to the numerous points of interest in Little Tokyo and the northern half of the Arts District. Although the dense street grid is discontinuous in places. Some large blocks are permeable, while many large parcels along Alameda Street and north of the proposed station are less walkable (narrow sidewalks, many driveways, and industrial uses) today. However, these large parcels have been envisioned by the community to transform into denser mixed use projects (e.g. Mangrove site). Considering the discontinuous street grid and already built-out Little Tokyo neighborhood, this station rates "**medium**" in potential for conditions to improve (see Figure 5-4 and Figure 5-5).

Arts District North Stations – These underground stations will provide access to points of interest in the northern half of the Arts District and Little Tokyo. Transferring to Regional Connector would require riders to have a new pedestrian transfer at LAUS one stop farther north, or by walking several blocks at street-level to transfer at the Regional Connector's Little Tokyo Station. Some streets are relatively walkable (with 87 total intersections); however, a number of blocks are long and impermeable. Given the transfer needed to access nearby pedestrian network, this station would rate "**medium**."

There are many commercial and cultural points of interest in the Arts District. Similar to the review of the Little Tokyo Station above, quality of pedestrian network would rate "**high**" since this station would provide access to the numerous points of interest in Little Tokyo and the northern half of the Arts District.

New development projects including widening sidewalks, adding shade trees, and sidewalk illumination, have improved the pedestrian experience. Considering the recent investment in the Arts District neighborhood, this station rates "**medium**" in potential for conditions to improve (see Figure 5-4 and Figure 5-5).

Figure 5-4. Little Tokyo/Arts District Station Pedestrian Analysis (½ Mile Radius)

Figure 5-5. Little Tokyo/Arts District Station Pedestrian Analysis by Adjacent Streets

HIGH

Wall Street

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer (both sides)
- Presence of landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

5th Street (Encampments Present)

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer
- Presence of landscape or shade
- Infrequent lighting on buildings
- Some street-level transparency

MEDIUM

4th Street

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer (both side)
- No landscape or shade
- Frequent lighting on buildings
- High street-level transparency

6th Street (Encampments Present)

- Pathway (sidewalks) < 5'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Infrequent lighting on buildings
- Some street-level transparency

LOW

Crocker Street

- Pathway (sidewalks) < 5'
- Infrequent traffic calming/street buffer (one side)
- No landscape or shade
- Infrequent lighting on buildings
- No street-level transparency
- Narrow roadway with low vehicular speeds

Arts District South Stations – The pedestrian network around these station options is "**low**", with long blocks, fewer intersections (90) and large parcels that inhibit east-west access. Because many of the current land uses are industrial, there are few major points of interest relative to other station areas. Heavy truck volumes, higher vehicular speeds on Alameda Street, narrow sidewalks, low street transparency, and a lack of street amenities, this station would rate "**low**" for quality of pedestrian environment.

New development projects, including widening sidewalks, adding shade trees and sidewalk illumination, have improved the pedestrian experience. For example, ROW DTLA, which used to be the American Apparel campus consisting of large industrial warehouses, was converted to commercial use and introduced new streets that improved the street grid. If more development such as ROW DTLA occurs, and streets that have parking constraints and lack sidewalks are addressed, there is potential for pedestrian conditions to continue to improve. Alameda Street's designation as a truck route will require special attention to address first-last mile challenges. As such, this station rates "**medium**" in potential for conditions to improve (see Figure 5-6 Figure 5-2 and Figure 5-7).

Figure 5-6. Art District South Pedestrian Analysis (½ Mile Radius)

Arts District South Station Area

Street Walkability (Pedestrian Experience)

- HIGH
- MEDIUM
- LOW

EXISTING

ENCAMPMENTS PRESENT
As of 1/18/18 (tents, carts, belongings on sidewalk)

Figure 5-7. Art District South Pedestrian Analysis by Adjacent Streets

HIGH

Mateo Street

- Pathway (sidewalks) > 5'
- Infrequent traffic calming/street buffer (one side)
- Infreqiuesnt landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

MEDIUM

Central Ave

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer
- Frequent landscape or shade
- Frequent lighting on buildings
- Some street-level transparency

8th Street (Encampments Present)

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- No lighting on buildings
- Some street-level transparency
- Narrow roadway with low vehicular speeds

LOW

Hemlock Street

- Infrequent Pathway (sidewalks) < 5'
- No traffic calming/street buffer
- No landscape or shade
- No pedestrian lighting
- No street-level transparency
- Narrow roadway with low vehicular speeds

Downtown Transit Core Stations and Terminus – The pedestrian network around these station options is "**high**", with walkable blocks, a high number of intersections (95), and a high number of major points of interest. The street grid and street amenities make the proposed station location(s) compatible with downtown Los Angeles' public realm. Given the direct access to the nearby pedestrian network and the quality of the existing pedestrian environment, a Downtown Transit Core station connecting to 7th/Metro Center or Pershing Square Stations would rate "**high**" for both considerations.

The potential for improvements is "**low**" because the area is already built out thus less likely to redevelop and add more pedestrian improvements than exist today (see Figure 5-8 and Figure 5-9).

Figure 5-8. Downtown Transit Core Pedestrian Analysis (½ Mile Radius)

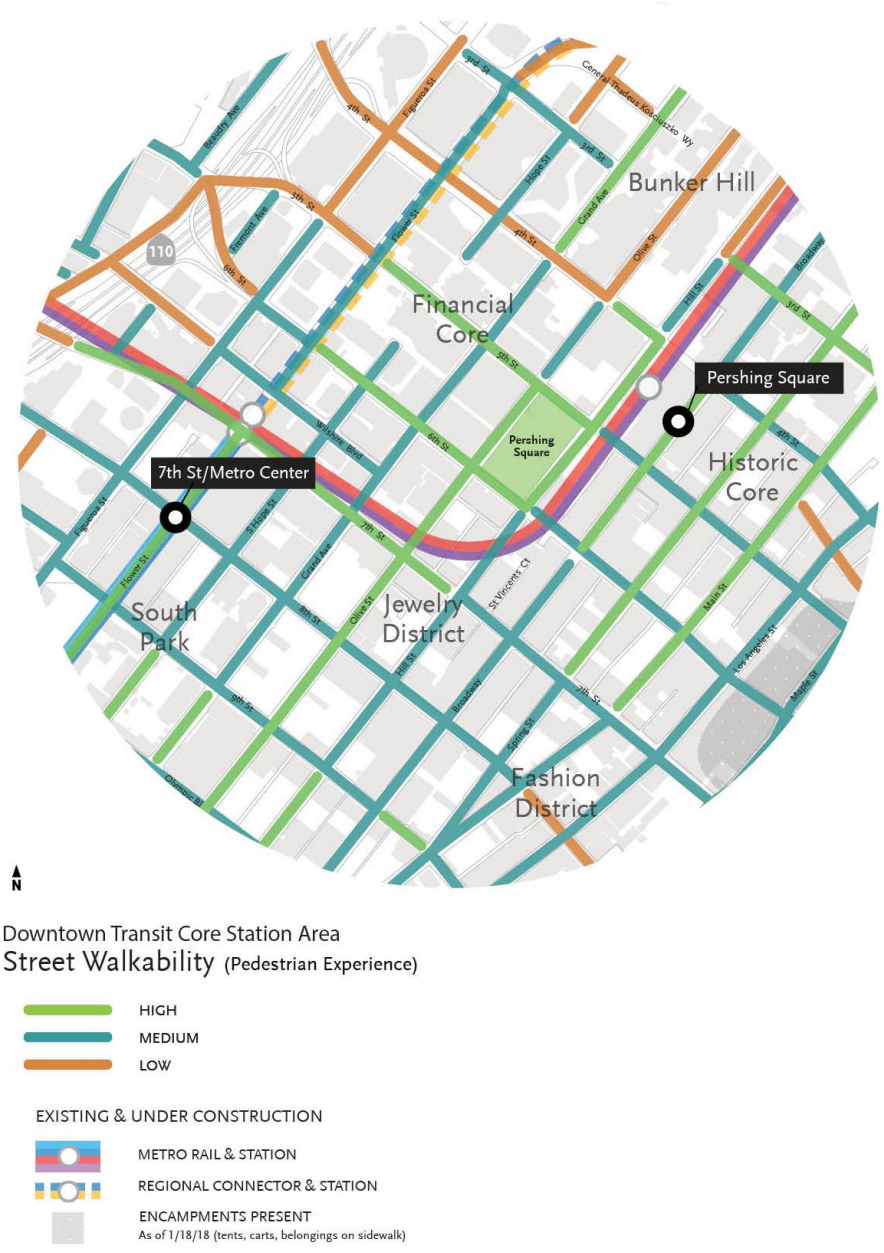
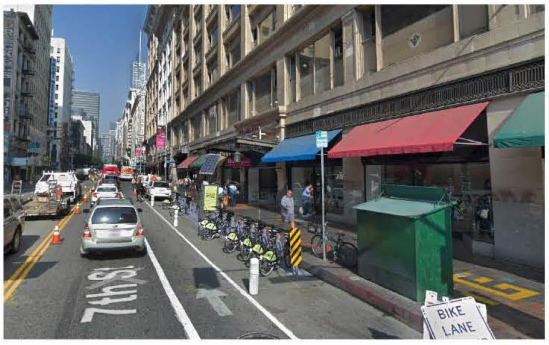


Figure 5-9. Downtown Transit Core Pedestrian Analysis by Adjacent Streets

HIGH

Hill Street

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Presence of landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds



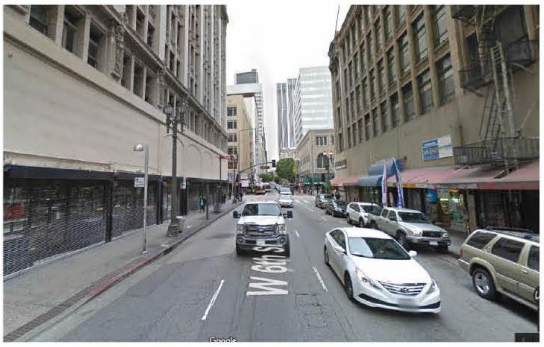
7th Street

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer
- Presence of landscape or shade
- Frequent pedestrian lighting
- High street-level transparency
- Narrow roadway with low vehicular speeds

MEDIUM

Grand Ave

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Frequent pedestrian light
- Some street-level transparency



6th Street

- Pathway (sidewalks) < 5'
- Infrequent traffic calming/street buffer (one side)
- No landscape or shade
- Frequent pedestrian lighting
- High street-level transparency

South Park/Fashion District Station – This underground station area has relatively walkable blocks and a high number of intersections (98), and therefore rates "**high**" for pedestrian network and access. The pathway/sidewalks are walkable with wide sidewalks, shade, and street transparency. Therefore, this station would rate "**high**" for quality of the pedestrian experience. The South Park/Fashion District rates "**high**" for potential for improvement because it is likely to support new development, which may suggest even more opportunities for developers to improve the pedestrian experience (see Figure 5-10 and Figure 5-11).

Figure 5-10. South Park/Fashion District Pedestrian Analysis (½ Mile Radius)

South Park/Fashion District Station Area
Street Walkability (Pedestrian Experience)

HIGH
MEDIUM
LOW

EXISTING

METRO RAIL

ENCAMPMENTS PRESENT
As of 1/18/18 (tents, carts, belongings on sidewalk)

Figure 5-11. South Park/Fashion District Pedestrian Analysis by Adjacent Streets

HIGH

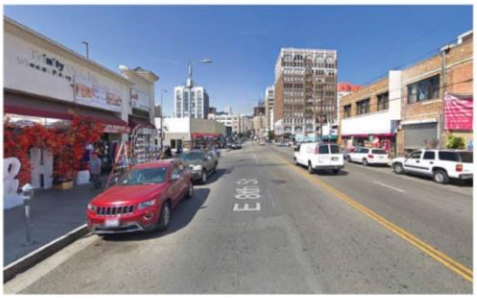
Olive Street

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer
- Frequent landscape or shade
- Frequent lighting on buildings
- High street-level transparency

Los Angeles Street

- Pathway (sidewalks) 5-20'
- Frequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

MEDIUM



Santa Fe Avenue

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer
- No landscape or shade
- High street-level transparency

LOW

Crocker Street

- Pathway (sidewalks) < 5'
- No traffic calming/street buffer
- No landscape or shade
- No pedestrian lighting
- No street-level transparency
- Narrow roadway with low vehicular speeds

Arts District/6th Street Station & Terminus – With the Los Angeles (LA) River dissecting the street grid, east-west access between the Arts District and Boyle Heights neighborhood is limited to three bridge crossings. Given these major infrastructure barriers, connection to the existing pedestrian network can be restricted and therefore this station would rate "**low**."

Though the Sixth Street Viaduct Replacement Project will significantly improve pedestrian conditions around 6th Street, overall, the area lacks connections (66 intersections) and major points of interest. The quality of the pedestrian network near this station would rate "**low**" as most streets would need higher visibility crossings and sidewalk improvements.

In the Arts District, recent development has replaced industrial uses and improved conditions for pedestrians in select areas (wider sidewalks, shade trees added, higher street transparency). If more development is proposed and includes public ROW improvements, and/or funds for pedestrian and bicycle facilities, first-last mile conditions could improve throughout the Arts District (pending detailed studies of available ROW and traffic analysis). As such, this station rates "**medium**" in potential for conditions to improve (see Figure 5-12 and Figure 5-13).

Figure 5-12. Art District/6th Street Pedestrian Analysis (½ Mile Radius)

Figure 5-13. Art District/6th Street Pedestrian Analysis by Adjacent Streets

HIGH

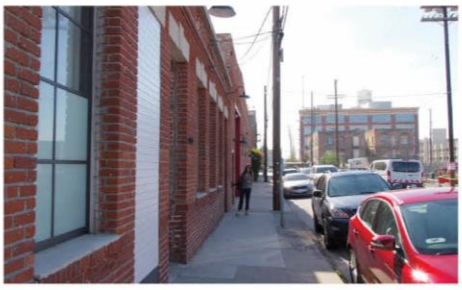
Mateo Street

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

Willow Street

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- Frequent landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

MEDIUM



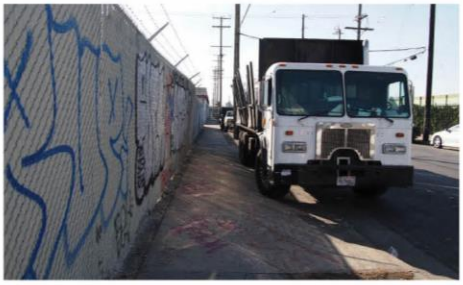
Santa Fe Avenue

- Pathway (sidewalks) 5-20'
- Infrequent traffic calming/street buffer (one side)
- No landscape or shade
- Frequent lighting on buildings
- High street-level transparency
- Narrow roadway with low vehicular speeds

Imperial Street

- Pathway (sidewalks) 5'-10'
- Frequent traffic calming/street buffer (both sides)
- Infrequent landscape or shade
- Infrequent lighting on buildings
- No street-level transparency
- Narrow roadway with low vehicular speeds

LOW



Industrial Street

- Pathway (sidewalks) < 5'
- No traffic calming/street buffer
- No landscape or shade
- No pedestrian lighting
- No street-level transparency
- Narrow roadway with low vehicular speeds

6th Street

- Pathway (sidewalks) < 5'
- Infrequent traffic calming/street buffer (one side)
- No landscape or shade
- Infrequent lighting on buildings
- No street-level transparency

Criteria: Connections to Bicycle Facilities

Only protected bike facilities and those with a physical separation from cars, either on-street or off-street, were evaluated as they represent a safer and more comfortable riding experience for the average cyclist in an urban area like downtown Los Angeles. Striped bike lanes or sharrows (shared use arrows) were not mapped nor considered for this evaluation. Information about existing and planned bicycle facilities were sourced from City of Los Angeles' adopted Mobility Element 2035.

To evaluate station areas served by bike facilities that support first/last mile connections, the overall length (number of miles) of protected bike facilities was measured as a percentage of the street network (total number of miles within half-mile radius). This percentage reflects the general quality of the bike network as "low," "medium," or "high" (see Table 5-15).

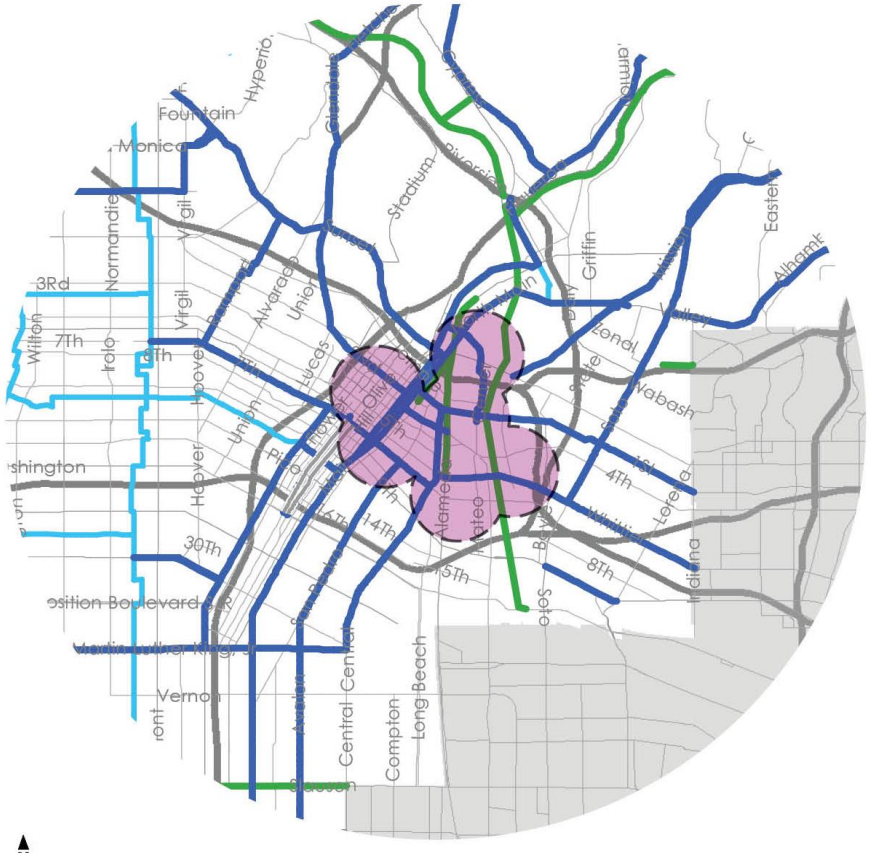
Table 5-15. Length of Bike Network and Access Thresholds

Rating	Description
High	> 26% of street network has bike facilities
Medium	Between 16% to 25% of street network has bike facilities
Low	≤ 15% of street network has bike facilities

Figure 5-14 presents the propose station bicycle analysis evaluated at a 3-mile and a .5-mile radius, surrounding each station area.

Potential for conditions to improve bicycle connections is dependent on the curb-to-curb street ROW and whether it is viable to add bicycle facilities or enhance facilities without negatively impacting other modes. The analysis was done by visual observation due to lack of detailed ROW information.

Figure 5-14. Proposed Station Bicycle Analysis (3-Mile and ½ Mile Study Areas)



N

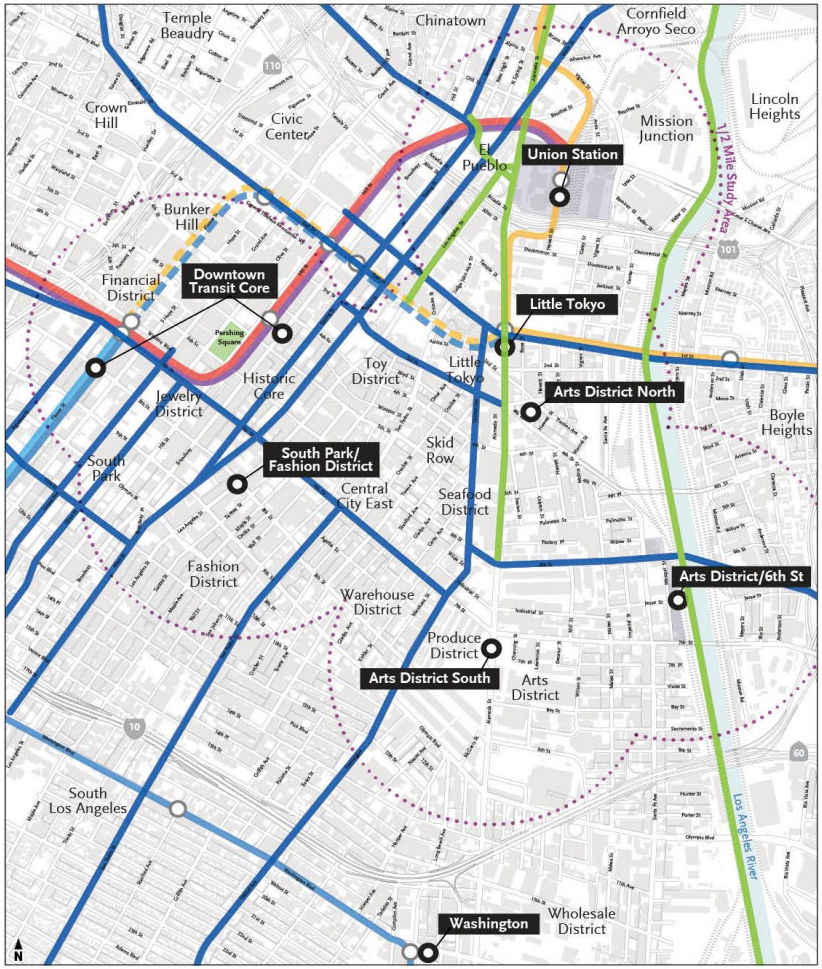
West Santa Ana Branch New Northern Alignment Study Area

Bicycle Enhanced Network (3-Mile Radius)

Combined 1/2 Mile WSAB Station Areas

BICYCLE ELEMENTS
(Low Stress Network - Mobility Element 2035)

- Tier 1 Protected Bike Lanes
- Bike Lanes (Physical Separation)
- BEN Segments from the Neighborhood Enhanced Network



WEST SANTA ANA BRANCH NEW NORTHERN ALIGNMENT STUDY AREA

Bicycle Enhanced Network

- 1/2 Mile Study Area
- WSAB Station

EXISTING & UNDER CONSTRUCTION

- Metro Rail & Station
- Regional Connector & Station (Gold Line/Blue Line Connections)

BICYCLE ELEMENTS
(Low Stress Network - Mobility Element 2035)

- Tier 1 Protected Bike Lanes
- Bike Lanes (Physical Separation)

Table 5-16. Active Transportation and First/Last Mile Connections by Station Evaluation

Evaluation Criteria		Station Area (1/2 Mile)						
		LAUS	Little Tokyo	Arts District North	Arts District South	Downtown Transit Core	South Park/ Fashion District	Arts District/ 6th Street
Quality of the pedestrian environment and public realm near station areas	Existing pedestrian network and access	Low	Medium	Medium	Medium	High	High	Low
	Quality of existing pedestrian experience	Low	High	High	Low	High	Medium	Low
	Potential for conditions to improve	High	Medium	Medium	Medium	Low	High	Medium
Potential of connections to bicycle facilities	Length of existing and planned bike and access network*	High (35%)	Medium (18%)	Medium (18%)	Medium (25%)	High (26%)	Medium (27%)	Low (15%)
	Potential for conditions to improve	High	High	High	Medium	Medium	High	Medium
Overall Rating		Medium	Medium	Medium	Medium	High	High	Low

*Information on existing and planned bike facilities are sourced from the City of Los Angeles Mobility Plan 2035.

