

Los Angeles County
Metropolitan Transportation Authority

Final Feasibility Report

SEPULVEDA TRANSIT CORRIDOR PROJECT

November 2019



Metro



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List of Acronyms

AMC	Airport Metro Connector
APM	Automated People Mover
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CIG	Capital Investment Grants
EJ	environmental justice
ESFV	East San Fernando Valley Light Rail Transit Corridor
FTA	Federal Transit Administration
HOT	high-occupancy toll
HOV	high-occupancy vehicle
HRT	heavy rail transit
I-	Interstate
LACFCD	Los Angeles County Flood Control District
LADCP	Los Angeles Department of City Planning
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles Airport
LEP	limited English proficiency
LOSSAN	Los Angeles – San Diego – San Luis Obispo
LRT	light rail transit
L RTP	Long-Range Transportation Plan
Metro	Los Angeles County Metropolitan Transportation Authority
mph	miles per hour
MRT	monorail/rubber-tire transit
MSF	maintenance and storage facility
MWD	Metropolitan Water District
NEPA	National Environmental Policy Act
O&M	operations and maintenance
Q&A	question and answer
SMMC	Santa Monica Mountains Conservancy
SR	State Route
TBM	tunnel boring machine
TOC	transit-oriented communities
UCLA	University of California, Los Angeles
USACE	United States Army Corps of Engineers
VHT	vehicle hours traveled
VMT	vehicle miles traveled

Executive Summary

The Feasibility Study for the Sepulveda Transit Corridor Project reviewed transportation conditions and travel patterns in the Sepulveda corridor to identify mobility problems affecting travel between the San Fernando Valley, the Westside, and the LAX area. Using an iterative evaluation process, feasible transit solutions for the Valley-Westside segment and the Westside-LAX segment were developed to address the Project's Purpose and Need.

ES-1 Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro) has prepared a Final Feasibility Report for the Sepulveda Transit Corridor Project (the Project). The corridor extends between the San Fernando Valley and the Westside of Los Angeles, including the Los Angeles International Airport (LAX) area of Los Angeles County. The purpose of the Project is to provide a high-quality transit service that effectively serves the large and growing travel demand between the San Fernando Valley and the Westside, including the LAX area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit lines.

The Sepulveda corridor has been the major transportation corridor between the San Fernando Valley and the Westside for 90 years. As Los Angeles' San Fernando Valley and Westside have grown, Metro, the California Department of Transportation (Caltrans), and their predecessor agencies have undertaken multiple efforts to improve mobility in the Sepulveda corridor. In 2016, the voters of Los Angeles County approved Measure M, the Los Angeles County Traffic Improvement Plan, to fund transportation improvements throughout the County. The *Measure M Expenditure Plan* (Metro, 2016a) provides for implementation of the Sepulveda Transit Corridor Project in two phases: the first segment between the San Fernando Valley and the Westside of Los Angeles (Valley-Westside) by 2033-2035 and an extension to LAX (Westside-LAX) by 2057-2059. Figure ES-1 shows the Study Area for the Sepulveda Transit Corridor Project in the context of other Measure M projects in the San Fernando Valley and the Westside.

This Sepulveda Transit Feasibility Study is being conducted so that the study can be referenced during scoping under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) in the next phase of the Project. The intent is for the results and decisions of this study to support the environmental review process by informing the purpose and need or goals and objectives. To meet the requirements of 23 Code of Federal Regulations Part 450 – Linking the Transportation and NEPA Processes, the study is being conducted with input from an extensive public outreach effort and through close coordination with local, state, and federal agencies and by ensuring that the process for

developing and screening of alternatives, the level of definition of the alternatives, and the types and level of analyses are commensurate with the decisions that need to be made.

ES-2 Purpose and Need

Study Area Characteristics

The Sepulveda Transit Corridor Project Study Area encompasses approximately 60 square miles on both sides of I-405 between Roscoe Boulevard in the San Fernando Valley and 111th Street near LAX. Within the Study Area, there are three distinct, yet interrelated, geographic areas: the San Fernando Valley (the Valley), the Westside, and the LAX area.

The Valley, the northernmost part of the Study Area, is located north of Mulholland Drive. Within the Study Area, the San Fernando Valley has a well-defined arterial grid, with major streets every half mile, lined largely with a combination of apartment buildings and businesses. The Valley portion of the Study Area is bisected by the Metro Orange Line, which has three stations in the Study Area. The Ventura Freeway (US 101) provides east/west connections through the Valley. The Los Angeles – San Diego – San Luis Obispo (LOSSAN) Rail Corridor, in which both Amtrak and Metrolink provide passenger service, runs through the northern part of the Study Area.

The Westside within the Study Area is generally between Mulholland Drive and the Santa Monica Freeway (I-10) and includes a major regional attractor, the University of California, Los Angeles (UCLA). I-10 runs through the southern part of the Westside within the Study Area, and the Metro Expo Line includes three stations in the Study Area. The Metro Purple Line is being extended into the Westside in the Study Area and is slated to open in 2026. Between the Valley and the Westside lies the Sepulveda Pass, a highly constrained area with steep hillsides, some of which have been cut back to accommodate I-405 and are retained by walls. Within the Pass, I-405 has grades of five percent, with one section steeper than six percent.

The southernmost portion of the Study Area includes another major regional attractor, LAX. The Metro Crenshaw/LAX Line, currently under construction, will connect the LAX area to the Metro Expo Line at the Expo/Crenshaw Station about 4.5 miles outside of the Study Area, as well as to the South Bay via the Metro Green Line.



Figure ES-1. Study Area and Related Projects

Source: Sepulveda Mobility Partners, 2019

As shown in Figure ES-2, while residential land uses are spread throughout the Study Area, commercial land uses (both retail and office) that support high levels of employment tend to be clustered in a limited number of geographic areas, primarily in the Westside and the LAX area. This type of land use pattern can result in frequent travel by residents outside of their communities for work, leisure, or educational purposes.

Patterns of population and employment density follow from the distribution of land uses: areas with high concentrations of residential land uses, particularly multi-family residential uses, have high population densities; similarly, areas with high concentrations of commercial land uses, particularly office uses, have high employment densities.

As shown in Figure ES-3, several portions of the Study Area are densely populated, with the highest density located in parts of Westwood, West Los Angeles, and Brentwood on the Westside. As shown in Figure ES-4, the Westside also has the greatest concentration of jobs within the Study Area. Although there are some job centers within the Study Area in the Valley and the LAX area, those areas generally have substantially less density than the Westside. When population centers and employment centers are in different areas, many people’s daily activities require them to travel between the two areas.

Vehicle ownership is a key factor influencing transit ridership, as households without access to a personal vehicle are more likely to utilize transit. The Valley has the highest concentration of zero-vehicle households in the Study Area. In several areas, such as along Van Nuys Boulevard, more than 20 