Table 5-17. Active Transportation and First/Last Mile Connections by Alternative and Concept Evaluation

Station Names	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Down-town Transit Core	Concept H Arts District/6th Street
LAUS Yard (above Gold Line or Platform 2)	Medium	Medium	Medium	Medium		Medium		
LAUS Forecourt or East of MWD (underground)					Medium			
Little Tokyo	Medium		Medium		Medium			
Arts District North	Medium	Medium		Medium		Medium		
Arts District South/7th Alameda			Medium	Medium	Medium	Medium	Medium	
Downtown Transit Core							High	
South Park/ Fashion District							High	
Arts District/ 6th Street								Low
Overall Rating	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

5.1.6 Summary

Based on the criterion analyzed, alignments along Alameda Street (Alternatives C and D, and Concepts E and F) and Concept G would provide the greatest overall mobility improvement benefits (Table 5-18). These Alternatives and Concepts connect directly to LAUS or the Downtown Transit Core and serve high-density residential and employment corridors, resulting in greater user benefits (overall time savings to the passenger) and higher daily boardings. These Alternatives and Concepts also directly serve numerous existing and planned Metro and regional rail lines and would be supported by first/last mile connections (bicycle and pedestrian accessibility), enhancing the overall mobility of the transit network.

Table 5-18. Goal 1: Provide Mobility Improvements Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Down-town Transit Core	Concept H Arts District/6th Street
1.1 Improves travel speeds and reduces travel times (daily hours of user benefits)	22,200 hours	22,500 hours	24,000 hours	23,500 hours	25,000 hours	24, 100 hours	24, 100 hours	18,500 hours
1.1 Improves travel speeds and reduces travel times (minutes of travel time)	36.6 minutes	34.5 minutes	35.5 minutes	35.5 minutes	33.5 minutes	34.0 minutes	33.6 minutes	37.5 minutes
1.2 Supports other transit systems (effects to other Metro Lines)	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium
1.2 Supports other transit systems (daily one seat ride)	36,900 daily one-seat rides	36,300 daily one-seat rides	45,600 daily one-seat rides	43,800 daily one-seat rides	47,800 daily one-seat rides	45,500 daily one-seat rides	46,500 daily one-seat rides	30,300 daily one-seat rides
1.3 Connects with the greater transit network (connections to Metro Lines, regional rail and future extensions)	Medium	Low	High	Medium	High	Medium	Medium	Low
1.4 Provides an alternative to freeway and arterial network. Serves local and regional trips. (Daily boardings; new transit trips, peak operational limits)	58,000 Boardings (24,500 new riders)	56,000 Boardings (25,000 new riders)	75,500 Boardings (26,000 new riders)	69,500 Boardings (25,500 new riders)	81,500 Boardings (27,000 new riders)	74,500 Boardings (26,000 new riders)	78,500 Boardings (25,000 new riders)	46,500 Boardings (19,500 new riders)
1.5 Supports active transportation and first/last mile connections (bicycle and pedestrian connections)	Medium	Medium	Medium	Medium	Medium	Medium	High	Low
Goal 1 Ratings	◑	◑	●	●	●	●	●	○

Note: Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments.

5.2 Support Local and Regional Land Use Plans and Policies

The purpose of the land use compatibility goal is to advance a project that meets the following objectives:

- 2.1 - Serves major employment centers and high density residential neighborhoods
- 2.2 - Encourages local economic development, projects, plans, and jobs
- 2.3 - Serves affordable housing developments
- 2.4 - Supports and is consistent with local plans

The following sections evaluate each Alternative and Concept against the evaluation criteria developed for the land use compatibility goal.

5.2.1 Serves Major Employment Centers and High Density Residential

Criteria: 2042 Population and Employment Density

Transit is beneficial when it can provide the greatest amount of access to high-density residential neighborhoods and employment centers. This increases transit ridership due to accessibility and ease of use. Year 2042 population data and employment data was utilized to determine the density of residential neighborhoods and employment centers within ½ mile of proposed stations for each Alternative and Concept by traffic analysis zone (TAZ). Data for the analysis was obtained from the Metro Travel Demand Model (2018).

The residential and employment density per square mile was evaluated around proposed station areas. Table 5-19 describes the rating system of "high," "medium," or "low" for the residential and employment density per square mile.

Table 5-19. Residential and Employment Density Thresholds

Rating	Description
RESIDENTIAL DENSITY THRESHOLDS	
High	> 20,000 persons per square mile
Medium	Between 15,000 and 20,000 persons per square mile
Low	<15,000 persons per square mile
EMPLOYMENT DENSITY THRESHOLDS	
High	> 25,000 jobs per square mile
Medium	Between 13,000 and 25,000 jobs per square mile
Low	<13,000 jobs per square mile

Table 5-20 presents the residential and employment average density per square mile (within ½ mile of station) for each of the Alternatives and Concepts and the corresponding ratings.

Table 5-20. Average Residential and Employment Densities Evaluation

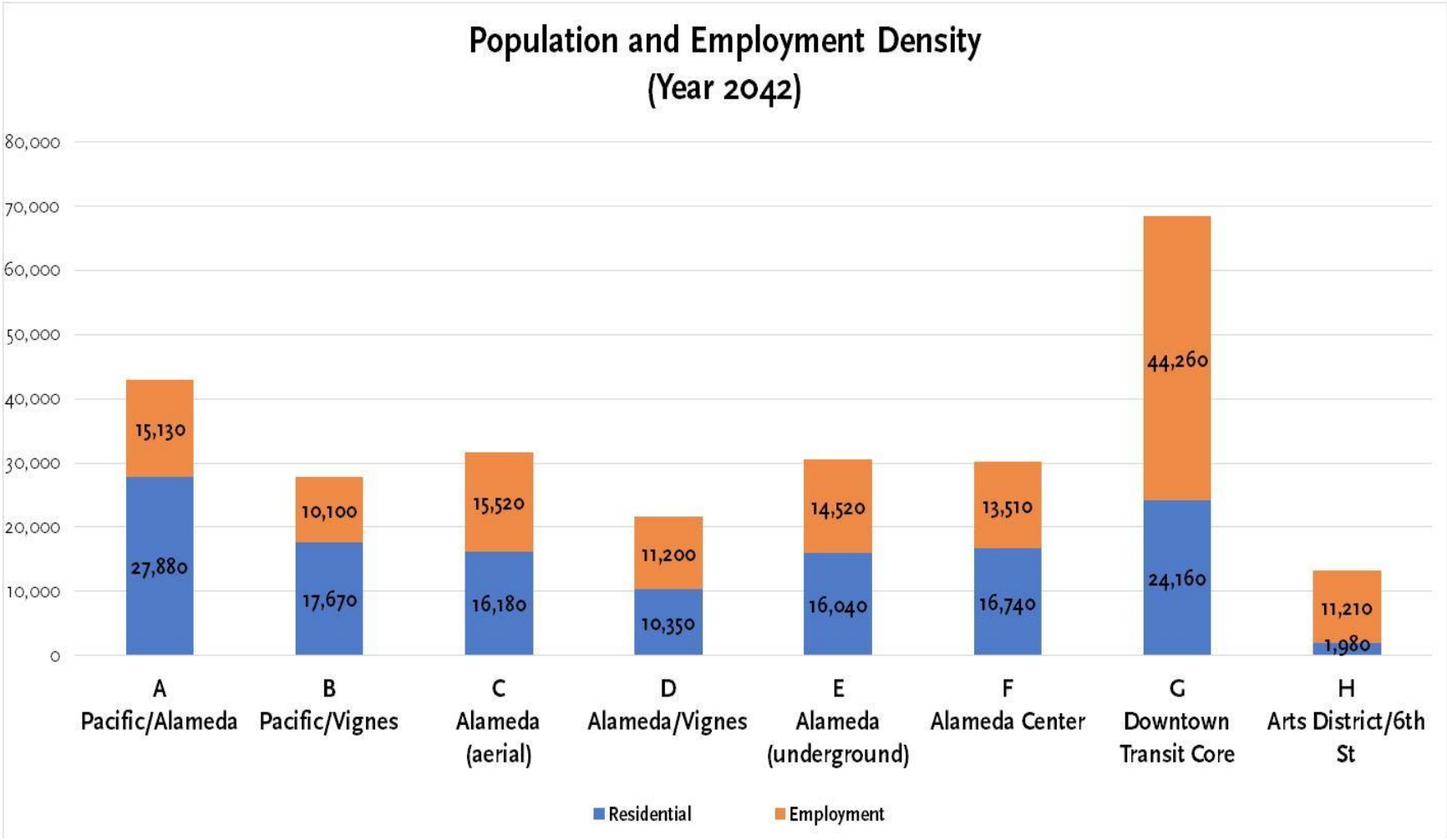
Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
2042 Population Density (within ½ mile of stations)	27,880 persons/ square mile	17,670 persons/ square mile	16,180 persons/ square mile	10,350 persons/ square mile	16,040 persons/ square mile	16,740 persons/ square mile	24,160 persons/ square mile	1,980 persons / square mile
Overall rating	**High**	**Medium**	**Medium**	**Low**	**Medium**	**Medium**	**High**	**Low**
2042 Employment Density (within ½ mile of stations)	15,130 jobs/ square mile	10,100 jobs/ square mile	15,520 jobs/ square mile	11,200 jobs/ square mile	14,520 jobs/ square mile	13,510 jobs/ square mile	44,260 jobs/ square mile	11,210 jobs/ square mile
Overall rating	**Medium**	**Low**	**Medium**	**Low**	**Medium**	**Medium**	**High**	**Low**

Concept G would rate high in both population and employment density based on the density of proposed station areas near the Downtown Transit Core and South Park/Fashion District. Alternative A would also rate high in residential density and have the second highest employment density around its proposed station areas. The high residential density of Alternative A is a result of a high population, particularly around the Little Tokyo Station. While Alternative C and Concepts E and F also include the highly dense Little Tokyo area, they also include additional stations which have low population numbers. This results in a larger total area which decreases the overall density for each of these Alternatives and Concepts. Therefore, Alternative A would have the greatest amount of access to high-density residential neighborhoods, while Concept G would provide the greatest amount of access employment centers.

In comparison, Concept H would rate the lowest in both population and employment density.

Figure 5-15 is a bar graph that illustrates total population and employment densities by Alternative and Concept.

Figure 5-15. Population and Employment Density Graph (Year 2042)



Note: Presented are average population and employment densities within ½ mile of proposed station areas for each Alternative and Concept.

5.2.2 Encourages Local Economic Development Projects, Plans, and Jobs

Criteria: Consistency with Plans and Metro's policies supporting Transit-Oriented Communities (TOC); supports land values and real estate market trends; potential joint use/joint development opportunities within ¼ mile of stations

The TOC concept is a development of the Transit Oriented Development (TOD) concept. TOCs represent a development approach that is focused on compact, walkable and bikeable places in a community context (rather than focusing on a single development parcel), integrated with transit. The creation of a transit station sets the precedent for the creation of a Transit Priority Area (TPA), which in turn facilitates the development of TOCs. This would be consistent with Metro Policies and would be the same for each alignment option.

The station areas associated with the Alternatives and Concepts encompass the commercial industrial, standalone residential and mixed commercial/residential areas of downtown Los Angeles, extending from I-110 to the LA River and from just north of US-101 to I-10. Each area represents a variety of specific real estate markets all of which are trending toward variations of mixed use projects, primarily with housing as a major component. One of the key factors influencing the growth of projects is the underlying land use entitlement including the permitted use as well as allowed density and intensity of uses.

The following evaluation considers two assessments that would support the development of TOCs:

- Assessment of Land Values and Potential Improvement Values
- Potential for Joint Use/Joint Development Opportunities around stations.

Supporting TOCs through Assessed Land Value and Improvement Values

With regard to land values and real estate market trends, the greatest densities permitted in the Downtown Transit Core area (regional center general plan land use designation) are directly associated with the higher assessed parcel valuations from the Los Angeles County Assessor. For the ½ mile station areas associated with the Alternatives and Concepts, assessed valuation for all affected parcels in each area ranges from approximately $895 million to $29.5 billion, with the highest values registered for the Pershing Square Station area associated with Concept G (see Table 5-22).

The relative difference in the ratio of assessed land value to total assessed improvement value for the station areas associated with each of the Alternatives and Concepts demonstrates the development potential of land under existing and future conditions. The ratio was calculated by dividing the assessed improvement value by the assessed land value for each Alternatives and Concepts. Those Alternatives and Concepts with higher existing land values and matching improvement values would have a ratio greater than 1.0.

Table 5-21. Average Assessed Land Value to Improvement Value Thresholds

Rating	Description
High	> 1.0
Medium	Between 0.75 and 1.0
Low	< 0.75

Concept G with Pershing Square, Metro Center and the Fashion District stands out with highest assessed value ratio reaching almost two times the underlying assessed land value, which is generally indicative of maximum economic development opportunity, although the buy-in is high. The other Alternatives and Concepts essentially show ratios where the largest component of the total assessed valuation for these station areas is land. While traditionally the development buy-in is low and risks are high, emerging residential housing markets in areas south and east of the Downtown Core represent substantial development opportunities. In the short-term, the underlying land use entitlements and surrounding remaining industrial uses are the likely factors that slow the pace of new growth and development in these station areas. Concept G would be the most supportive of land use value and real estate market trends, while Concept H would be the least supportive.

Table 5-22. Average Assessed Land Value and Improvement Value Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Assessed Land Value (in million$)	$5,073	$2,486	$5,481	$5,228	$8,997	$8,406	$12,731	$1,417
Assessed Improvement Value (in million$)	$4,499	$2,077	$4,526	$4,328	$7,795	$7,241	$29,513	$895
Overall Ratio of Assessed Land Value to Assessed Improvement Value	0.89	0.84	0.83	0.83	0.87	0.86	2.32	0.63
Overall rating	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

Alternatives and Concepts would be more beneficial if they run next to land that has rising or high market values and good potential in the real estate market. The presence of an alignment and station would support these trends and further encourage development within these areas. Joint Development is the real estate development program through which Metro collaborates with qualified developers to build transit-oriented developments on Metro-owned properties.

Table 5-23. Support of Land Values, Real Estate Market Trends and Joint Development Potential Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Support of Land Values and Real Estate Market Trends	Medium	Medium	Medium	Medium	Medium	Medium	High	Low
Overall Rating	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

5.2.3 Serves Affordable Housing Developments

Criteria: Number of existing affordable housing units within ½ mile of stations

Persons living within affordable housing are an important consideration for the Project. It is often the case for persons living within affordable housing units that the only source of transportation is public transit. Increased access to a transit line could increase access to jobs and potentially help raise the socioeconomic status of those who benefit. The number of affordable housing units was calculated within ½ mile of proposed stations for each Alternative and Concept.

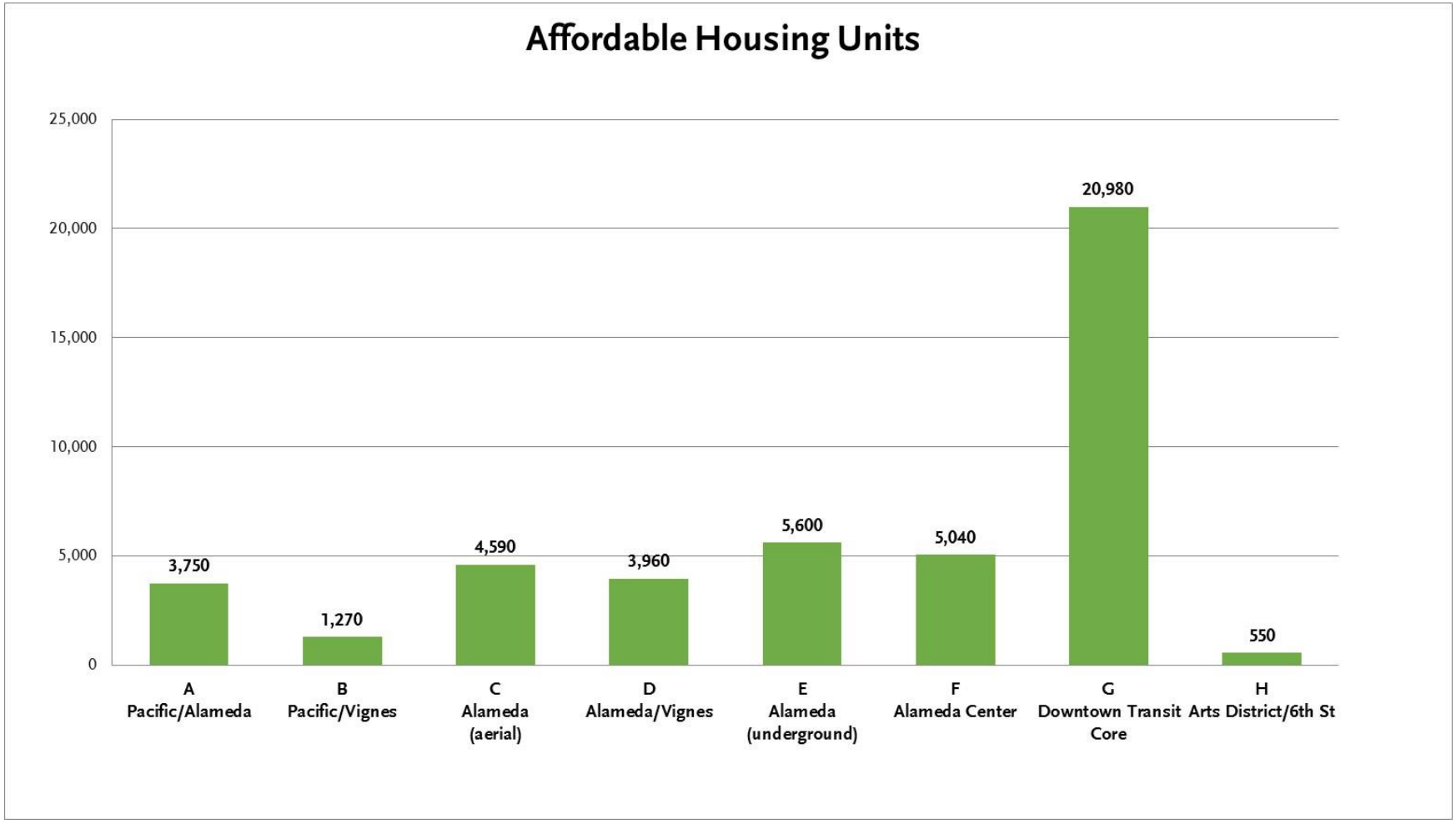
Table 5-24 presents the number of affordable housing units benefited (within ½ mile of station) for each of the Alternatives and Concepts under consideration, and its corresponding ratings.

Table 5-24. Affordable Housing Units Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Number of affordable housing units with ½ mile of proposed station areas	3,750	1,270	4,590	3,960	5,600	5,040	20,980	550

Concept G would benefit the highest number of affordable housing units while Concept H would benefit the least number of affordable housing units. Therefore, Concept G would provide the greatest amount of access and benefit to affordable housing units (see Figure 5-16).

Figure 5-16. Affordable Housing Units Graph (2018)



Note: Presented are number of affordable housing units within ½ mile of proposed station areas for each Alternative and Concept.

5.2.4 Supports and is Consistent with Local Plans

Criteria: Supports and is consistent with development patterns and land uses; Consistent with ongoing planning efforts that update zoning/development standards

Each half-mile station area for the Alternatives and Concepts were evaluated for existing and future (adopted/projected) land uses and the capacity for those land uses to be transit-supportive. Table 5-14 presents matrix of which stations are proposed by each Alternative or Concept. Figure 5-17 presents the land uses within ½ mile of each station area around all station areas.

Station areas rated as "high" had higher percentages of transit-supportive land uses (residential, commercial or public facilities) and are projected for greater intensity development based on current policies[4], or a pattern of development already underway. Station areas rated as "low" had less transit-supportive land uses (industrial or vacant) and are projected to have lower intensity development in the future making them less favorable for stations.

The following is a qualitative discussion of the land use patterns for each downtown Los Angeles station (proposed stations located north of the I-10 Freeway).

Union Station and Terminus – The station provides access to seven historic and culturally unique neighborhoods: El Pueblo, Chinatown, Cornfield Arroyo Seco, Boyle Heights, Little Tokyo, Arts District and Civic Center. Land uses immediately surrounding LAUS are mostly publicly-owned. This area (station platforms would be either under the historic building Forecourt, east of the MWD building, over Gold Line platforms, or on Platform 2) has some potential for additional transit-supportive uses. Station and alignments are most compatible if underground due to cultural resources and sensitive views, and less compatible if aerial (though an aerial guideway and station may be necessary for efficient transfers and constructability). WSAB Terminus location is compatible with LAUS' role as LA County's regional transportation center with immediate access to other rail and bus services, and numerous civic and cultural destinations. For land use, LAUS rates "**medium**" for consistency with existing development and land uses and "**medium**" for consistency with ongoing planning efforts and projected growth (see Figure 5-18).

[4] Policies/plans/projections considered City of Los Angeles General Plan, re: code LA (underway), current development trends and intensification, upcoming transit and public projects, and proposed developments

Figure 5-17. Land Use Analysis (½ Mile Radius around All Station Areas)

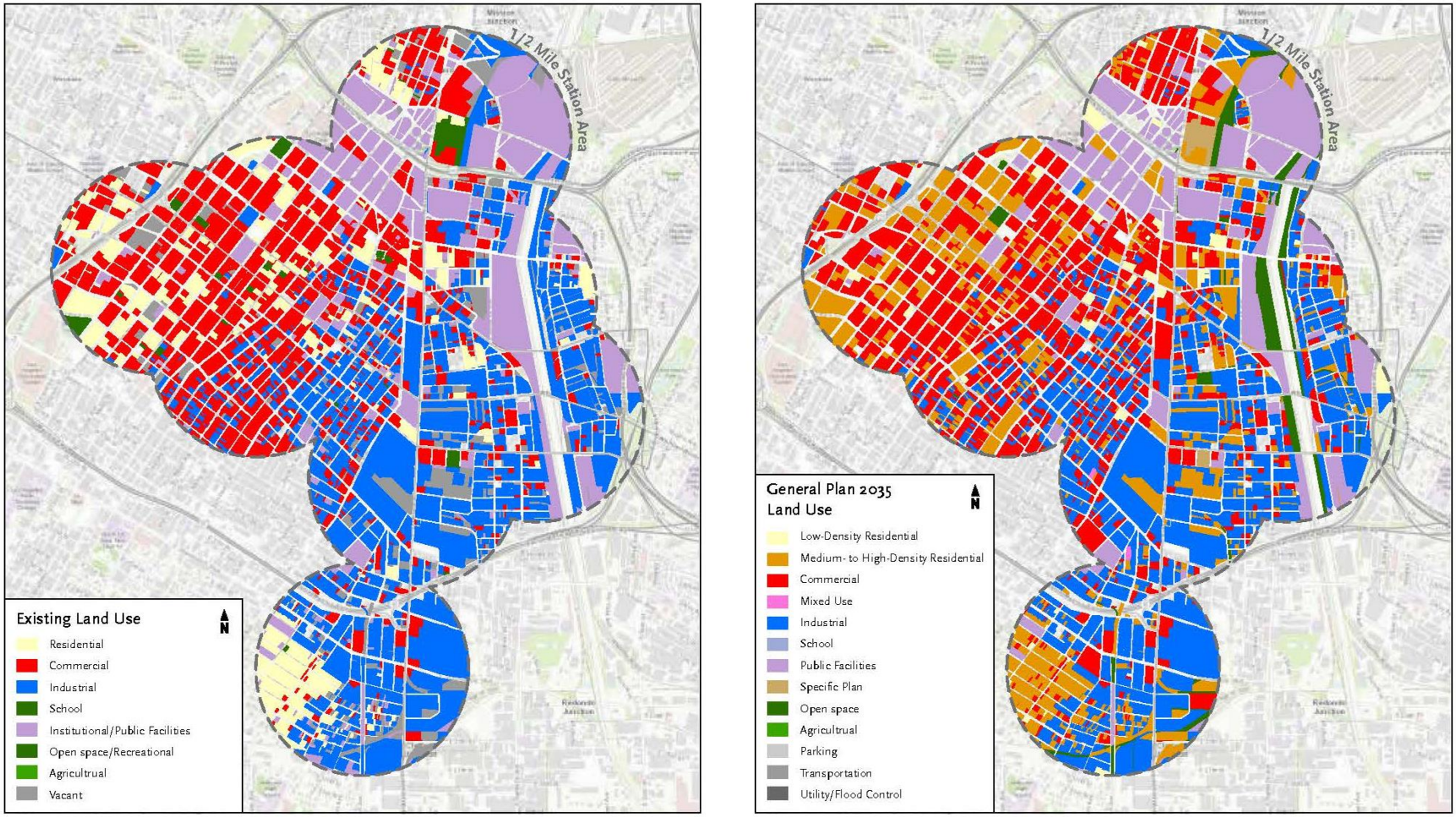
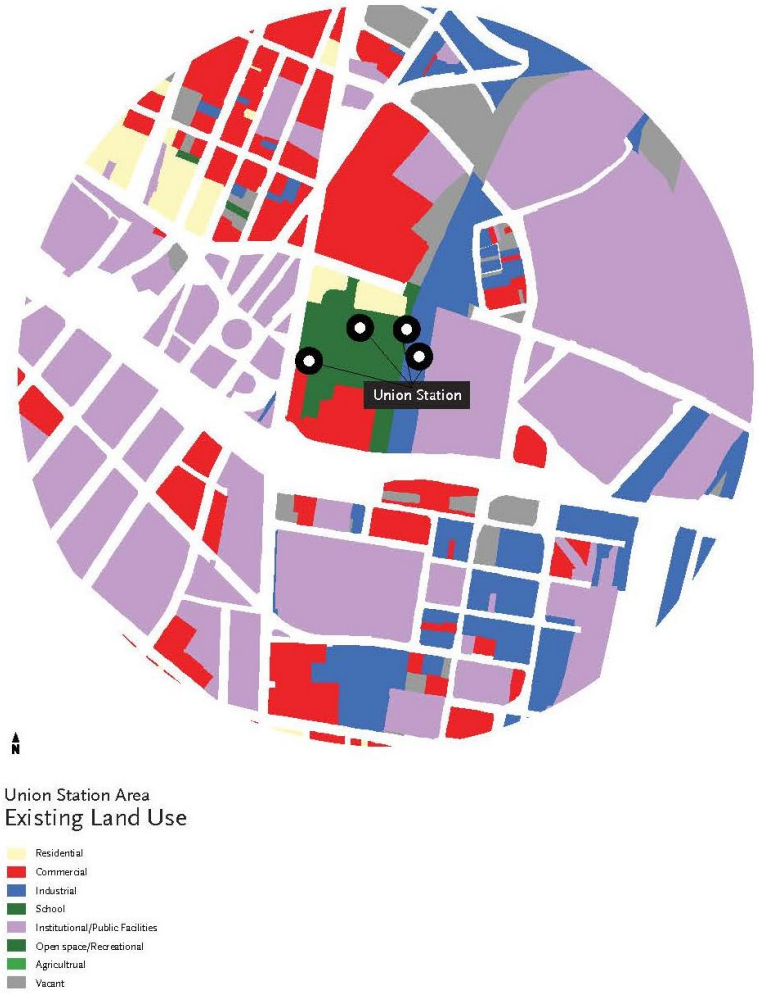
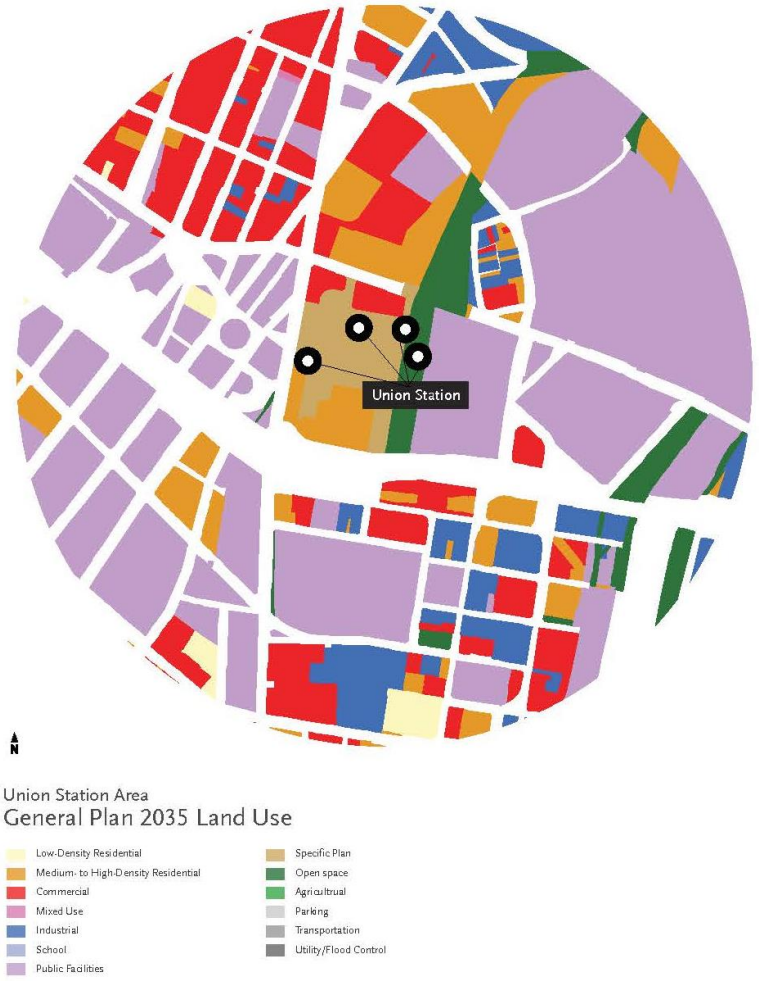


Figure 5-18. Land Use Analysis (½ Mile Radius around All Station Areas)





Little Tokyo Station – The station provides access to Little Tokyo, Arts District, Toy District and Seafood District. The Little Tokyo station locations are mostly within commercial and public facility areas that are developed as low to medium density. Existing uses in Little Tokyo make views of aerial structures incompatible for this location. Therefore, Little Tokyo Station rates "**medium**" for consistency with existing development and land uses and "**medium**" for consistency with ongoing planning efforts and projected growth (see Figure 5-19).

Arts District North Stations – The station provides access to Little Tokyo community, Arts District neighborhood, Toy District and Seafood District. The Arts District North Station locations are mostly within commercial and public facility areas that are developed as low to medium density. This area has low capacity for future growth since it is approaching full build-out due to a recent development cycle, still underway. Stations and the alignment are compatible with underground allocation due to the lack of available ROW and Little Tokyo cultural resources. Existing uses in Little Tokyo and Arts District make views of aerial structures incompatible in this location (whether station location is on Alameda, 3rd St or 4th Streets). For land use, Arts District North Station rates "**medium**" for consistency with existing development and land uses and "**medium**" for consistency with ongoing planning efforts and projected growth (see Figure 5-19).

Figure 5-19. Little Tokyo/Arts District North Station Land Use Analysis (½ Mile Radius)

Little Tokyo/Arts District Station Area
Existing Land Use

- Residential
- Commercial
- Industrial
- School
- Institutional/Public Facilities
- Open space/Recreational
- Agricultrual
- Vacant

Little Tokyo/Arts District Station Area
General Plan 2035 Land Use

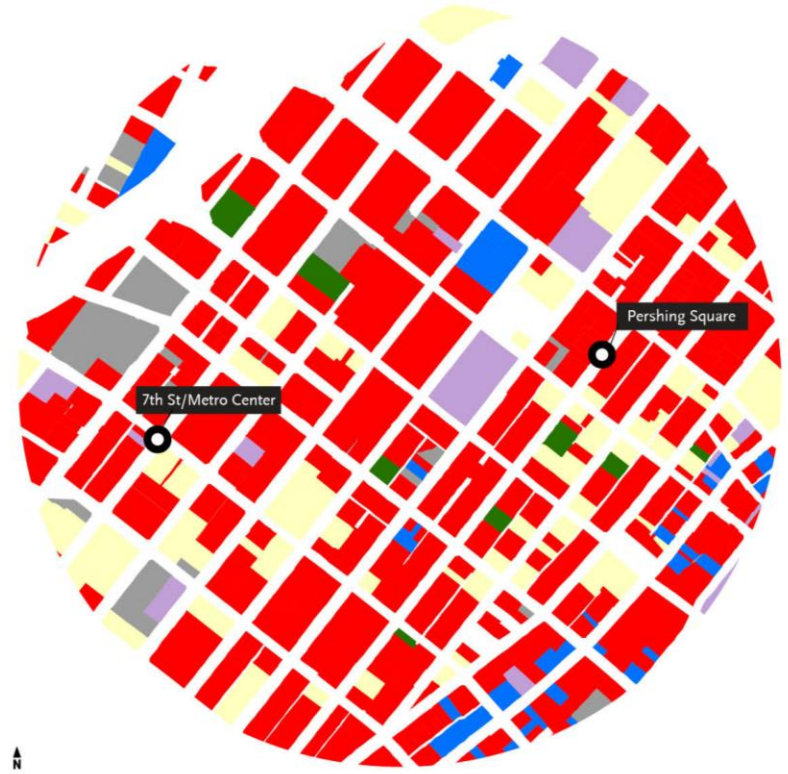
- Low-Density Residential
- Medium- to High-Density Residential
- Commercial
- Mixed Use
- Industrial
- School
- Public Facilities
- Specific Plan
- Open space
- Agricultrual
- Parking
- Transportation
- Utility/Flood Control

Arts District South Stations – This station provides access to Little Tokyo community, Arts District neighborhood, Toy District and Seafood District. The area is mostly industrial uses today with assumed capacity for residential or commercial medium density growth in future. The stations and the alignment are compatible with underground allocation, given the potential future residential uses; though views of aerial structures could also be considered compatible in this location given the industrial character of the Arts District and existing presence of large industrial properties with utilitarian designs. For land use, Arts District South Station rates "**low**" for consistency with existing development and land uses and "**medium**" for consistency with ongoing planning efforts and projected growth (see Figure 5-20).

Figure 5-20. Arts District South Station Land Use Analysis (½ Mile Radius)

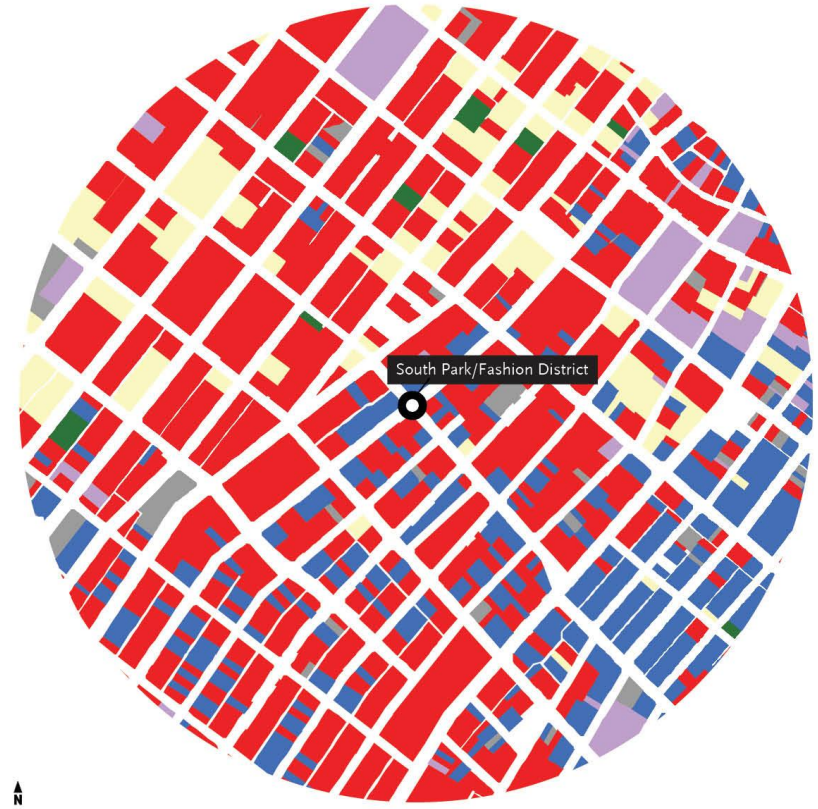
Downtown Transit Core Stations and WSAB Terminus – The station provides access to the Historic Core, Jewelry District, Toy District, South Park, Fashion District, and Central City East District. The high intensity commercial development taking place today allows less capacity for additional future growth. The stations and alignment are only compatible with underground allocation due to the lack of available ROW and intensity of cultural resources (whether station location is 8th/Flower or Broadway/5th). Views of aerial structures would not be compatible with land uses and existing historic buildings. The WSAB terminus location is compatible with land uses, existing transit infrastructure and access to a variety of destinations. For land use, the Downtown Transit Core station's rate "**high**" for consistency with existing development and land uses and "**medium**" for consistency with ongoing planning efforts and projected growth (see Figure 5-21).

Figure 5-21. Downtown Transit Core Station Land Use Analysis (½ Mile Radius)



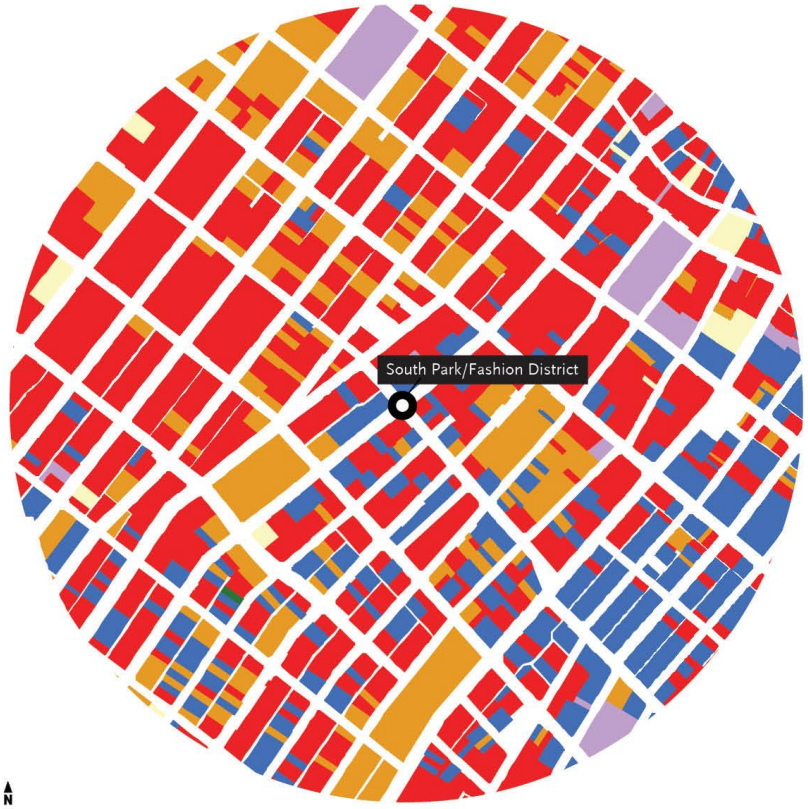
South Park/Fashion District Station – This station provides access to South Park, Fashion District, Central City East, and Jewelry District. There is medium to high intensity commercial development today and high capacity for future growth and transit-supportive uses (residential and commercial). The stations and alignment are only compatible with underground due to the lack of available ROW and intensity of residential uses being developed now and projected for the future. Views of aerial structures would not be compatible with existing or future land uses. For land use, the South Park/Fashion District Station rates "**high**" for consistency with existing development and land uses and "**high**" for consistency with ongoing planning efforts and projected growth (see Figure 5-22).

Figure 5-22. South Park/Fashion District Station Land Use Analysis (½ Mile Radius)



South Park/Fashion District Station Area
Existing Land Use

- Residential
- Commercial
- Industrial
- School
- Institutional/Public Facilities
- Open space/Recreational
- Agricultrual
- Vacant



South Park/Fashion District Station Area
General Plan 2035 Land Use

- Low-Density Residential
- Medium- to High-Density Residential
- Commercial
- Mixed Use
- Industrial
- School
- Public Facilities
- Specific Plan
- Open space
- Agricultrual
- Parking
- Transportation
- Utility/Flood Control

Arts District/6th Street Station and Terminus – The station provides access to the Arts District, 6th Street Viaduct, and connections to Boyle Heights. This area is comprised of primarily industrial uses today with assumed capacity for residential or commercial medium density growth in the future. The station and the alignment are compatible with underground allocation, given potential future residential uses. At-grade allocation, adjacent to LA River, may be compatible if the viable given ROW constraints are remedied. Proximity of the LA River with oversight by Army Corps of Engineers could become a compatibility issue depending on advanced engineering concepts. Questions remain regarding the use of the rail yard for Red or Purple Line and how it would be extended to make this station viable. The WSAB terminus location is incompatible with land uses, existing transit infrastructure and access constraints due to LA River and its limited points of connection to Boyle Heights. For land use, the Arts District/6th Street Station rates "**low**" for consistency with existing development and land uses and "**low**" for consistency with ongoing planning efforts and projected growth (see Figure 5-23).

Figure 5-23. Arts District/6th Street Station Land Use Analysis (½ Mile Radius)

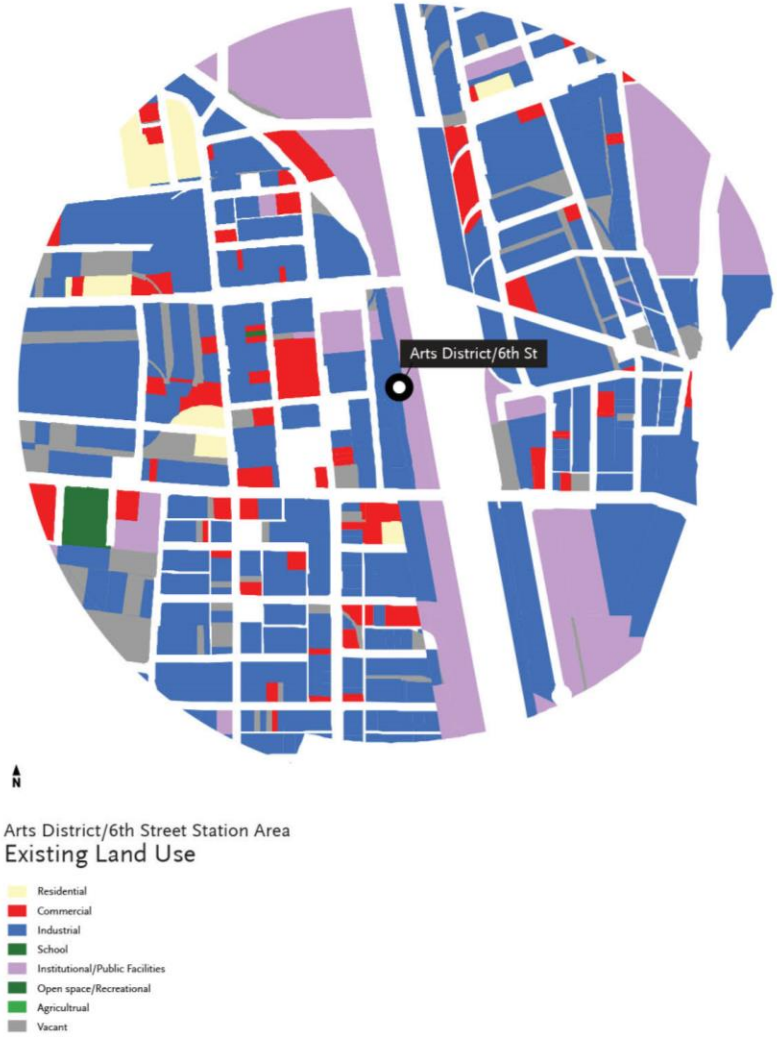


Table 5-25. Station Area Consistency with Local Plans

Evaluation Criteria	Station Area (1/2 Mile)						
	LAUS	Little Tokyo	Arts District North	Arts District South	Downtown Transit Core	South Park/ Fashion District	Arts District/ 6th Street
Consistent with existing development and land uses	Medium	Medium	Medium	Low	High	High	Low
Consistent with ongoing planning efforts and projected growth	Medium	Medium	Medium	Medium	Medium	High	Low
Overall Rating	Medium	Medium	Medium	Low	High	High	Low

Table 5-26. Consistency with Local Plans by Alternative and Concept Evaluation

Station Names	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Down-town Transit Core	Concept H Arts District/6th Street
LAUS Yard (above Gold Line or Platform 2)	Medium	Medium	Medium	Medium		Medium		
LAUS Forecourt or East of MWD (underground)					Medium			
Little Tokyo	Medium		Medium		Medium			
Arts District North	Medium	Medium		Medium		Medium		
Arts District South/7th Alameda			Low	Low	Low	Low	Low	
Downtown Transit Core							High	
South Park/ Fashion District							High	
Arts District/ 6th Street								Low
Overall Rating	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

5.2.5 Summary

TOCs are places (such as corridors or neighborhoods) that, by design, allow people to drive less and access transit more. A TOC maximizes equitable access to a multi-modal transit network as a key organizing principle of land use planning and community development. TOCs differ from TOD in that a TOD is a specific building or development project that is fundamentally shaped by close proximity to transit. TOCs promote equity and sustainable living in a diversity of community contexts by (a) offering a mix of uses that support transit ridership of all income levels (e.g. housing, jobs, retail, services and recreation); (b) ensuring appropriate building densities, parking policies, and urban design that support accessible neighborhoods connected by multi-modal transit; and (c) ensuring that transit related investments provide equitable benefits that serve local, disadvantaged and underrepresented communities[5].

With regard to land values and real estate market trends, the greatest densities permitted in the Downtown Core (regional center general plan land use designation) are directly associated with the higher assessed parcel valuations from the LA County Assessor. Concept G includes the Pershing Square or 7th Street/Metro Center and the Fashion District communities and stands out with the highest assessed value ratio which is generally indicative of maximum economic development opportunity, although the buy-in is high. The other Alternatives and Concepts analyzed essentially show ratios where the largest component of the total assessed valuation for these station areas is land. While traditionally the development buy in is low and risks are high, emerging residential housing markets in areas south and east of the Downtown Core represent substantial development opportunities. In the short term, the underlying land use entitlements and surrounding remaining industrial uses are the likely factors that slow the pace of new growth and development in these station areas.

Overall, Concept G provides the greatest compatibility with existing and planned land uses as the proposed stations along the corridor serve the second-highest population density, the highest employment density, and affordable housing units. Concept G would also be supportive of TOC investments and development patterns within downtown Los Angeles. Although other Alternatives and Concepts connecting to LAUS (Alternatives A, B, C, and D and Concepts E and F) would generally serve high population and employment densities, these alignments would offer only moderate support of local land use and regional plans and policies in terms of land use, affordable housing, and development patterns.

It has been noted that the northern terminus station proposed in Concept H provides an opportunity to connect to an emerging TOC. However, compared to potential TOC investment and development anticipated near the Downtown Core and LAUS, Concept H would not connect to the highest population and employment densities within downtown Los Angeles.

Table 5-27 presents a summary of the results for all evaluation criteria under Goal 2.

[5] Where Metro identifies disadvantaged and underrepresented communities, included are lower income households as well as the following protected categories as defined by the California Fair Employment and Housing Act (FEHA): race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age for individuals over forty years of age, military and veteran status, and sexual orientation.

Table 5-27. Goal 2: Support Local and Regional Land Use Plans and Policies Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
2.1 Serves major employment centers and high density residential (2042 Population Density)	27,880 persons/ square mile	17,670 persons/ square mile	16,180 persons/ square mile	10,350 persons/ square mile	16,040 persons/ square mile	16,740 persons/ square mile	24,160 persons/ square mile	1,980 persons/ square mile
2.1 Serves major employment centers and high density residential (2042 Employment Density)	15,130 jobs/ square mile	10,100 jobs/ square mile	15,520 jobs/ square mile	11,200 jobs/ square mile	14,520 jobs/ square mile	13,510 jobs/ square mile	44,260 jobs/ square mile	11,210 jobs/ square mile
2.2 Encourages local economic development (TOC policies; supports land values; potential joint development opportunities)	Medium	Medium	Medium	Medium	Medium	Medium	High	Low
2.3 Serves affordable housing developments (number affordable housing units near stations)	3,750 affordable housing units	1,270 affordable housing units	4,590 affordable housing units	3,960 affordable housing units	5,600 affordable housing units	5,040 affordable housing units	20,980 affordable housing units	550 affordable housing units
2.4 Supports and is consistent with local plans (development patterns; character of public realm; development standards)	Medium	Medium	Medium	Medium	Medium	Medium	High	Low
Goal 2 Ratings	◑	◑	◑	◑	◑	◑	●	○

Note: Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments.

5.3 Minimize Environmental Impacts

The purpose of the goal to minimize environmental impacts is to advance a Project that meets the following objectives:

- 3.1 - Minimizes environmental and community impacts
- 3.2 - Minimizes impacts to the transportation network
- 3.3 - Minimizes other potential environmental impacts

The following sections evaluate each Alternative and Concept against the evaluation criteria developed for the goal to minimize environmental impacts.

5.3.1 Minimizes Environmental and Community Impacts

Criteria: Reduction in regional vehicle miles traveled

Vehicle miles traveled (VMT) is the basis of evaluating potential emissions reductions with implementation of a new transit system. According to Metro's Countywide Sustainable Planning Policy and Implementation Plan (2012), reductions in VMT would result in a multitude of benefits including but not limited to: reduced greenhouse gas emissions, reduced emissions of pollutants, increased physical activity, and increased use of active transportation and transit. Also, included within the Countywide Sustainable Planning Policy and Implementation Plan is a focus on increasing sustainable transportation modes.

Alternatives and Concepts that provide the greatest VMT savings would result in greater reductions in emissions and other sustainability benefits pursuant to Metro's Countywide Sustainable Planning Policy and Implementation Plan. Table 5-28 describes the rating system for the "high," "medium," or "low" rating.

Table 5-28. Reduction in VMT Rating Threshold

Rating	Description
High	Greater than 640,000 VMT reduced
Medium	Between 500,000 and 639,000 VMT reduced
Low	Less than 500,000 VMT reduced

Table 5-29 shows the VMT reduction by Alternative and Concepts with the associated rating.

Alternative B is anticipated to provide the greatest reduction in VMT, approximately 648,000 miles of reduction, followed by two other "high" rating concepts: Concept E and Concept F: with reductions in VMT of 631,000 and 630,000, respectively. Concept H is forecasted to provide the smallest reduction in VMT, approximately 327,000-miles, which aligns with the fewest new trips (change from auto to transit). Concept G also rated "low" with a reduction of only 458,000 VMT. Although Concept G has more new trips than Concept H, it would not serve some of the longer trips that arrive at LAUS on Metrolink.

Table 5-29. Reduction in VMT Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Reduction in vehicle miles traveled (VMT)	624,400 VMT reduced	645,5000 VMT reduced	621,100 VMT reduced	611,500 VMT reduced	648,800 VMT reduced	629,100 VMT reduced	458,300 VMT reduced	327,300 VMT reduced
Overall Ratings	Medium	High	Medium	Medium	High	Medium	Low	Low

Criteria: Level of effects to Section 4f (park/recreational land) or sensitive uses (e.g., residences or historic properties)

Alignment and station construction may result in impacts to historic properties. Certain portions of the city, such as historic districts, contain a proportionally higher amount of historic resources than other areas of the city. The area surrounding the LA River, including old rail yards, may include undiscovered archaeological resources due to the River's use for trade by Native Americans and settlers and the long history of railroad operation in the area.

The evaluation criterion has been assessed based on the proximity to historic resources and the potential to encounter archaeological resources. A "low" rating constitutes a high level of impact potential, followed by a "medium" rating, then a "high" rating being the least impactful.

The following is a qualitative assessment of each Alternative's or Concept's potential level of effects to Section 4f or sensitive uses and the respective rating.

Alternative A would pass near the LA River and several areas historically used by the railroads, such as the Santa Fe Inbound Freight House. The proximity to the LA River may yield more archaeological resources than other areas, as rivers were often used as trade routes by the Native Americans and settlers. The terminus would also be located near historic uses such as LAUS, El Pueblo de Los Angeles, and parts of the old City. This Alternative would place an aerial structure near residences in Little Tokyo. Overall, the Alternative received a **"low"** rating.

Alternative B would pass near the LA River and several areas historically used by the railroads, such as the Santa Fe Inbound Freight House. The proximity to the LA River may yield more archaeological resources than other areas, as rivers were often used as trade routes by the Native Americans and settlers. The terminus would also be located near historic uses such as LAUS, El Pueblo de Los Angeles, and parts of the old City. This Alternative received a "**medium**" rating.

Alternative C would pass through the largely industrial heart of Los Angeles, which may contain buildings that have significance due to their industrial past and associations with key events and inventions. The terminus would also be located near historic uses such as LAUS, El Pueblo de Los Angeles, and parts of the old City. This alignment option would place an aerial structure near residences in Little Tokyo. Overall, the Alternative received a "**low**" rating.

Alternative D would pass through the largely industrial heart of Los Angeles, which may contain buildings that have significance due to their industrial past and associations with key events and inventions. The northern portion of the alignment would be located near the LA River, which could yield more archaeological resources versus other areas of downtown. The terminus would also be located near historic uses such as LAUS, El Pueblo de Los Angeles, and parts of the old City. This Alternative received a "**medium**" rating.

Concept E would pass through the largely industrial heart of Los Angeles, which may contain buildings that have significance due to their industrial past and associations with key events and inventions. The terminus would also be located near historic uses such as Union Station, El Pueblo de Los Angeles, and parts of the old City. However, as the alignment through this area would be underground, this Concept received a "**high**" rating.

Concept F would pass through the largely industrial heart of Los Angeles, which may contain buildings that have significance due to their industrial past and associations with key events and inventions. The northern portion of the alignment would be located near the LA River, which could yield more archaeological resources versus other areas. The terminus would also be located near historic uses such as LAUS, El Pueblo de Los Angeles, and parts of the old City. This Concept received a "**medium**" rating.

Concept G would pass through the historic core of Los Angeles, which has many designated Historic Cultural Monuments. However, as the alignment through this area would be underground, this Concept received a "**low**" rating.

Concept H would pass nearby the LA River and several areas historically used by the railroads, such as the Redondo Junction. The proximity to the LA River may yield more archaeological resources than other areas of downtown, as rivers were often used as trade routes by the Native Americans and settlers. This Concept received a "**medium**" rating.

As shown in Table 5-30, Alternative C and Concept G and would have the highest potential to impact cultural resources/sensitive uses, while Concept E would have the lowest potential.

Table 5-30. Impacts to Cultural Resources and Sensitive Uses Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Potential Impacts to Cultural Resources and Sensitive Uses	Low	Medium	Low	Medium	High	Medium	Low	Medium

5.3.2 Minimizes Impacts to the Transportation Network

Criteria: Minimizes impacts to roadway travel lanes, parking, and truck movements

At-grade portions of the Alternatives and Concepts would have a higher potential to disrupt travel lanes, parking, truck movements, and existing rail ROWs, followed by aerial portions, and then underground portions being the least disruptive. The evaluation criterion has been assessed based on the design of each Alternative's and Concept's alignment and the area which each would travel through. A "low" rating constitutes a high level of impact potential, followed by a "medium" rating, then a "high" rating being the least impactful.

The following is a qualitative description of each Alternative's and Concept's potential impacts to the transportation network and the respective rating.

Alternative A includes both aerial and underground segments. The above grade portions of the alignment would be located in mix of industrial, commercial and residential areas with significant traffic. Travel lane capacity may be affected by columns and/or straddle bents that may restrict turns, reduce lane widths, and interrupt sight distances. This Alternative received a "**medium**" rating.

Alternative B includes both aerial and below grade segments with a small portion of at-grade in the Arts District. The aerial portions of the alignment would be located in an industrial area with large amounts of truck traffic. Truck traffic may be disrupted by support facilities necessary for aerial structures and the at-grade portion may disrupt travel lanes along Santa Fe Avenue. In addition, street closures are possible in transitions from underground to aerial segments. This Alternative received a "**medium**" rating.

Alternative C would travel largely aerial, with a small portion of at-grade near the I-10. The above grade portions of the alignment would be located in a mix of industrial, commercial, and residential areas with significant traffic along Alameda Street. Travel lane capacity may be affected by columns and/or straddle bents that may restrict turns, reduce lane widths, and interrupt sight distances. Because of the extensive aerial segment along Alameda Street, this Alternative received a "**low**" rating.

Alternative D would be primarily aerial along Alameda Street and would traverse an industrial and commercial area with significant truck traffic. Similar to Alternative C, travel lane capacity may be affected by columns and/or straddle bents that may restrict turns, reduce lane widths, and interrupt sight distances. In addition, street closures are possible in transitions from below grade to aerial segments. Because of the Alameda segment and the possibility of street closures just south of the US-101, this Alternative received a "**low**" rating.

Concept E would travel largely underground, with a portion of aerial before the I-10 in the rail ROW and a small portion of at-grade near the I-10. Impacts related to travel lanes and truck traffic would largely be limited to station areas, if any. This Concept received a "**high**" rating.

Concept F would travel largely underground, with a portion of aerial before the I-10 in the rail ROW and going into LAUS and a small portion of at-grade near the I-10 and near Commercial Street. Impacts related to travel lanes and truck traffic would largely be limited to station areas, if any. Because of the possibility of street closures just south of the US-101, this Concept received a "**medium**" rating.

Concept G would travel largely underground. Impacts related to travel lanes and truck traffic would largely be limited to station areas, if any. This Concept received a "**high**" rating.

Concept H would travel primarily below grade. While roadway travel lanes would not be affected, existing freight and passenger rail traffic may be disrupted in proximity to the station. This Concept received a "**medium**" rating.

Table 5-31. Impacts to Transportation Networks Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Potential Impacts to roadways, parking, and trucks	Medium	Medium	Low	Low	High	Medium	High	Medium

Criteria: Minimizes disruptions to existing railroad ROW

The Study Area includes railroad ROW that are located adjacent to the alignments of the Alternatives and Concept. Various rail operators including Metro, UPRR, BNSF, and the Ports of Los Angeles and Long Beach could constrain construction of and operation for many of the Alternatives and Concepts. In order to construct LRT tracks within an existing railroad ROW not owned by Metro, Metro would require an easement to operate on a portion of the ROW.

Table 5-32 describes the rating system for the "high," "medium," or "low" rating. Table 5-33 presents the percentage of miles each alignment option overlaps with existing railroad ROW north of the Florence/Salt Lake Station, and the corresponding rating.

Alternatives A and B would operate primarily in the street ROW thereby having the least amount of alignment overlap of all Alternatives and Concepts. Both these Alternatives received a "high" rating. Alternatives C and D, and Concepts E, F, G, and H received a "medium" rating as their alignments would run adjacent to freight tracks that are parallel to and in between the Metro Blue Line and Long Beach Boulevard.

Table 5-32. Disruption to Existing Railroad ROW Rating Threshold

Rating	Description
High	Less than 50% of alignment overlaps with existing rail operations
Medium	Between 50% and 75% of alignment overlaps with existing rail operations
Low	More than 75% of alignment overlaps with existing rail operations

Table 5-33. Disruption to Existing Railroad ROW Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Minimal disruption to existing railroad ROW (% of miles overlap with existing railroad ROW)	38%	40%	60%	59%	61%	61%	61%	63%
Overall Ratings	High	High	Medium	Medium	Medium	Medium	Medium	Medium

5.3.3 Minimizes Other Potential Environmental Impacts

Criteria: Minimizes impacts to visual, noise, vibration, hazards, and other environmental considerations

Additional environmental considerations were evaluated, such as potential visual impacts due to aerial segments or noise impacts near sensitive uses such as residential areas, schools, and places of worship. For instance, aerial structures can be visually displeasing and are louder than equivalent at-grade or underground alignments. The evaluation criterion has been assessed based on the design of each alignment and the area which each would travel through. A "low" rating constitutes a high level of impact potential, followed by a "medium" rating, then a "high" rating being the least impactful.

The following is a qualitative description of the potential environmental impacts for the Alternatives and Concepts and the respective rating.

Alternative A includes aerial segments which could result in visual and noise impacts near Little Tokyo and along Alameda Street. The Alternative would also pass through the heavily industrial area of Los Angeles which may have a higher potential for hazardous materials encounters. This Alternative received a "**low**" rating.

Alternative B includes aerial segments which could result in visual and noise impacts along Vignes Street. However, the number of sensitive receptors is fairly limited. The Alternative would also pass through the heavily industrial area of Los Angeles which may have a higher potential for hazardous materials encounters. This Alternative received a "**medium**" rating.

Alternative C would travel extensively in an aerial segment along Alameda Street which could result in visual and noise impacts, this Alternative received a "**low**" rating.

Alternative D would be aerial along Alameda Street which could result in visual and noise impacts. However, the number of sensitive receptors is fairly limited. This Alternative received a "**low**" rating.

Concept E would travel largely underground. Therefore, visual impacts would be limited to station areas and noise impacts would be largely non-existent. This Concept received a "**high**" rating.

Concept F would travel largely underground, with a portion of aerial before the I-10 in the rail ROW and going into LAUS and a small portion of at-grade near the I-10 and near Commercial Street. The at-grade and aerial segments could result in visual and noise impacts. This Concept received a "**medium**" rating.

Concept G would likely have a high potential for vibration impacts when passing underground and near the station areas due to the historic nature of the area. Underground alignments may also have a higher chance of encountering underground hazardous materials sites. This Concept received a "**low**" rating.

Concept H would travel primarily below grade passing through the heavily industrial area of Los Angeles and may have a higher potential for hazardous materials encounters. This Concept received a "**medium**" rating.

Table 5-34. Other Environmental Impacts

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/6th Street
Minimizes potential impacts to visual, noise, vibration, hazards, etc.	Low	Medium	Low	Low	High	Medium	Low	Medium

5.3.4 Summary

Concept E provides the greatest overall potential to minimize environmental impacts. This concept would be primarily underground, and would likely avoid impacts that would affect the at-grade environment (e.g., sensitive uses, transportation network, visual impacts, hazards, etc.). This concept would also have the highest reduction in VMT from travelers reducing their auto trips and resulting in a reduction in greenhouse gas and other pollutants.

Alternative B and Concepts F and H would have moderate environmental impacts and partially avoid sensitive uses. Alternative B and Concept F would have moderate impacts to the transportation network and other environmental considerations and have high VMT reductions. Although Concept H would likely avoid any sensitive uses, the concept would offer the lowest VMT reduction compared to all of the Alternatives and Concepts considered.

It is anticipated that Alternatives A, C and D and Concept G would need to address significant environmental impacts given the potential effects to sensitive uses and other potential environmental impacts. Alternative A and C would include an aerial alignment through the Little Tokyo and would likely affect sensitive uses and travel lanes where columns and/or straddle bents may restrict turns, reduce lane widths, and interrupt sight distances. Alternative

A and C would also likely result in visual and noise impacts near the Little Tokyo community and Alameda Street and have a higher potential for hazardous materials encounters in the heavily industrial area of Los Angeles. Alternative D would include at-grade and aerial alignments near the Little Tokyo community and would likely result in transportation and visual impacts related to the aerial alignment along Alameda Street. Concept G may likely affect the Historic Core of Los Angeles and its associated designated Historic Cultural Monuments. Concept G may have a high potential for vibration impacts when passing underground due to the historic and dense nature of the Downtown Core area. Additionally, this Concept has one of the lowest VMT reductions.

It should be noted that while Goal 3 is to minimize adverse environmental impacts, the ability to maximize environmental benefits should also be considered. It is notable that both Concepts G and H do not reduce VMT as significantly as the other alignments and would therefore have less environmental benefits. Table 5-35 presents a summary of the results for all evaluation criteria under Goal 3.

Table 5-35. Goal 3: Minimize Environmental Impacts Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
3.1 Minimizes environmental and community impacts (Reduction in VMT)	624,400 VMT reduction	645,500 VMT reduction	621,100 VMT reduction	611,500 VMT reduction	648,800 VMT reduction	629,100 VMT reduction	458,300 VMT reduction	327,300 VMT reduction
3.1 Minimizes environmental and community impacts (Effects to sensitive uses)	Low	Medium	Low	Medium	High	Medium	Low	Medium
3.2 Minimizes impacts to the transportation network (Impacts to travel lanes, parking and truck movements; disruption to existing rail ROW)	Medium	Medium	Low	Low	High	Medium	High	Medium
3.3 Minimizes other potential environmental impacts (Impacts to visual, noise, hazards, and other environmental topics.)	Low	Medium	Low	Low	High	Medium	Low	Medium
Goal 3 Ratings	○	◑	○	○	●	◑	○	◑

Note: Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments

5.4 Ensure Cost Effectiveness and Financial Feasibility

The purpose of the cost effectiveness and financial feasibility goal is to advance a project that meets the following objectives:

- 4.1 - Costs are financially feasible
- 4.2 - Provides cost effective project
- 4.3 - Minimizes risk of cost increase

The following sections evaluate each alignment option against the evaluation criteria developed for the cost effectiveness and financial feasibility goal.

5.4.1 Costs are Financially Feasible

Criteria: Rough-Order-of-Magnitude Capital Costs

Rough-Order-of-Magnitude (ROM) capital cost estimates for each alignment option were developed in accordance with FTA guidelines and using the latest revision of FTA's Standard Cost Categories (SCC). These estimates were prepared in a standard estimating format appropriate for 5 percent level of design of project development. These cost estimates will be refined as design progresses.

The FTA guidelines require cost estimates to be prepared and reported using the latest version of the SCC. Cost categories form the basis of the cost estimate. The cost categories consist of the following:

- Guideway: At-Grade, Aerial, Tunnel, Cut and Cover
- Stations: At-Grade, Aerial, and Underground
- Support Facilities
- Sitework and Special Conditions
- Systems
- ROW, Land, Existing Improvements
- Vehicles
- Professional Services
- Contingency
- Finance Charges

Table 5-36 presents the capital costs (2017 dollars) for each of the alignment options under consideration. These costs are for the full length of the alignment (northern terminus to Artesia). Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results are attributed to differences in the Northern Alignments.

The capital cost estimates range from $4.5 billion (Concept H) to $5.8 billion (Concepts E and G). In general, the Alternatives and Concepts that are relatively longer with more tunneling are costlier than relatively shorter Alternatives and Concepts that have more aerial and at-grade alignment length. The number of stations is also a distinguishing factor in the cost estimates.

Alternatives A and B share most of their total alignment length but Alternative A has slightly more aerial alignment length and one more aerial station than Alternative B while Alternative B has slightly more tunneling. These Alternatives have similar cost estimates at $4.7 billion each. Alternative C is the only Alternative or Concept without any tunneling, but it has the most aerial alignment length at almost six miles with a $4.6 billion cost estimate. Of the Alternatives and Concepts with tunnels, Alternative D has the shortest tunnel length but has the second most aerial alignment length at five miles with a $5.0 billion cost estimate. Concepts E and F share most of their total alignment length with Alternatives A and B but the tunnel lengths for Concepts E and F are approximately one mile longer and Concept E has an additional underground station. Concepts E and F have cost estimates of $5.8 billion and $5.4 billion, respectively. Concept G has the same total alignment length and number and type of stations as Concept E but with slightly less tunneling, and a similar cost estimate of $5.8 billion. Concept H has the second shortest total alignment length but the most tunneling and only four stations, with a cost estimate of $4.5 billion.

Table 5-36. Capital Costs Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Capital Cost (*ROM capital costs in $Billions)	$4.7 Billion (2017$)	$4.7 Billion (2017$)	$4.6 Billion (2017$)	$5.0 Billion (2017$)	$5.8 Billion (2017$)	$5.4 Billion (2017$)	$5.8 Billion (2017$)	$4.5 Billion (2017$)

*ROM capital cost is based on early engineering assumptions and are provided to demonstrate general differentiators in costs.

5.4.2 Provide a Cost-Effective Project

Criteria: Capital Cost / New Riders Per Year

A common measure of project cost effectiveness is the project's cost compared to the number of riders served. For this analysis, the lower the cost per rider, the more cost effective the alignment option. Similarly, the higher the cost per rider, the less cost effective the alignment option. Table 5-37 summarizes the capital costs/per new riders per year for each alignment option and the respective score for this criterion. It should be noted that this cost effectiveness calculation should not be compared to the FTA New Starts criteria, which uses a different methodology.

Alternative C with its high number of projected new riders and low capital cost compared to the other Northern Alignment Alternatives and Concepts is the most cost effective at $557 per new riders per year. Concept H has a lower capital cost than the other Northern Alignment Alternatives and Concepts but has the highest capital cost / new riders per year at $740. This makes Concept H the least cost effective alignment since it attracts far fewer new riders than the other Northern Alignment Alternatives and Concepts.

Table 5-37. Cost Effectiveness Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Capital cost/ new riders per year	$607	$596	$557	$620	$679	$655	$729	$740

5.4.3 Minimizes Risk of Cost Increase

Criteria: Intensity of engineering challenges

Three factors were considered to evaluate the potential engineering challenges for each Alternative and Concept:

- Guideway configuration
- ROW and infrastructure constraints/conflicts
- Third party approvals

The engineering challenges are considered in terms of risk and uncertainty, where alignment options with greater engineering challenges present greater potential for unforeseen cost increases. Only those criteria that present distinguishing factors between the Northern Alignment Alternatives and Concepts are accounted for in the summary of results.

Guideway Configuration

Table 5-38 presents the guideway configuration by Alternative and Concept. The guideway configurations were developed assuming up to a 5% level of design that was based upon applicable criteria and standards for a Metro LRT system. With the exception of Alternative C, all alignment options include at-grade, aerial, and underground profile components. Alternatives A and B have shorter length of tunneling compared to Concepts E, F, G, and H. Concept H has the longest length of underground alignment compared to all other Alternatives and Concepts. Since tunneling presents a higher degree of uncertainty and risk than building at-grade or aerial alignment since the challenges are more clearly defined. Therefore, Alternatives and Concepts with the longest tunnel alignments present a greater risk and higher potential to pose significant engineering challenges.

Table 5-38. Guideway Configuration by Alternative and Concept

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Guideway Configuration	3.6 miles aerial; 2.9 miles at-grade; 1.2 miles UG	3.0 miles aerial; 2.9 miles at-grade; 1.6 miles UG	5.8 miles aerial; 2.5 miles at-grade	5.0 miles aerial; 2.5 miles at-grade; 0.8 miles UG	3.2 miles aerial; 2.5 miles at-grade; 2.4 miles UG	3.6 miles aerial; 2.4 miles at-grade; 2.2 miles UG	2.8 miles aerial; 3.2 miles at-grade; 2.1 miles UG	2.6 miles aerial; 2.4 miles at-grade, 2.6 miles UG
Risk Assessment	Higher risks with tunneling in Arts District	Higher risks with tunneling in Arts District	Less risk with aerial or at-grade	Risks with short tunneling in Arts District	Higher risks with tunneling	Higher risks with tunneling	Higher risks with tunneling	Higher risks with tunneling

Note: UG=Underground

ROW and Infrastructure Constraints/Conflicts

Appendix A presents ROW and infrastructure constraints/conflicts for each Alternative and Concept by segment. Since all of the Northern Alignment Alternatives and Concepts would be located in a highly constrained urban environment with numerous potential conflicts, including existing rail lines, utilities, and bridges, all alignments and stations would have substantial engineering challenges. Therefore, this criterion does not present distinguishing factors between the Northern Alignment Alternatives and Concepts. However, key findings are included in this report to disclose the significant ROW and/or infrastructure constraints and conflicts that are present.

By tunneling through the Arts District area, Alternatives A, B, and D and Concepts E and F avoid direct conflicts with the dense urban environment. However, these Alternatives and Concepts still have the potential to conflict with utilities or structural foundations underground and there is greater uncertainty as to exactly where these conflicts would occur. The Alternatives and Concepts involving tunneling may also require extensive laydown areas for a Tunnel Boring Machine (TBM) launch and tunneling support activities, which requires a substantial footprint. Furthermore, the transition structures from aerial or at-grade to underground would potentially have a significant impact and require permanent street closures in some cases.

Alternatives that do not involve or have minimal tunneling (Alternatives C and D) would primarily be in an aerial configuration. The major challenges would be conflicts with overhead utilities and other existing aerial structures, such as pedestrian bridges. Although these alignments may result in the narrowing of some roads, they are feasible to construct. While the challenges of placing an aerial structure in an urban environment are not insignificant, they are more predictable than the challenges that may be encountered through tunneling.

Concepts E, F, G and H involve longer lengths of tunneling. The alignment for Concepts E and F involve tunneling under Alameda Street. The major challenges associated with these alignments are potential conflicts with utilities, foundations, piles, and tie-backs among other unknown underground facilities.

There are major considerations for Concept E for the underground alignment and terminus location at LAUS (Alameda Forecourt or east of MWD). Concept E would have the following major challenges:

- Possible additional mitigation measures for protection of underground facilities and above ground structures. Concept E's alignment would cross directly under the Metro Regional Connector in Little Tokyo.
- Tunnel construction underneath US-101 and the existing Red/Purple Line subway tunnel, including a potential interface with the existing Red/Purple Line station at LAUS.
- Utility rearrangements at cut and cover stations and portals.
- Limited real estate availability behind MWD for construction laydown areas
- Property acquisitions for construction laydown areas and TBM operations.
- Mitigation of traffic impacts due to cut and cover station construction within City ROW along Alameda Street and surrounding streets, the Arts District South Station and Little Tokyo Station.

There are also major considerations for Concept F for the underground alignment and terminus location at LAUS (either above the Metro Gold Line or at Platform 2). Concept F would have the following major challenges:

- Possible additional mitigation measures for protection of underground facilities and above ground structures. Concept F would be under private properties until aligning with Alameda Street.
- Utility rearrangements at cut and cover stations and portals.
- Mitigation of traffic impacts due to cut and cover station construction within City ROW along Alameda Street and surrounding streets, the Arts District South Station and Arts District North Station.
- Construction within the LAUS rail yard (either over the existing Metro Gold Line platform and tracks or at Platform 2) while maintaining rail operations.
- Extensive property acquisitions and permanent street closures for the construction of the tunnel portal and the transition of guideway from aerial structure to tunnel as well as construction laydown areas and TBM operations.

There are major considerations for Concept G for the underground alignment and terminus in the Downtown Core area (near 7th Street/Metro Center or Pershing Square). Concept G would have the following major challenges:

- An underground station at 8th Street and Flower Street would have construction challenges due to being located beneath an existing tunnel for the Blue and Gold Lines.

- An underground alignment within City ROW might have conflicts with underground utilities, requiring large scale relocation with cost and schedule implications.
- An underground section of the alignment beneath the Historic Core of Los Angeles might have conflicts with building foundations.
- Cut and cover station construction within City ROW may impact downtown traffic along 8th Street (new underground station at 8th and Flower Streets with an underground pedestrian connection to the existing 7th/Metro Center Station and South Park/Fashion District Station), Broadway (Pershing Square Station), and Alameda Street (Arts District South Station), and all surrounding streets.

There are major considerations for Concept H for the underground alignment and terminus at the Arts District/6th Street Station. Concept H would have the following major challenges:

- Possible additional mitigation measures for protection of underground facilities and above ground structures. The majority of Concept H would not be within street ROW.
- Property acquisitions for the construction of the tunnel portal and the transition of guideway from aerial structure to tunnel as well as construction laydown areas and TBM operations.
- Construction adjacent to or within tail tracks near Division 20 while maintaining rail operations.

Third Party Approvals

Appendix B presents the major third party approvals that are anticipated for each Alternative and Concept. The anticipated approvals are similar for many of the Alternatives and Concepts, with approvals required from the appropriate jurisdictions based on alignment and anticipated station locations. Therefore, this criterion does not present distinguishing factors between the Northern Alignment Alternatives and Concepts.

The following is a summary of the potential Third Party approvals need for each Alternative and Concept:

- Alternative A and Alternative B would likely need approvals from at least 10 different agencies/entities: Cities of Los Angeles, Vernon, Huntington Park; utility companies, Caltrans, California Public Utilities Commission (CPUC); Alameda Corridor; FRA, UPRR, and Burlington Northern Santa Fe (BNSF).
- Alternatives C and D would likely need approvals from at least 9 different agencies/entities: Cities of Los Angeles, Vernon, Huntington Park; utility companies, Caltrans, CPUC; Alameda Corridor; FRA, and UPRR.
- Concepts E and F would likely need approvals from at least 9 different agencies/entities: Cities of Los Angeles, Vernon, Huntington Park; utility companies, Caltrans, CPUC; Alameda Corridor; FRA, and UPRR.
- Concept G. would likely need approvals from at least 8 different agencies/entities: Cities of Los Angeles, Vernon, Huntington Park; utility companies, Caltrans, CPUC; FRA, and UPRR.

- Concept H would likely need approvals from at least 10 different agencies/entities: Cities of Los Angeles, Vernon, Huntington Park; utility companies, Caltrans, CPUC; Alameda Corridor; FRA, UPRR, and Amtrak.

Given the similar number and types of approvals likely required for all of the Alternatives and Concepts (ranges from seven to nine), extensive negotiation and approval would be needed from the same agencies and entities. Table 5-39 presents the number of anticipated third party approvals for each Alternative and Concept.

Table 5-39. Third Party Approvals Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Anticipated number of Third Party Approvals	10	10	9	9	9	9	8	10

Criteria: Amount of property acquisition

Based on the current level of conceptual design, the alignment options were reviewed to determine whether the existing ROW along each alignment is sufficient or whether extensive property acquisitions would be required. Specific property acquisitions will be determined as design progresses and therefore an exact count is unavailable at this stage of design.

Appendix C presents detailed review of the anticipated property acquisitions and easements for each alignment option based on the current level of design. Acquisitions are presented separately from easements because acquisitions often necessitate the demolition of existing uses, whereas the existing uses often continue under an easement. The Alternatives or Concepts that require a greater number of acquisitions are therefore more disruptive than those that may require easements, particularly underground easements.

The acquisitions required along Alternatives A, B, C, and D would be at profile transitions, alignment turns, or, for Alternatives A, B, and D, to support tunneling activities. Alternative A and B have medium risk of cost increases associated with property acquisition because they both have tunnel alignments from the Arts District to the I-10 Freeway, minimizing surface impacts. Alternative C and D have higher risk of cost increases associated with property acquisition because they both have aerial alignments from the Arts District to the I-10 Freeway that will likely require support structures that could affect adjacent properties along Alameda Street. Concept F has a higher risk for cost increases associated with property acquisitions than the other Concepts due to the need for a long vertical transition area between 1st Street and LAUS. All Alternatives and Concepts with underground stations will require additional property acquisitions at station locations for laydown areas and TBM operations.

All Alternatives and Concepts would require easements for the portions of the alignment located within the street ROW and subsurface easements where there are tunnels. Concept G is anticipated to require the most easements among the Northern Alignment Alternatives and Concepts that have tunneling outside the street ROW. However, these easements are not anticipated to disrupt existing uses on private property.

Table 5-40 presents the resulting ratings for this criterion.

Table 5-40. Property Acquisitions Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Number of property acquisitions	Medium risks due to property impacts	Medium risks due to property impacts	Higher risks due to more property impacts	Higher risks due to more property impacts	Lower risk due to reduced property impacts	Medium risks due to property impacts	Lower risk due to reduced property impacts	Lower risk due to reduced property impacts
Number of Easements	Medium	Medium	Medium	Medium	Medium	Medium	High	Medium

5.4.4 Summary

Overall, the original four Northern Alignment Alternatives would demonstrate medium findings of cost effectiveness and financial feasibility as they have a combination of lower cost alignments, such as at-grade, aerial and minimal underground segments. Given Public Scoping comments and stakeholder input, the four new Northern Alignment Concepts offers reduced social costs (e.g., environmental and equity) of at-grade and aerial alignments by proposing variations with new and longer underground segments. The trade-off however, is higher financial cost.

Table 5-41 presents a summary of the results for all evaluation criteria under Goal 4.

Table 5-41. Goal 4: Cost Effectiveness and Financial Feasibility Summary

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
4.1 Costs are financial feasible (*ROM capital costs in $Billions)	$4.7 Billion (2017$)	$4.7 Billion (2017$)	$4.6 Billion (2017$)	$5.0 Billion (2017$)	$5.8 Billion (2017$)	$5.4 Billion (2017$)	$5.8 Billion (2017$)	$4.5 Billion (2017$)
4.2 Provide a cost-effective project (capital cost / new riders per year)	$607	$596	$557	$620	$679	$655	$729	$740
4.3 Minimizes risk of cost increase (engineering challenges)	Higher risks with tunneling	Higher risks with tunneling	Less risk with aerial or at-grade	Risks with short tunneling in Arts District	Higher risks with tunneling	Higher risks with tunneling	Higher risks with tunneling	Higher risks with tunneling
4.3 Minimizes risk of cost increase (property acquisition)	Medium risks due to property impacts	Medium risks due to property impacts	Higher risks due to more property impacts	Higher risks due to more property impacts	Lower risk due to reduced property impacts	Medium risks due to property impacts	Lower risk due to reduced property impacts	Lower risk due to reduced property impacts
Goal 4 Ratings	◑	◑	◑	◑	○	○	○	○

Notes: *ROM capital cost is based on early engineering assumptions and are provided to demonstrate general differentiators in costs.
Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments

5.5 Ensure Equity

The purpose of the equity goal is to advance a project that provides benefits to transit-dependent, minority and low-income populations and advances a Project that meets the following objectives:

- 5.1 - Provides benefits to transit-dependent and minority populations
- 5.2 - Minimizes adverse effects to an EJ community
- 5.3 - Provision of new reliable fixed service to underserved communities
- 5.4 - Serves low income riders

The following sections evaluate each Alternative and Concept against the evaluation criteria developed for the equity goal.

5.5.1 Provides Benefits to Transit-Dependent and Minority Populations

Criteria: Percentage of transit-dependent persons within ½ mile of stations

Transit-dependent persons are those persons whom do not own a car. The percentage of transit-dependent persons within ½ mile of stations gives a perspective on how beneficial a particular alignment would be for those who would utilize it the most. Table 5-42 describes the rating system of "high," "medium," or "low" for the average percentage of transit-dependent persons around station areas.

Table 5-42. Transit-Dependent Persons Percentage Thresholds

Rating	Description
High	> 50 percent
Medium	Between 30 and 50 percent
Low	< 30 percent

Table 5-43 presents average percentage of transit-dependent persons near station areas for each of the alignment options under consideration, and the corresponding ratings. A "high" rating would correspond to a higher percentage of transit-dependent persons with a "low" rating being the lowest percentage.

EJ communities are those areas that are more than 50 percent minorities or which have a higher percentage of low income persons than the Los Angeles County average. A review of the most recent US Census statistics indicates that most of Downtown Los Angeles qualifies as an EJ community. Within downtown, Little Tokyo and Chinatown are two distinct and well-defined minority and low-income neighborhoods. Nearly all of the stations for the alignment options encompass census block groups that can be classified EJ populations. As such, the alignment options would increase service to minority populations overall.

Table 5-43. Transit-Dependent Persons and Environmental Justice Communities Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Average Percentage of Transit-Dependent Persons within a ½ mile of stations	34.7%	21.6%	39.7%	35.8%	38.4%	38.8%	51.6%	24.1%
Overall Ratings	Medium	Low	Medium	Medium	Medium	Medium	High	Low

5.5.2 Minimizes adverse effects to an EJ Community

Criteria: Potential adverse effects to EJ Communities

Table 5-44 presents whether or not a particular Alternative or Concept would have impacts on EJ communities along with the severity of impacts, with a "low" rating being the most impactful. A low rating for EJ communities would result from the location and vertical profile of alignments (aerial, etc.) in close proximity to EJ communities, such as Little Tokyo, and could result in a high potential for disruption related to noise, and visual quality. Those alignments that pass-by EJ communities would have a moderate potential for disruption and receive a medium rating, while those alignments that generally avoid EJ communities would have a limited potential for disruption and receive a "high" rating.

Table 5-44. Potential for Adverse Effects to EJ Communities Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Adverse Effect to an EJ Community (potential for disruption)	High Potential	Moderate Potential	High Potential	Moderate Potential	Moderate Potential	Moderate Potential	Limited Potential	Limited Potential
Overall Ratings	Low	Medium	Low	Medium	High	High	High	High

Concepts E, F, G, and H would have a "high" rating as all of these concepts would be underground near EJ communities. Alternatives B and D would not directly impact EJ communities, but may potentially affect adjacent community centers such as the Nishi Hongwanji Buddhist Temple on Vignes Street.

Alternatives A and C would likely have "low" rating for negative visual impacts on the adjacent Little Tokyo EJ community due to their aerial alignment.

5.5.3 Provision of New Reliable Fixed Service to Underserved Communities

Criteria 5.3: New fixed service to transit-dependent persons around station areas

One of the major benefits of a new transit service is providing new travel opportunities for communities that are not currently served by an existing fixed transit service. The provision of new fixed service to underserved communities is also largely tied to service to transit-dependent persons.

All of the Alternatives (A, B, C and D) and Concepts E and F would serve similar travel markets since they all connect to LAUS, provide new service to emerging communities at the proposed Arts District stations, and would provide new access for underserved communities near the industrial area of Los Angeles. As such each of these Alternatives and Concepts received a "**medium**" rating.

Concept G would have the highest average percentage of transit-dependent persons around station areas and serve emerging and underserved communities at South Park/Fashion District and Arts District South. Concept G would also provide access to homeless persons near the 7th and Alameda Station or Pershing Square. Therefore, Concept G received a "**high**" rating.

Concept H received a low rating since it would provide only one new station at the Arts District/6th Street. Although this station would provide new service to an underserved community, given the limited number of transit-dependent and low income riders near this station area, this concept received a "**low**" rating.

Table 5-45. New Fixed Service to Underserved Communities Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Provision of new fixed service to underserved communities	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to Arts District North, South, and Industrial Areas	New fixed service to South Park/ Fashion District, Arts District South	New fixed service to Arts District/ 6th Street,
Overall Ratings	Medium	Medium	Medium	Medium	Medium	Medium	High	Low

5.5.4 Serves Low Income Riders

Criteria: Estimated number of low income riders

In general, the mobility of low income household populations is highly constrained. Current transit service in the Study Area has limited direct access to employment centers therefore requiring transit users to make several transfers to get to their destination. Low income populations are highly prevalent within the Study Area, with 25 percent of residents living below poverty compared to 17 percent of LA County as a whole. Therefore, it is important to consider benefits to low-income populations that would be served by the Project.

Based on the Metro model (2018), this criteria reviews number of low income riders (riders with household incomes below $35,000 annually) that would be served by each Alternative or Concept. For each Alternative or Concept the mode choice model was run with only the low - income portion of trip tables for the Home-Based Work, Home-Based Other, and Home-Based University trip purposes for the peak and off-peak, the results are then assigned to the transit networks, and the boardings on the Concept are reported. The Non-Home Based (NHB) trip tables are not stratified by income; therefore, they are not included in this analysis.

Concepts E and G would provide service to the highest number of low income riders (31,700 and 32,400, respectively) given service to the Little Tokyo and Downtown Transit Core stations.

Alternatives C, D and Concept F would also provide service to a high number of low income riders (between 26,800 and 29,600 riders) as the alignment and stations would have similar service areas.

Alternatives A, B and Concept H would serve a lower number of low income riders (19,000 to 22,100) which is consistent with findings of transit-dependent persons within ½ mile of stations (Criteria 5.1).

Table 5-46 presents the number of low income riders by Alternative and Concept.

Table 5-46. Service to Low Income Riders Evaluation

Evaluation Criteria	Northern Alignment Alternatives and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (under-ground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
Number of low income riders	22,100 low income riders	21,300 low income riders	29,600 low income riders	26,800 low income riders	31,700 low income riders	28,400 low income riders	32,400 low income riders	19,000 low income riders

5.5.5 Summary

The ensuring equity goal focuses on benefits to transit-dependent, minority populations, and low-income groups and the potential for adverse effects to EJ communities. Concept G would serve the highest amount of transit-dependent persons (51.6 percent are transit-dependent within ½ mile of the stations), highest number of low-income riders (32,400 low-income riders), and provide new fixed service to underserved communities near the Arts District South and South Park/Fashion District Stations. This concept would also likely have minimal adverse effects to EJ communities such as Little Tokyo and Chinatown based on its proximity away from the communities. As a result, Concept G would receive the highest rating.

Both Concept E and Concept F would serve a high number of transit-dependent populations (38.4 percent and 38.8 percent, respectively) and low-income riders (31,700 and 28,400 low-income riders, respectively). Therefore, both of these concepts receive high ratings.

Alternative B and Concept H would serve the lowest percentage of transit-dependent persons (21.6 percent and 24.1 percent, respectively) and low income riders (21,300 and 19,000 low-income riders, respectively) compared to all other Alternatives and Concepts, limiting the provision of new fixed service to transit-dependent communities compared to the other Alternatives and Concepts.

Table 5-47 presents a summary of the results for all evaluation criteria under Goal 5.

Table 5-47. Goal 5: Ensure Equity Summary

Evaluation Criteria	Northern Alignment Alternative and Concepts							
	Alternative A Pacific/ Alameda	Alternative B Pacific/ Vignes	Alternative C Alameda (aerial)	Alternative D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
5.1 Provides benefits to transit-dependent and minority populations (% transit-dependent persons within ½ mile of stations)	34.7% transit-dependent	21.6% transit-dependent	39.7% transit-dependent	35.8% transit-dependent	38.4% transit-dependent	38.8% transit-dependent	51.6% transit-dependent	24.1% transit-dependent
5.2 Minimizes adverse effects to an EJ community (potential adverse effects to EJ communities)	Low	Medium	Low	Medium	High	High	High	High
5. 3 Provision of new reliable fixed service to underserved communities (new fixed service to transit dependent persons around station areas)	Medium	Medium	Medium	Medium	Medium	Medium	High	Low
5. 4 Serves low income riders (estimated number of low income riders)	22,100 low income riders	21,300 low income riders	29,600 low income riders	26,800 low income riders	31,700 low income riders	28,400 low income riders	32,400 low income riders	19,000 low income riders
Goal 5 Ratings	◑	○	◑	◑	●	●	●	○

Note: Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments.

6 COMMUNITY AND STAKEHOLDER OUTREACH

To support development of the new Northern Alignment Concepts and discuss the original four Alternatives, community update meetings were held to communicate Alternatives and new Concepts being considered with stakeholders along the WSAB Transit Corridor. Five meetings were held between March 12 and March 19, 2018, with over 250 people participating in-person and approximately 85 written comment cards received. Over 270 people have viewed the recording of the Artesia webcast as of April 2, 2018. Table 6-1 presents the meeting details. Comments also continue to be received via the project e-mail address and the online comment submission form available on the project website. Three additional public meetings are planned for early May 2018, prior to the Metro Board decision.

Table 6-1. WSAB Public Outreach Meetings March 2018

Meeting #	Community	Date	Time	Location	Number of Participants
1	Little Tokyo	Monday, March 12, 2018	3 to 5 PM	Nishi Hongwanji Buddhist Temple 815 E 1st St, Los Angeles, CA 90012	75
2	Little Tokyo	Monday, March 12, 2018	6 to 8 PM	Nishi Hongwanji Buddhist Temple 815 E 1st St, Los Angeles, CA 90012	36
3	*Artesia	Tuesday, March 13, 2018	6 to 8 PM	Albert O. Little Community Center 18750 Clarkdale Av, Artesia, CA 90701	52
4	Bell	Saturday, March 17, 2018	10 AM to 12 PM	Bell Community Center 6250 Pine Ave, Bell, CA 90201	26
5	Downey	Monday, March 19, 2018	6 to 8 PM	Barbara J. Riley Community and Senior Center 7810 Quill Dr., Downey, CA 90242	64

*The Artesia meeting was also conducted as a live webcast, which was recorded and is available for viewing on the project website.

Meeting participants were encouraged to provide comments, and were specifically asked to consider the following about the new Northern Alignment Concepts:

1. Where would you prefer to end/begin in downtown (i.e., Downtown Transit Core, Union Station, Arts District)?
2. Are there destinations beyond the WSAB Transit Corridor you ultimately want to reach?
3. What are your comments on the new Northern Alignments?

In addition, presentations have been made to the Gateway Cities Council of Governments Transportation Committee and over twenty stakeholder and community organizations.

Comments received cited both LAUS and the Downtown Transit Core as the top preferences for beginning/ending their trips, followed by the Arts District. Other destinations meeting participants want to reach include Pasadena, Glendale, Burbank, Orange County, and Metrolink/Amtrak connections to other cities from LAUS. Not everyone responded to Question 3, although of those who did, Concept G was most selected, followed by Concept E. Other comments submitted pertained to pedestrian connections, safety, first/last mile in relation to a community's need, parking supply and impacts at stations, traffic around stations, property values, noise levels, budget, ridership, P3 potential, and property acquisitions.

7 FINDINGS SUMMARY

7.1 Key Findings

Each of the Northern Alignment Alternatives and Concepts provides a unique set of benefits that must be considered against the potential costs and challenges. The following discussion summarizes the key findings:

- **Alternative A: Pacific/Alameda:** By serving LAUS, and providing a Little Tokyo Station and an Arts District North Station, moderate mobility benefits are achieved with long travel times (36.6 minutes), limited user benefits (22,200 hours), a moderate number of boardings (58,000) and a low number of new riders (24,500) compared to the other Alternatives and Concepts. However, this Alternative's station areas would collectively serve the highest residential and employment densities. There are also TOC opportunities near the Arts District North Station that would meet the needs of emerging communities and stakeholders. In terms of environmental impacts and ensuring equity, this Alternative would need to address significant environmental challenges with effects to sensitive uses and EJ communities like Little Tokyo. Given the tradeoffs of moderate mobility, land use and cost and likely significant environmental and social justice concerns, Alternative A received an overall rating of **Medium/Low**.
- **Alternative B: Pacific/Vignes:** This Alternative would provide many of the same moderate benefits as the Alternative A, but would not propose a station in Little Tokyo therefore minimizing adverse effects to that EJ community. However, without a station in Little Tokyo, this Alternative misses a key connection to the East-West Line (Gold Line/Regional Connector) thereby further limiting mobility benefits and access to high residential and employment densities. For equity, this Alternative would rate low since it would not serve a high percentage of transit-dependent (21.6 percent), minority, or low income riders (21,300) compared to the other Alternatives and Concepts. Based on the moderate mobility, land use, environmental and cost considerations; and the limited ability to ensure equity for the project; Alternative B received an overall rating of **Medium/Low**.
- **Alternative C: Alameda (aerial):** The Alameda (aerial) Alternative provides connections to LAUS, Little Tokyo, Arts District South, and Metro Blue Line (North-South Line), resulting in significant mobility benefits with higher user benefits (24,000 hours), number of boardings (75,500) and new riders (26,000). By following the Metro Blue Line, this Alternative serves low-income and densely populated areas that would benefit from additional transit service and helps to address overcrowding on the Metro Blue Line. However, this Alternative would need to address significant environmental challenges including visual impacts from a primarily aerial alignment along Alameda Street, through Little Tokyo, then into LAUS. Given the tradeoffs of high mobility benefits, moderate land use, equity and cost, and significant environmental concerns, Alternative C received an overall rating of **Medium**.
- **Alternative D: Alameda/Vignes:** As with Alternative C, this Alternative provides new transit service to a transit-dependent community along the Metro Blue Line (North-South Line) and results in substantial mobility benefits including user benefits (23,500 hours), number of boardings (69,500) and new riders (25,500). With at-grade and

aerial alignments, this Alternative would likely have environmental impacts near the Little Tokyo community center and transportation and visual impacts along Alameda Street. This Alternative would support a moderate amount of residential and employment densities and have a medium amount of cost and risk as it limits the amount of underground segments proposed. Given the high mobility benefits, but medium findings for land use, cost and equity, and low findings for environmental impacts, Alternative D received an overall rating of **Medium**.

- **Concept E: Alameda (underground)**: The new Concept E would provide similar or better benefits as the Alameda (aerial) Alternative with an underground alignment to address environmental concerns for the Little Tokyo community. This Concept would connect to both the North-South and East-West Lines thereby providing significant mobility benefits with higher user benefits (25,000 hours), and highest number of boardings (81,500) and new riders (27,000). By following the Metro Blue Line, then transitioning into an underground alignment, this Concept would serve low-income and densely populated areas to the south with the fastest, most direct connection into LAUS (33.5 minutes). Although this Concept would likely have less environmental impacts to consider (since it is mostly underground), it would have the highest cost and risk compared to the other Alternatives and Concepts. Given that Concept E would rate high in all of the goals except for cost and risk, this Concept received an overall rating of **High**.
- **Concept F: Alameda/Center:** The new Concept F provides similar mobility benefits as Alternative D but provides a faster connection (34.0 minutes) with an underground alignment north of I-10 to the Gold Line resulting in higher number of boardings (74,500) and new riders (26,000). Since majority of the alignment is underground, the Alternative would likely have less environmental impacts to consider. However, this would result in higher costs and risks. Given the tradeoffs of high mobility and equity benefits, moderate land use and environmental concerns; and high financial cost and risk with tunneling, Concept F received an overall rating of **Medium/High**.
- **Concept G: Downtown Transit Core:** The new Concept G would provide a fast and direct connection (33.6 minutes) to the highest residential and employment densities in downtown Los Angeles. With emerging TOCs at South Park/Fashion District and the Arts District South Station, this Concept would provide significant mobility benefits to low-income and minority populations with 51.6 percent of persons near station areas being transit dependent. High mobility benefits include user benefits (24,100 hours), daily boardings (78,500) and new riders (25,000). Although Concept G is primarily underground, there are significant environmental impacts to consider including potential impacts to historic uses near proposed station areas and the lower reduction in VMT compared to the other Alternatives and Concepts. Given the high mobility, land use, and equity benefits, but potential risk of underground tunnel costs and environmental impact concerns, this Concept received an overall rating of **Medium/High**.
- **Concept H: Arts District/6th Street:** The new Concept H would provide opportunities to connect to an emerging TOC near Arts District/6th Street. However, compared to the other Alternatives and Concepts, Concept H would provide significantly lower mobility and land use benefits. With only one station connecting to the Red/Purple Line, this Concept would generally provide limited user benefits (18,500 hours), fewest daily boardings (46,500) and fewest new riders (19,500). This Concept would also support

very low population densities and a small number of low-income and minority communities since the station and alignment would primarily be located in the core industrial area of Los Angeles. Although a potential extension of Concept H to serve the Fashion District and Pico Station may provide additional connectivity to these communities, an extension of the alignment would increase travel time and further reduce the number of new riders traveling between the southern portion of this alignment and northern destinations. Concept H would not provide comparable benefits to the other alternatives or concepts; therefore, this Concept received an overall rating of **Low**.

7.2 Summary of Results

Based on the findings of the Northern Alignment Alternatives and Concepts screening analysis, a northern terminus at LAUS or in the Downtown Transit Core would provide the highest benefits. This was further confirmed based on input gathered from public outreach meetings held in March 2018. Table 7-1 presents overall ratings of each Alternative and Concept by Project goal. The evaluation resulted in three Concepts that best align with Project goals:

- **Concept E: Alameda (underground)** aligns with the overall project goals for the Project. This Concept rates high for mobility improvements, minimizes environmental impacts, and ensures equity by providing more transit access to minority and low-income communities. Concept E is also supportive of land use plans and policies by serving high population and employment densities. The significant underground section of this alignment would result in high capital costs and risks; however, the opportunity to provide a direct connection to LAUS, the East-West (Gold Line/Regional Connector), and the North-South (Blue Line) Lines offers benefits that best meet the project goals, objectives, and evaluation criteria.
- **Concept F: Alameda/Center,** with a similar alignment as Concept E, also aligns with the overall project goals by rating high in mobility improvements and ensures equity to minority and low-income communities. Concept F would provide additional benefits of a connection to emerging Transit Oriented Communities (TOC) near the Arts District North Station and an aerial connection into LAUS above the Gold Line Platform or on Platform 2. The significant underground section of this alignment would also result in high capital costs and risks; however, the opportunity to provide a direct connection to LAUS and the Blue Line offers benefits that best meet the project goals, objectives, and evaluation criteria.
- **Concept G: Downtown Transit Core** also aligns with the overall project goals by supporting connectivity for emerging TOCs, and providing access to very high population densities, employment densities and transit-dependent/environmental justice communities. Like Concepts E and F, the significant underground portions of this alignment, particularly in the Downtown Core, would result in high capital costs and risks. Based on modeling results, transfers to the Regional Connector at the 7th Street/Metro Center terminus would likely attract more riders than a terminus at Pershing Square. This Concept would offer valuable benefits of mobility and supportive land use while meeting the project goals, objectives, and evaluation criteria.

Table 7-1. Summary of Results

Evaluation Criteria	Northern Alignment Alternative and Concepts							
	Alt A Pacific/ Alameda	Alt B Pacific/ Vignes	Alt C Alameda (aerial)	Alt D Alameda/ Vignes	Concept E Alameda (underground)	Concept F Alameda/ Center	Concept G Downtown Transit Core	Concept H Arts District/ 6th Street
1. Provide Mobility Improvements	◑	◑	●	●	●	●	●	○
2. Support Local and Regional Land Use Plans and Policies	◑	◑	◑	◑	◑	◑	●	○
3. Minimize Environmental Impacts	○	◑	○	○	●	◑	○	◑
4. Ensure Cost Effectiveness and Financial Feasibility	◑	◑	◑	◑	○	○	○	○
5. Ensure Equity	◑	○	◑	◑	●	●	●	○
Overall Ratings	Medium/ Low	Medium/ Low	Medium	Medium	High	Medium/ High	Medium/ High	Low

Note: Since the proposed alignment for all Alternatives and Concepts is the same south of Florence/Salt Lake Station, evaluation results shown are attributed to differences in the Northern Alignments.

APPENDICES

Appendix A – ROW and Infrastructure Constraints/Conflicts

Appendix B – Third Party Approvals

Appendix C – Anticipated Property Acquisitions and Easements

APPENDIX A ROW AND INFRASTRUCTURE CONSTRAINTS / CONFLICTS

Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes ROW and Infrastructure Constraints/Conflicts

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative A: Pacific/Alameda	Union Station to Alameda Street (aerial)	▪ At LAUS, a WSAB station is proposed either above the existing Metro Gold Line or at-grade at Platform 2. The aerial station option would need to provide sufficient clearance over the existing Metro Gold Line along with coordination of station features that would connect the two stations, such as stairs and elevators. The Platform 2 station option would need to upgrade the existing platform, tracks, stairs, and ramps to support electrified LRT service. ▪ The LAUS rail yard is constrained by the existing Metrolink/Amtrak tracks to the east and Union Station and MWD to the west. ▪ The Caltrans ROW is constrained when crossing US-101 with the Alameda Street overcrossing and the Metro Gold Line aerial structure. ▪ A new bridge would be required over US-101 to accommodate the WSAB alignment.
Alternative A: Pacific/Alameda	Alameda Street to 4th Place (aerial to tunnel)	▪ Constrained city ROW – Alameda Street is a public street comprised of two travel lanes in each direction, a center left-turn lane, and on-street parking. To accommodate the WSAB aerial structure along Alameda Street, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. Alameda St ROW is constrained to the east and west by adjacent multi-story businesses (up to four stories) and residential (up to four stories). ▪ Overhead power/communication utilities and street lighting along Alameda Street are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to Alameda Street would be required to accommodate WSAB aerial structure. ▪ Relocation of utilities underneath Alameda Street and where the alignment transitions to 4th Place would be required to accommodate WSAB tunnel.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative A: Pacific/Alameda	4th Place to Santa Fe Avenue at 7th Street (tunnel)	▪ Constrained city ROW – 4th Place is a public street comprised of four one-way travel lanes and on-street parking. Removal of parking on both sides of 4th Place would be required to accommodate WSAB trench and Arts District Station. North and south of 4th Place ROW are adjacent multi-story businesses (mostly two stories with one three story) and one parking structure (six stories) that constrain the ROW. ▪ Overhead power/communication utilities and street lighting along 4th Place are located above or within existing sidewalk. Relocation of utilities underneath 4th Place would be required to accommodate WSAB tunnel. ▪ Design would need to avoid conflicts between the WSAB underground alignment and the 4th Street bridge supports. ▪ Constrained city ROW – Santa Fe Ave is a public street comprised of one travel lane in each direction and on-street parking. Santa Fe Ave ROW is constrained to the east and west by adjacent multi-story businesses (up to two stories until 7th Street) and residences (none until 7th Street); most buildings are located adjacent to the back of the existing sidewalk. ▪ Overhead power/communication utilities and street lighting along Santa Fe Ave are located above or within existing sidewalks ▪ There is an electrical substation located south of 6th Street.
Alternative B: Pacific/Vignes	Union Station to Commercial Street (aerial)	▪ The Metro ROW is constrained by the existing Metrolink/Amtrak tracks to the east and the existing adjacent occupied properties to the west. ▪ The Caltrans ROW is constrained when crossing the US-101 with the Metro Gold Line aerial structure to the west and the future Link US tracks to the east. ▪ The support columns and aerial viaduct for the alignment would cross US-101 and Commercial Street and could impact the existing Metro Gold Line bridge, the US-101 freeway and ramps, and the Link US project.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative B: Pacific/Vignes	Commercial Street to Temple Street (aerial to tunnel)	▪ Constrained city ROW – Commercial Street is a public street comprised of two travel lanes in each direction and a center left turn lane. The Commercial Street ROW is constrained on the north by US-101 and on the south by adjacent multi-story businesses (up to two stories) and a future LADOT bus maintenance facility at Hewitt Street. ▪ Constrained city ROW – Vignes Street is a public street comprised of one travel lane in each direction and on-street parking. Removal of parking, loss of through travel lanes, and/or narrowing of sidewalks in each direction on Vignes Street would be required to accommodate columns for the WSAB aerial and transition structures. Vignes Street ROW is constrained to the east and west by businesses (up to three stories), a Buddhist Temple located at the northwest corner of Vignes Street and 1st Street, and residences (up to three stories and with underground parking) south of 1st Street. Most of the buildings are adjacent to the back of the sidewalk. ▪ Overhead power/communication utilities and street lighting are located along Commercial Street and Vignes Street, above or within the existing sidewalk. ▪ Overhead power/communication lines that cross perpendicular to Vignes Street would be relocated to accommodate the WSAB aerial and transition structures. ▪ The transition from aerial to underground between Commercial Street and Temple Street will permanently close a section of Vignes, Ducommun, and Jackson Streets to vehicle traffic between Garey Street and Center Street. Vehicle traffic will divert to Commercial Street (north of Ducommon Street) and Temple Avenue (south of Jackson Street), which will be kept as is. The transition section from aerial structure to tunnel will be located to avoid impacting Temple Street (a major east-west corridor). At least two driveways would permanently close along Vignes Street as a result of the adjacent street closure. The provision of alternative access to these properties is unknown at this time. ▪ Use of a TBM to construct the tunnels would require identifying an off-street site for the TBM launch pit in this area as well as to support tunneling activities.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative B: Pacific/Vignes	Temple Street to Santa Fe Avenue at 7th Street (tunnel)	▪ Metro Gold Line is perpendicular to Vignes Street at 1st Street. The WSAB tunnel would pass under the Metro Gold Line Eastside Extension at 1st Street. The design would need to accommodate or avoid support features for the Metro Gold Line. ▪ The area of the proposed Arts District Station on Santa Fe Avenue is highly constrained, making the cut and cover construction of the station challenging. Along Santa Fe Avenue, there is limited public ROW width consisting of one travel lane in each direction, a center left-turn lane, and on-street parking. ▪ The tunnels will need adequate clearance to pass beneath abutments and foundations of the historic 1st Street, 4th Street and 4th Place bridges and the new 6th Street bridge.
Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes	Santa Fe Avenue at 7th Street to Harbor Subdivision (tunnel to aerial)	▪ Constrained city ROW – Santa Fe Avenue is a public street comprised of one travel lane in each direction and on-street parking until 25th Street. A travel lane in each direction would be required on Santa Fe Ave between 7th and 25th Streets to accommodate columns for the WSAB aerial structure. Santa Fe Avenue ROW is constrained to the east and west by adjacent multi-story businesses (up to four stories until 25th Street) and residences (up to three stories mostly by 7th Street); most buildings are located adjacent to the back of the existing sidewalk ▪ Utilities underneath Santa Fe Avenue would require relocation to accommodate the WSAB tunnel. ▪ Modification to Santa Fe Avenue under the Caltrans I-10 bridge may be required to accommodate WSAB tracks. Constrained ROW underneath the existing Caltrans aerial structure at I-10 that would require confirmation of sufficient clearance. ▪ Between Washington Boulevard and 25th Street is the at-grade Redondo Junction, comprised of freight and Amtrak tracks. A new aerial structure over Redondo Junction would be required to accommodate the WSAB aerial alignment. ▪ Constrained city ROW – 25th Street is a public street comprised of one travel lane in each direction and on-street parking. Parking would be removed on 25th Street to accommodate columns for the WSAB aerial alignment. North and South of 25th Street are adjacent multi-story industrial businesses (up to two stories). ▪ Constrained City ROW – Minerva Avenue is a public street comprised of one travel lane in each direction and on-street parking. Minerva Avenue ROW is constrained to the east and west by adjacent multi-story businesses (up to four stories) ▪ Overhead power/communication utilities and street lighting along Minerva Avenue are located above or within existing sidewalks ▪ Relocation of overhead power/communication lines that cross perpendicular to Santa Fe Avenue, 25th Street, and Minerva Avenue would be required to accommodate WSAB aerial structure.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative A: Pacific /Alameda and Alternative B: Pacific/Vignes	Harbor Subdivision to Pacific Boulevard (aerial to at-grade)	▪ Constrained Metro ROW due to existing BNSF tracks and spur tracks. The freight tracks would be relocated to accommodate the WSAB alignment. West and east of the ROW are multi-story businesses (up to three stories) that constrain the ROW and overhead power/communication utilities. ▪ Relocation of overhead power/communication lines that cross perpendicular to Harbor Subdivision would be required to accommodate WSAB aerial structure. ▪ Relocation of overhead power/communication lines that cross perpendicular to Harbor Subdivision and Pacific Boulevard would be required to accommodate WSAB aerial structure transition.
Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes	Pacific Boulevard to La Habra Subdivision/ Randolph Street (at-grade)	▪ Constrained city ROW – Pacific Boulevard is a public street comprised of two to three travel lanes in each direction, dedicated left-turn lanes, and on-street parking. A travel lane in each direction would be removed to accommodate the WSAB alignment. Pacific Blvd ROW is constrained to the east and west by adjacent multi-story businesses (up to two stories). ▪ Overhead power/communication utilities and street lighting along Pacific Boulevard are located above and within existing sidewalks.
Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes	La Habra Subdivision/ Randolph Street to San Pedro Subdivision (at-grade)	▪ Constrained La Habra Subdivision ROW, which is owned by UPRR, due to existing UPRR tracks, mature trees, landscaping and parking lots. The freight tracks would require relocation and the mature trees, landscaping, and parking lots would be removed to accommodate the WSAB alignment. ▪ Adjacent and parallel to the La Habra Subdivision ROW is Randolph Street, a public street comprised of two travel lanes in each direction, dedicated left-turn lanes, and on-street parking. On-street parking would be removed to accommodate La Habra Subdivision the WSAB alignment. North and South of Randolph Street ROW are adjacent multi-story residential (up to two stories) and businesses (up to two stories). ▪ Overhead power/communication utilities and street lighting along Randolph Street are located above or within existing sidewalks. ▪ Relocation of overhead power/communication lines that cross perpendicular to San Pedro Subdivision to accommodate the transition of WSAB to an aerial structure.

Alternative C: Alameda (aerial) and Alternative D: Alameda/Vignes ROW and Infrastructure Constraints/Conflicts

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative C: Alameda (aerial)	Union Station to Alameda Street (aerial)	▪ A WSAB aerial station is proposed over the existing Metro Gold Line station or to the west of that station above the relocated bus plaza. This station would need to provide sufficient clearance over the existing Metro Gold Line station or the bus plaza along with coordination of station features that would connect the two stations, such as stairs and elevators. ▪ The Metro ROW is constrained by the existing Metrolink/Amtrak tracks to the east and the existing adjacent occupied properties to the west. ▪ The Caltrans ROW is constrained when crossing US-101 with the Alameda Street overcrossing to the west and the Metro Gold Line aerial structure to the east. ▪ A new bridge would be required over US-101 to accommodate the WSAB alignment.
Alternative D: Alameda/Vignes	Union Station to Commercial Street (aerial)	▪ The Metro ROW is constrained by the existing Metrolink/Amtrak tracks to the east and the existing adjacent occupied properties to the west. ▪ The Caltrans ROW is constrained when crossing the US-101 with the Metro Gold Line aerial structure to the west and the future Link US tracks to the east. ▪ The support columns and aerial viaduct for the alignment would cross US-101 and Commercial Street and could impact the existing Metro Gold Line bridge, the US-101 freeway and ramps, and the Link US project.
Alternative D: Alameda/Vignes	Commercial Street to 3rd Street (tunnel)	▪ Constrained city ROW – Commercial Street is a public street comprised of two travel lanes in each direction and a center left-turn lane. The Commercial Street ROW is constrained on the north by US-101 and on the south by adjacent multi-story businesses (up to two stories) and a future LADOT bus maintenance facility at Hewitt Street. ▪ Constrained city ROW – Vignes Street is a public street comprised of one travel lane in each direction and on-street parking. Removal of parking, loss of through travel lanes, and/or narrowing of sidewalks in each direction on Vignes Street would be required to accommodate columns for the WSAB aerial and transition structures. Vignes Street ROW is constrained to the east and west by businesses (up to three stories), a Buddhist Temple located at the northwest corner of Vignes Street and 1st Street, and residences (up to three stories and with underground parking) south of 1st Street. Most of the buildings are adjacent to the back of the sidewalk. ▪ Overhead power/communication utilities and street lighting are located along Commercial Street and Vignes Street, above or within the existing sidewalk. Overhead power/communication lines that cross perpendicular to Vignes Street would be relocated to accommodate the WSAB aerial and transition structures.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
		Underground utilities along Vignes Street and where the alignment transitions to 3rd Street would be relocated to accommodate the alignment in a tunnel. ▪ The transition section from an aerial to underground alignment would need to be located to avoid affecting Temple Street (a major east-west corridor). The transition from an aerial to underground configuration between Commercial Street and Temple Street would permanently close a section of Vignes, Ducommun, and Jackson Streets to vehicle traffic between Garey Street and Center Street. Vehicle traffic would be diverted to Commercial Street (north of Ducommon Street) and Temple Avenue (south of Jackson Street), which will be kept as is. At least two driveways would be permanently closed along Vignes Street as a result of the adjacent street closure. The provision of alternative access to these properties is unknown at this time. ▪ Metro Gold Line is perpendicular to Vignes Street at 1st Street. The WSAB tunnel would pass under the Metro Gold Line Eastside Extension at 1st Street. The design would need to accommodate or avoid support features for the Metro Gold Line. ▪ Use of a TBM to construct the tunnels would require identifying an off-street site for the TBM launch pit in this area. ▪ If cut-and-cover construction is used instead of TBM-driven tunnels, temporary street closures would be needed along Vignes Street and property acquisitions would be needed for the curve into 3rd Street.
Alternative D: Alameda/Vignes	3rd Street to Alameda Street (tunnel to aerial)	▪ Constrained city ROW – 3rd Street is a public street comprised of one travel lane in each direction and on-street parking. East and west of 3rd Street are business and new residential buildings that constrain the ROW, mostly adjacent to the back of the sidewalk. ▪ Overhead power/communication utilities and street lighting along 3rd Street are located above or within the existing sidewalk. ▪ On 3rd Street near Traction Avenue, the Arts District Station would be in a cut-and-cover box structure with entrance structures located within adjacent property.

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Alternative C: Alameda (aerial) and Alternative D: Alameda/Vignes	Alameda Street to Long Beach Avenue (aerial)	▪ Constrained city ROW – Alameda Street is a public street comprised of two travel lanes in each direction, a center left-turn lane, and on-street parking. To accommodate the WSAB aerial structure along Alameda Street, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. Alameda Street ROW is constrained to the east and west by adjacent multi-story businesses (up to six stories) and residences (up to three stories). Buildings on the north end of Alameda Street are adjacent to the back of the sidewalk, and buildings on the south end are set back from the sidewalk but have parking lots between the street and building. ▪ Overhead power/communication utilities and street lighting along Alameda Street are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to Alameda Street would be required to accommodate the WSAB aerial structure. Relocation of utilities underneath Alameda Street would be required to accommodate columns for the WSAB aerial structure. ▪ Support columns on Alameda Street from 4th Street to 14th Street may affect the left-turn movements on Alameda Street ▪ Constrained Caltrans and city ROW occurs where the alignment would transition from Alameda Street to Long Beach Avenue due to an I-10 on-ramp located at Newton Street, existing businesses, and I-10 freeway. Modification to Caltrans I-10 on-ramp located at Newton Street and bridges at Newton Street and Long Beach Avenue would be required.
Alternative C: Alameda (aerial) and Alternative D: Alameda/Vignes	Long Beach Avenue to Randolph Street	▪ Constrained city ROW – Long Beach Avenue is a public street comprised of one travel lane in each direction, a center left-turn lane, and on-street parking. The Metro Blue Line and UPRR ROW are in the median of Long Beach Avenue. To accommodate the WSAB aerial structure along Long Beach Avenue, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. ▪ Wilmington Subdivision –The WSAB aerial structure columns would be adjacent to the Wilmington Subdivision ROW. The aerial structure would encroach over the tracks but the height of structure would provide full vertical clearance as required by UPRR. ▪ Overhead power/communication utilities and street lighting along Pacific Boulevard are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to the Harbor Subdivision would be required to accommodate the WSAB alignment. ▪ The WSAB vertical profile is constrained by a pedestrian overcrossing at 53rd Street, which would require modifications.
Alternative C: Alameda	Randolph Street to San Pedro Subdivision	▪ The La Habra Branch ROW, which is owned by UPRR, is constrained by the existing UPRR tracks, mature trees, landscaping, and parking lots. The UPRR tracks would require

	Alignment Segment	ROW and Infrastructure Constraints/Conflicts
		relocation to accommodate the WSAB alignment. The mature trees, landscaping, and parking lots would be removed. ▪ Adjacent and parallel to the La Habra Subdivision ROW is Randolph Street, a public street comprised of two travel lanes in each direction, dedicated left-turn lanes, and on-street parking. On-street parking would be removed to accommodate the WSAB alignment. North and South of Randolph Street ROW are adjacent multi-story residential (up to two stories) and businesses (up to two stories). ▪ Overhead power/communication lines that cross perpendicular to La Habra Subdivision/Randolph Street would be relocated to accommodate the WSAB aerial structure.

Concept E: Alameda (underground) ROW and Infrastructure Constraints/Conflicts

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Union Station to Alameda Street (Underground)	▪ Two WSAB underground station options are being considered at LAUS for Concept E: one in front of Union Station, the other east of the Metropolitan Water District building. Either station would need to provide sufficient clearance below the existing Metro Red/Purple Line tunnel along with coordination of station features that would connect to Union Station, such as stairs and elevators, as well as coordination with potential proposed projects at Union Station. ▪ The station option in front of Union Station is constrained by the existing at-grade parking lots, access road to Union Station and MWD. The station option east of the Metropolitan Water District building is constrained by the existing at-grade parking lots, access roads, and the Amtrak baggage facility. ▪ For both station options, the WSAB alignment would cross the Caltrans ROW underground when crossing US-101. ▪ Private ROW – Between Commercial Street and 1st Street, the WSAB alignment associated with the station option east of the Metropolitan Water District building is underneath City of Los Angeles property and Department of Water and Power property.
Alameda Street to 8th Street (Tunnel)	▪ Constrained City ROW – Alameda Street is a public street comprised of two travel lanes in each direction, a center left-turn lane, and on-street parking. Alameda St ROW is constrained to the east and west by adjacent multi-story businesses (up to four stories) and residential (up to four stories). ▪ Sufficient clearance needs to be provided below the existing Metro Regional Connector tunnel to allow for the WSAB tunnel and potential Little Tokyo Station, including connections to the Regional Connector 1st/Central Station, such as stairs and elevators. ▪ Relocation of utilities underneath Alameda Street for Arts District South Station would be required to accommodate the WSAB tunnel.
8th Street to 15th Street(Tunnel)	▪ Private ROW – Between 8th Street and 15th Street, the alignment would be in a tunnel beneath private properties. The area is comprised of multi-story businesses (mostly two stories and single story), at-grade parking and two lane roads with on-street parking (Long Beach Avenue and McGarry Street).
15th Street to Long Beach Avenue (Tunnel to Aerial)	▪ North of 15th Street, the alignment crosses the road at-grade and continues at-grade beneath the I-10 Freeway and across 16th Street to enter the former PEROW currently owned by Metro (near Long Beach Avenue). Within the PEROW, the alignment transitions from at-grade to aerial. No constraints anticipated in this area.

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Long Beach Avenue to Randolph Street (Aerial)	▪ Constrained city ROW – Long Beach Avenue is a public street comprised of one travel lane in each direction, a center left-turn lane, and on-street parking. The Metro Blue Line and UPRR ROW are in the median of Long Beach Avenue. To accommodate the WSAB aerial structure along Long Beach Avenue, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. ▪ Wilmington Subdivision –The WSAB aerial structure columns would be adjacent to the Wilmington Subdivision ROW. The aerial structure would encroach over the tracks but the height of structure would provide full vertical clearance as required by UPRR. ▪ Overhead power/communication utilities and street lighting along Pacific Boulevard are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to the Harbor Subdivision would be required to accommodate the WSAB alignment. ▪ The WSAB vertical profile is constrained by a pedestrian overcrossing at 53rd Street, which would require modifications.
Randolph Street to San Pedro Subdivision (Aerial to At-Grade)	▪ The La Habra Branch ROW, which is owned by UPRR, is constrained by the existing UPRR tracks, mature trees, landscaping, and parking lots. The UPRR tracks would require relocation to accommodate the WSAB alignment. The mature trees, landscaping, and parking lots would be removed. ▪ Adjacent and parallel to the La Habra Subdivision ROW is Randolph Street, a public street comprised of two travel lanes in each direction, dedicated left-turn lanes, and on-street parking. On-street parking would be removed to accommodate the WSAB alignment. North and South of Randolph Street ROW are adjacent multi-story residential (up to two stories) and businesses (up to two stories). ▪ Overhead power/communication lines that cross perpendicular to La Habra Subdivision/Randolph Street would be relocated to accommodate the WSAB aerial structure.

Concept F: Alameda/Center ROW and Infrastructure Constraints/Conflicts

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Union Station to Commercial Street (aerial)	▪ The Metro ROW is constrained by the existing Metrolink/Amtrak tracks to the east and the existing adjacent occupied properties to the west. ▪ The Caltrans ROW is constrained when crossing the US-101 with the Metro Gold Line aerial structure to the west and the future LinkUS tracks to the east. ▪ The support columns and aerial viaduct for the alignment would cross US-101 and Commercial Street and could impact the existing Metro Gold Line bridge, the US-101 freeway and ramps, and the LinkUS project.
Commercial Street to Temple Street (aerial to tunnel)	▪ Constrained city ROW – Commercial Street is a public street comprised of two travel lanes in each direction and a center left-turn lane. The Commercial Street ROW is constrained on the north by US-101 and on the south by adjacent multi-story businesses (up to two stories) and a future LADOT bus maintenance facility at Hewitt Street. ▪ The transition from aerial to underground between Commercial Street and Temple Street will permanently close a section of Vignes, Ducommun and Jackson Streets to vehicle traffic between Garey Street and Center Street. Vehicle traffic will divert to Commercial Street (north of Ducommon Street) and Temple Avenue (south of Jackson Street), which will be kept as is. The transition section from aerial structure to tunnel will be located to avoid impacting Temple Street (a major east-west corridor). Private properties within Garey, Commercial, Ducommun and Vignes Streets as well as properties within Ducommun, Vignes, Center and Temple Streets will be affected by the transition structure as well as construction activities and staging. ▪ Use of a TBM to construct the tunnels would require identifying an off-street site for the TBM launch pit in this area as well as to support tunneling activities. ▪ Overhead power/communication utilities and street lighting are located along Commercial Street and Vignes Street, above or within the existing sidewalk. ▪ Overhead power/communication lines that cross perpendicular to Vignes Street would be relocated to accommodate the WSAB aerial and transition structures.
Temple Street to Hewitt Street (tunnel)	▪ Constrained city ROW – Hewitt Street is a public street comprised of one travel lane in each direction and on-street parking. East and west of Hewitt Street are business and residential buildings and city owned parking structure that constrain the ROW. ▪ Overhead power/communication utilities and street lighting along Hewitt Street are located above or within the existing sidewalk. ▪ On Hewitt Street between Traction Avenue and 4th Place, the Arts District Station would be in a cut-and-cover box structure with entrance structures located within adjacent properties.

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Hewitt Street to Alameda Street (tunnel)	▪ From the station box for the WSAB station, the tunnel would continue west and turn south into Alameda Street. ▪ The tunnel profile would continue down the center of Alameda Street.
Alameda Street to 8th Street (Tunnel to At-Grade)	▪ Constrained city ROW – Alameda Street is a public street comprised of two travel lanes in each direction, a center left-turn lane, and on-street parking. Alameda St ROW is constrained to the east and west by adjacent multi-story businesses (up to four stories) and residential (up to four stories). ▪ Sufficient clearance needs to be provided below the existing Metro Regional Connector tunnel to allow for the WSAB tunnel and potential Little Tokyo Station, including connections to the Regional Connector 1st/Central Station, such as stairs and elevators. ▪ Relocation of utilities underneath Alameda Street for Arts District South Station would be required to accommodate the WSAB tunnel.
8th Street to 15th Street Fe (Tunnel)	▪ Private ROW – Between 8th Street and 15th Street, the alignment would be in a tunnel beneath private properties. The area is comprised of multi-story businesses (mostly two stories and single story), at-grade parking and two lane roads with parking (Long Beach Avenue and McGarry Street).
15th Street to Long Beach Avenue (Tunnel to Aerial)	▪ North of 15th Street, the alignment crosses the road at-grade and continues at-grade beneath the I-10 Freeway and across 16th Street to enter the former PEROW currently owned by Metro (near Long Beach Avenue). Within the PEROW, the alignment transitions from at-grade to aerial. No constraints anticipated in this area.
Long Beach Avenue to Randolph Street (Aerial)	▪ Constrained city ROW – Long Beach Avenue is a public street comprised of one travel lane in each direction, a center left-turn lane, and on-street parking. The Metro Blue Line and UPRR ROW are in the median of Long Beach Avenue. To accommodate the WSAB aerial structure along Long Beach Avenue, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. ▪ Wilmington Subdivision –The WSAB aerial structure columns would be adjacent to the Wilmington Subdivision ROW. The aerial structure would encroach over the tracks but the height of structure would provide full vertical clearance as required by UPRR. ▪ Overhead power/communication utilities and street lighting along Pacific Boulevard are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to the Harbor Subdivision would be required to accommodate the WSAB alignment. ▪ The WSAB vertical profile is constrained by a pedestrian overcrossing at 53rd Street, which would require modifications.

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Randolph Street to San Pedro Subdivision (Aerial to At-Grade)	▪ The UPRR ROW is constrained because of existing UPRR tracks, mature trees, landscaping, and parking lots. The freight tracks would be relocated to accommodate the WSAB alignment, and the landscaping and parking lots would be removed. ▪ Adjacent and parallel to the La Habra Subdivision ROW is Randolph Street, a public street comprised of two travel lanes in each direction, dedicated left-turn lanes, and on-street parking. On-street parking would be removed to accommodate the WSAB alignment. North and South of Randolph Street ROW are adjacent multi-story residential (up to two stories) and businesses (up to two stories). ▪ Overhead power/communication that cross perpendicular to La Habra Subdivision/Randolph Street would be relocated to accommodate the WSAB aerial structure.

Concept G: Downtown Transit Core ROW and Infrastructure Constraints/Conflicts

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
7th Street/ Metro Center Station to South Park/ Fashion District Station	▪ The 7th St/Metro Center Station would be below-grade, within City ROW beneath 8th St. The station would be constrained by an existing tunnel for the Blue/Gold Line and underground utilities. The South Park/Fashion District Station would be located below-grade, within City ROW beneath 8th St, and constrained by underground utilities. ▪ Traveling south-east from S Figueroa St to the South Park/Fashion District Station, the alignment would be below grade, within City ROW, and constrained by underground utilities. ▪ The section of the alignment beneath 8th St (between S Figueroa St and S Santee St) might have conflicts with an existing underground sewer system, as well as other underground utilities beneath 8th St.
Pershing Square Station to South Park and Fashion District Station	▪ The Pershing Square Station would be below-grade, within City ROW beneath Broadway. The South Park/Fashion District Station would be located below-grade, within City ROW beneath 8th St. ▪ Traveling south-west from E 3rd St to E 7th St, the alignment would remain in City ROW beneath Broadway. The alignment would make a sharp turn to the south-east where it would tunnel beneath several buildings between E 7th St and S Main St outside of City ROW, likely requiring subterranean easements, with possible impacts on building foundations in the Historic Core of Los Angeles. From S Main St to the South Park/Fashion District Station the alignment would remain below-grade, within City ROW beneath 8th St. ▪ The below-grade alignment beneath Broadway might have conflicts with underground utilities as it crosses E 4th St, E 6th St, and E 7th St. The below-grade alignment beneath 8th St (between Main St and S Santee St) might have conflicts with an existing underground sewer system, as well as other underground utilities beneath 8th St.

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
South Park/ Fashion District Station to Washington Station	▪ The South Park/Fashion District Station would be located below-grade, within City ROW beneath 8th St and constrained by underground utilities. The Alameda / Arts District South Station would be below-grade, within City ROW beneath Alameda St and constrained by underground utilities. The Washington Station would be above-grade, within City and existing railroad ROW and constrained by existing railroad infrastructure and utilities. ▪ Traveling south-east from S Santee St to S San Julian St, the alignment would be below-grade, within City ROW beneath 8th St. From S San Julian St to Alameda St the alignment would remain below-grade, traveling outside of City ROW, likely requiring subterranean easements, with possible impacts on building foundations. The alignment would remain below-grade from Alameda Station to Long Beach Ave, and again would travel outside of City ROW, likely requiring subterranean easements, with possible impacts on building foundations. After crossing beneath Long Beach Ave, the alignment would transition to at-grade between Long Beach Ave and E 15th St. The transition area would have ROW impacts to multiple properties, and would require partial or full ROW takes, to include several buildings. The alignment would remain at-grade from north of 15th St to south of 16th St, again traveling outside of City ROW, requiring partial or full ROW takes, to include several buildings. The alignment here passes under the 10 Freeway with interface with Caltrans structures and ramps. The alignment would transition to an above-grade configuration south of 16th St, and continue south to Washington Station within City and existing railroad ROW. The configuration at Washington Station will require careful consideration to modify and connect to the existing Blue Line platforms and provide safe and convenient transfer paths for passengers and access from the surrounding streets. Impacts on existing freight lines will need to be considered and discussed with the freight operators. ▪ The section of the alignment beneath 8th St (between S Santee St and S San Pedro St) might have conflicts with an existing underground sewer system, as well as other underground utilities beneath 8th St. ▪ The below-grade section of the alignment beneath Central Ave and E 7th St might have conflicts with existing underground utilities. ▪ The below-grade section of the alignment beneath E 7th St (between Central Ave and Alameda St) might have conflicts with underground utilities. ▪ South of Alameda Station the alignment might have conflicts with existing underground utilities as it crosses beneath Bay St., and as it crosses beneath E 8th St.

Concept H: Arts District/6th Street ROW and Infrastructure Constraints/Conflicts

Alignment Segment	ROW and Infrastructure Constraints/Conflicts
Arts District/6th Street to Washington Boulevard (Tunnel)	▪ Tunnel profile would be underground. Sufficient clearance from bridge foundations must be provided underneath 7th Street Bridge, I-10 and Olympic Blvd.
Washington Boulevard to Long Beach Avenue (Tunnel to Aerial)	▪ Tunnel profile would be underground. Sufficient clearance from bridge foundations must be provided underneath Santa Fe Avenue. ▪ This ROW is constrained by existing freight tracks and existing adjacent uses.
Long Beach Avenue to Randolph Street (Aerial)	▪ Constrained city ROW – Long Beach Avenue is a public street comprised of one travel lane in each direction, a center left-turn lane, and on-street parking. The Metro Blue Line and UPRR ROW are in the median of Long Beach Avenue. To accommodate the WSAB aerial structure along Long Beach Avenue, a number of strategies may be required: removal of parking, narrowing of travel lanes, narrowing of sidewalks, and potentially adjacent property encroachments. ▪ Wilmington Subdivision –The WSAB aerial structure columns would be adjacent to the Wilmington Subdivision ROW. The aerial structure would encroach over the tracks but the height of structure would provide full vertical clearance as required by UPRR. ▪ Overhead power/communication utilities and street lighting along Pacific Boulevard are located above or within existing sidewalks. Relocation of overhead power/communication lines that cross perpendicular to the Harbor Subdivision would be required to accommodate the WSAB alignment. ▪ The WSAB vertical profile is constrained by a pedestrian overcrossing at 53rd Street, which would require modifications.
Randolph Street to San Pedro Subdivision (Aerial to At-Grade)	▪ The La Habra Branch ROW, which is owned by UPRR, is constrained by the existing UPRR tracks, mature trees, landscaping, and parking lots. The UPRR tracks would require relocation to accommodate the WSAB alignment. The mature trees, landscaping, and parking lots would be removed. ▪ Adjacent and parallel to the La Habra Subdivision ROW is Randolph Street, a public street comprised of two travel lanes in each direction, dedicated left-turn lanes, and on-street parking. On-street parking would be removed to accommodate the WSAB alignment. North and South of Randolph Street ROW are adjacent multi-story residential (up to two stories) and businesses (up to two stories). ▪ Overhead power/communication lines that cross perpendicular to La Habra Subdivision/Randolph Street would be relocated to accommodate the WSAB aerial structure.

APPENDIX B THIRD PARTY APPROVALS

Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes Third Party Approvals

Third Party	Alternative A and Alternative B Potential Third Party Approvals
City of Los Angeles	▪ Approval for WSAB tunnel located underneath 4th Place (Pacific/Alameda), Vignes (Pacific/Vignes) and Santa Fe Avenue, including the historic bridges and new 6th Street Bridge ▪ Approval for WSAB aerial structure and at-grade alignment located in center of Alameda Street, Santa Fe Avenue, 25th Street and Minerva Avenue.
City of Vernon	▪ Approval for WSAB aerial structure located in center of Pacific Boulevard and at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for WSAB at-grade alignment located in center of Pacific Boulevard and Randolph Avenue
Utilities	▪ Approval for relocation of utilities underneath 4th Place (Pacific/Alameda), Vignes (Pacific/Vignes) and Santa Fe Avenue to accommodate WSAB tunnel ▪ Approval for relocation of overhead power/communication lines that cross perpendicular to Alameda Street, Santa Fe Avenue, 15th Street, Minerva Street, the Harbor Subdivision, and Pacific Boulevard to accommodate the WSAB aerial structure
Caltrans	▪ Approval to construct aerial viaduct and foundations across US-101 ▪ Approval to go underneath the existing I-10 bridge
CPUC	▪ Approval for new grade crossings
Alameda Corridor	▪ Approval to cross over Alameda Corridor trench and tracks
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the Harbor Subdivision and UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB structure to cross Redondo Junction between 15th Street/Washington Boulevard and Minerva Street ▪ Approval for an easement for Metro within the UPRR ROW along Randolph Street to accommodate the WSAB tracks ▪ Approval to relocate the UPRR tracks within the UPRR ROW
BNSF	▪ Approval to relocate the BNSF tracks within the Harbor Subdivision, Metro ROW

Alternative C: Alameda (aerial) and Alternative D: Alameda/Vignes Third Party Approvals

Third Party	Alternative C and Alternative D Potential Third Party Approvals
City of Los Angeles	▪ Approval for WSAB aerial structure located in center of Alameda Street and over Long Beach Avenue ▪ Approval for WSAB aerial and underground structure along Vignes Street (Alameda/Vignes) ▪ Approval for permanent closure of sections of Vignes Street to accommodate transition of alignment from aerial to underground (Alameda/Vignes) ▪ Possible approval for cut-and-cover tunnel construction on Vignes and 3rd Streets (Alameda/Vignes)
City of Vernon	▪ Approval for WSAB at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for street reconfiguration on Randolph Avenue
Utilities	▪ Approval for relocation of utilities underneath Commercial Street, Vignes Street, 3rd Street, Alameda Street, Long Beach Boulevard, and Randolph Street to accommodate the WSAB aerial and station structures ▪ Approval for relocation of overhead power/communication lines that cross perpendicular to Vignes Street, Alameda Street, Long Beach Avenue, Randolph Street, the Harbor Subdivision, and the La Habra Subdivision to accommodate the WSAB aerial structure
Caltrans	▪ Approval to construct aerial viaduct and foundations across US-101 ▪ Approval to go underneath existing I-10 bridge and reconfigure on-ramp at Newton Street
CPUC	▪ Approval for new grade crossings
Alameda Corridor	▪ Approval to cross over Alameda Corridor trench and tracks
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB aerial structure over the UPRR ROW east of the Metro Blue Line ▪ Approval for an easement within the La Habra Subdivision ROW and to relocate the UPRR tracks to accommodate the WSAB tracks

Concept E: Alameda (underground) Third Party Approvals

Third Party	Concept E Potential Third Party Approvals
City of Los Angeles	▪ Approval for permanent closure of sections of McGarry Street to accommodate transition of alignment from aerial to underground ▪ Approval for WSAB aerial structure located over Long Beach Avenue ▪ Possible approval for cut-and-cover tunnel construction on McGarry Street
City of Vernon	▪ Approval for WSAB at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for street reconfiguration on Randolph Avenue. ▪ Approval for permanent closure of sections of Wilmington Avenue to accommodate transition of alignment from aerial to underground
Utilities	▪ Approval for relocation of utilities underneath Alameda Street, Long Beach Avenue, and Randolph Street to accommodate the WSAB aerial and underground station structures ▪ Approval for relocation of overhead power/communication lines that cross perpendicular to 14th Street, McGarry Street, Long Beach Avenue, Randolph Street, and the La Habra Subdivision to accommodate the WSAB aerial structure
Caltrans	▪ Approval to tunnel underneath US-101 ▪ Approval to tunnel underneath existing I-10 bridge
CPUC	▪ Approval for new grade crossings
Alameda Corridor	▪ Approval to cross over Alameda Corridor trench and tracks
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB aerial structure over the UPRR ROW east of the Metro Blue Line ▪ Approval for an easement within the La Habra Subdivision ROW and to relocate the UPRR tracks to accommodate the WSAB tracks

Concept F: Alameda/Center Third Party Approvals

Third Party	Concept F Potential Third Party Approvals
City of Los Angeles	▪ Approval for WSAB aerial structure crossing Commercial Street and Garey Street ▪ Approval for WSAB aerial structure located over Long Beach Avenue ▪ Approval for permanent closure of sections of Vignes Street, Ducommun Street, Jackson Street and McGarry Street to accommodate transition of alignment from aerial to underground ▪ Possible approval for cut-and-cover tunnel construction on Temple Street and McGarry Street
City of Vernon	▪ Approval for WSAB at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for street reconfiguration on Randolph Avenue
Utilities	▪ Approval for relocation of utilities underneath Commercial Street, Vignes Street, Alameda Street, Long Beach Avenue, and Randolph Street to accommodate the WSAB aerial and underground station structures ▪ Approval for relocation of overhead power/communication lines that cross perpendicular to Vignes Street, Long Beach Avenue, Randolph Street and the La Habra Subdivision to accommodate the WSAB aerial structure
Caltrans	▪ Approval to construct aerial viaduct and foundations across US-101 ▪ Approval to tunnel underneath existing I-10 bridge
CPUC	▪ Approval for new grade crossings
Alameda Corridor	▪ Approval to cross over Alameda Corridor trench and tracks
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB aerial structure over the UPRR ROW east of the Metro Blue Line ▪ Approval for an easement within the La Habra Subdivision ROW and to relocate the UPRR tracks to accommodate the WSAB tracks

Concept G: Downtown Transit Core Third Party Approvals

Third Party	Concept G Potential Third Party Approvals
City of Los Angeles	▪ Approval for WSAB aerial structure located over Long Beach Avenue ▪ Approval for potential permanent closure of a section of Newton Avenue to accommodate possible tunnel portal location
City of Vernon	▪ Approval for WSAB at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for street reconfiguration on Randolph Avenue
Utilities	▪ Approval for potential relocation of utilities beneath 8th St, Broadway (Pershing Square option), 7th Street, Alameda St, Olympic Ave, Long Beach Avenue, and Randolph Street to accommodate the WSAB aerial and underground stations and guideways ▪ Approval for relocation of overhead power/communication lines that cross perpendicular Long Beach Avenue, Randolph Street and the La Habra Subdivision to accommodate the WSAB aerial structure
Caltrans	▪ Approval tunnel underneath existing I-10 bridge
CPUC	▪ Approval for new grade crossings
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB aerial structure over the UPRR ROW east of the Metro Blue Line ▪ Approval for an easement within the La Habra Subdivision ROW and to relocate the UPRR tracks to accommodate the WSAB tracks

Concept H: Arts District/6th Street Third Party Approvals

Third Party	Concept H Potential Third Party Approvals
City of Los Angeles	▪ Approval for WSAB aerial structure located over Long Beach Avenue
City of Vernon	▪ Approval for WSAB at-grade to aerial transition structure along Randolph Street.
City of Huntington Park	▪ Approval for street reconfiguration on Randolph Avenue
Utilities	▪ Approval for relocation of utilities underneath Long Beach Avenue and Randolph Street to accommodate the WSAB aerial station structures ▪ Approval for relocation of overhead power/communication lines that cross perpendicular to Long Beach Avenue, Randolph Street and the La Habra Subdivision to accommodate the WSAB aerial structure
Caltrans	▪ Approval to tunnel underneath existing I-10 bridge
CPUC	▪ Approval for new grade crossings
Alameda Corridor	▪ Approval to cross over Alameda Corridor trench and tracks
FRA	▪ Approval for placement of WSAB tracks for a shared corridor within the UPRR ROW
UPRR	▪ Approval for an aerial easement for the WSAB aerial structure over the UPRR ROW east of the Metro Blue Line ▪ Approval for an easement within the La Habra Subdivision ROW and to relocate the UPRR tracks to accommodate the WSAB tracks
Amtrak	▪ Approval for an underground easement for the WSAB tunnel beneath the Amtrak rail yard on the west bank of the Los Angeles River

APPENDIX C ANTICIPATED PROPERTY ACQUISITIONS AND EASEMENTS

Alternative A: Pacific/Alameda and Alternative B: Pacific/Vignes Property Acquisitions and Easements

	Alignment Segment	Potential Property Acquisitions	Potential Easements
A: Pacific/Alameda	Union Station to Alameda Street	▪ None	▪ Easement from Caltrans for WSAB aerial structure crossing over the US-101
	Alameda Street to 4th Place	▪ Potential property encroachments along Alameda Street for the WSAB aerial structure	▪ Easement from City of Los Angeles for WSAB aerial structure along Alameda Street and the transition structure to tunnel along Alameda Street
	4th Place to Santa Fe Avenue at I-10 Bridge	▪ Acquisitions or easements for construction staging sites to launch the TBMs and support tunneling activities	▪ Easement from City of LA for WSAB tracks below 4th Place and Santa Fe Avenue
B: Pacific/Vignes	Union Station to Commercial Street	▪ None	▪ Easement from Caltrans for WSAB aerial structure crossing over the US-101
	Commercial Street to 1st Street	▪ Acquisitions or easements for construction staging sites to launch the TBMs and support tunneling activities	▪ None
	1st Street to Santa Fe Ave at I-10 Bridge	▪ Acquisition of property for WSAB aerial connection from Santa Fe, Minerva Street and Harbor Subdivision	▪ None

	Alignment Segment	Potential Property Acquisitions	Potential Easements
A: Pacific/Alameda and B: Pacific/Vignes	Santa Fe Avenue at I-10 Bridge to Harbor Subdivision	▪ Acquisition of property for WSAB aerial connection from Santa Fe, Minerva Street and Harbor Subdivision	▪ Easement from UPRR for WSAB aerial structure over Redondo Junction ▪ Easement from Cities of LA and Vernon for WSAB aerial structure within Santa Fe Avenue, 25th Street and Minerva Avenue
	Harbor Subdivision to Pacific Boulevard	▪ Acquisition of property for WSAB aerial structure transitioning from Harbor Subdivision to Pacific Boulevard	▪ Easement and possible acquisition to locate aerial WSAB Vernon Station and entrances above Harbor Subdivision ▪ Agreement within Metro to encroach on Metro Vernon Yard site
	Pacific Boulevard to Randolph Street	▪ Potential acquisition of property for WSAB tracks transitioning from Pacific Boulevard to Randolph Street	▪ Easement from City of Vernon for WSAB tracks at-grade in Pacific Boulevard
	Randolph Street to San Pedro Subdivision	▪ Potential property acquisition(s) (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for WSAB tracks and Pacific/Vernon Station

Alternative C: Alameda (aerial) and Alternative D: Alameda/Vignes Property Acquisitions and Easements

	Alignment Segment	Potential Property Acquisitions	Potential Easements
C: Alameda	Union Station to Alameda Street	▪ None	▪ Easement from Caltrans for WSAB aerial structure crossing over the US-101
D: Alameda/Vignes	Union Station to Alameda Street	▪ Potential acquisition of property along Vignes Street if bored tunnel is used ▪ Possible property acquisition if cut-and-cover tunnel is used at curve from Vignes to 3rd Streets ▪ Acquisition of property at 3rd Street/Traction Avenue for Arts District Station access	▪ Easement from Caltrans for WSAB aerial structure crossing over the US-101 ▪ Underground easement if bored tunnel is used to make curve from Vignes Street to 3rd Street
C: Alameda and D: Alameda/Vignes	Alameda Street to Long Beach Avenue	▪ Potential property encroachments along Alameda Street for the WSAB aerial structure ▪ Potential property acquisition(s) (partial or full, to be determined) along Newton Street between Alameda Street and Long Beach Avenue for the WSAB aerial structure	▪ Easement from City of Los Angeles for the WSAB aerial structure in center of Alameda Street, Newton Street, and all streets perpendicular to Alameda Street
C: Alameda and D: Alameda/Vignes	Long Beach Avenue to Randolph Street	▪ Potential property encroachments along Long Beach Avenue for the WSAB aerial structure ▪ WSAB Vernon and Slauson Stations may require localized property acquisition on northbound side of Long Beach Boulevard	▪ Easement from City of Los Angeles and possibly UPRR for the WSAB aerial structure along Long Beach Avenue
	Randolph Street to San Pedro Subdivision	▪ Potential property acquisition(s) (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for the WSAB aerial structure and tracks ▪ Easement from City of Huntington Park to widen UPRR ROW to accommodate both WSAB and UPRR tracks

Concept E: Alameda (underground) Property Acquisitions and Easements

	Alignment Segment	Potential Property Acquisitions	Potential Easements
Alameda Forecourt	Union Station to Alameda Street	▪ None	▪ Easement from Caltrans for WSAB tunnel structure crossing under the US-101
East of MWD	LAUS to Alameda Street	▪ None	▪ Easement from Caltrans for WSAB tunnel structure crossing under the US-101 ▪ Easement from City of Los Angeles and Department of Water and Power
Alameda (underground)	Alameda Street to Long Beach Avenue	▪ Acquisitions for construction staging sites to launch the TBMs near 15th Street and support tunneling activities ▪ Acquisitions for at-grade alignment and aerial transition structure between 15th Street and Washington Boulevard	▪ Easement from City of Los Angeles for the WSAB tunnel beneath Alameda Street. ▪ Easements from property owners for the WSAB tunnel outside of street ROW between 8th Street and 15th Street ▪ Easements for construction staging sites to launch the TBMs near 15th Street and support tunneling activities
	Long Beach Avenue to Randolph Street	▪ Potential property encroachments along Long Beach Avenue for the WSAB aerial structure ▪ WSAB Vernon and Slauson Stations may require localized property acquisition on northbound side of Long Beach Boulevard.	▪ Easement from City of Los Angeles and possibly UPRR for the WSAB aerial structure along Long Beach Avenue.
	Randolph Street to San Pedro Subdivision	▪ Potential property acquisition(s) (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for the WSAB aerial structure and tracks ▪ Easement from City of Huntington Park to widen UPRR ROW to accommodate both WSAB and UPRR tracks

Concept F: Alameda/Center Property Acquisitions and Easements

Alignment Segment	Potential Property Acquisitions	Potential Easements
Union Station to Commercial Street	▪ None	▪ Easement from Caltrans for WSAB aerial structure crossing over the US-101
Commercial Street to Alameda Street	▪ Potential property acquisitions (partial or full, to be determined) within Commercial Street, Garey Street, Center Street and Temple Street for the WSAB transition structure. ▪ Acquisitions or easements for construction staging sites to launch the TBMs and support tunneling activities.	▪ None
Alameda Street to Long Beach Avenue	▪ Acquisitions for construction staging sites to launch the TBMs near 15th Street and support tunneling activities ▪ Acquisitions for at-grade alignment and aerial transition structure between 15th Street and Washington Boulevard	▪ Easement from City of Los Angeles for the WSAB tunnel beneath Alameda Street. ▪ Easements from property owners for the WSAB tunnel outside of street ROW between 8th Street and 15th Street ▪ Easements for construction staging sites to launch the TBMs near 15th Street and support tunneling activities
Long Beach Avenue to Randolph Street	▪ Potential property encroachments along Long Beach Avenue for the WSAB aerial structure ▪ WSAB Vernon and Slauson Stations may require localized property acquisition on northbound side of Long Beach Boulevard	▪ Easement from City of Los Angeles and possibly UPRR for the WSAB aerial structure along Long Beach Avenue
Randolph Street to San Pedro Subdivision	▪ Potential property acquisition(s) (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for the WSAB aerial structure and tracks ▪ Easement from City of Huntington Park to widen UPRR ROW to accommodate both WSAB and UPRR tracks

Concept G: Downtown Transit Core Property Acquisitions and Easements

Alignment Segment	Potential Property Acquisitions	Potential Easements
Downtown Transit Core Station to Main Street	▪ Property acquisition for construction of underground Downtown Transit Core station	▪ Easement from the City of Los Angeles for the WSAB tunnel beneath 8th Street for the 7th Street/Metro Center station option ▪ Easement from the City of Los Angeles for the WSAB tunnel beneath Broadway and easements from property owners for the WSAB tunnel between Broadway and Main Street for the Pershing Square station option
Main Street to Alameda Street	▪ Property acquisition for construction of underground South Park/Fashion District Station and Arts District South Station	▪ Easement from the City of Los Angeles for the WSAB tunnel beneath 8th Street and 7th Street ▪ Easements from property owners for the WSAB tunnel outside of street ROW between 8th Street and 7th Street
Alameda Street to Long Beach Avenue	▪ Acquisitions for construction staging sites to launch the TBMs near 15th Street and support tunneling activities ▪ Acquisitions for at-grade alignment and aerial transition structure between 15th Street and Washington Boulevard	▪ Easements from property owners for the WSAB tunnel outside of street ROW between 8th Street and 15th Street
Long Beach Avenue to Randolph Street	▪ Potential property encroachments along Long Beach Avenue for the WSAB aerial structure ▪ WSAB Vernon and Slauson Stations may require localized property acquisition on northbound side of Long Beach Boulevard	▪ Easement from City of Los Angeles and possibly UPRR for the WSAB aerial structure along Long Beach Avenue
Randolph Street to San Pedro Subdivision	▪ Property acquisitions (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for the WSAB aerial structure and tracks ▪ Easement from City of Huntington Park to widen UPRR ROW to accommodate both WSAB and UPRR tracks

Concept H: Arts District/6th Street Property Acquisitions and Easements

Alignment Segment	Potential Property Acquisitions	Potential Easements
6th Street to Washington Boulevard	▪ Property acquisition for construction of underground Arts District/6th Street Station	▪ Easements from property owners for the WSAB tunnel outside of street ROW between 6th Street and Washington Boulevard ▪ Easement from City of Los Angeles for WSAB tunnel beneath 7th Street and Olympic Boulevard ▪ Easement from Caltrans for WSAB tunnel crossing under the I-10 Freeway ▪ Easement from Amtrak for WSAB tunnel beneath the Amtrak rail yard on the west bank of the Los Angeles River
Washington Boulevard to Long Beach Avenue	▪ None	▪ Easement from the City of Los Angeles for WSAB tunnel beneath Washington Boulevard and Santa Fe Avenue ▪ Easements from property owners for the WSAB tunnel outside of street ROW between Washington Boulevard and Long Beach Avenue
Long Beach Avenue to Randolph Street	▪ Potential property encroachments along Long Beach Avenue for the WSAB aerial structure ▪ WSAB Vernon and Slauson Stations may require localized property acquisition on northbound side of Long Beach Boulevard. ▪ Acquisitions or easements for construction staging sites to launch the TBMs and support tunneling activities.	▪ Easement from City of Los Angeles and possibly UPRR for the WSAB aerial structure along Long Beach Avenue
Randolph Street to San Pedro Subdivision	▪ Potential property acquisition(s) (partial or full, to be determined) on southwest corner of Randolph Street and the San Pedro subdivision for WSAB aerial structure columns from Randolph Street to the San Pedro Subdivision	▪ Easement from UPRR for the WSAB aerial structure and tracks ▪ Easement from City of Huntington Park to widen UPRR ROW to accommodate both WSAB and UPRR tracks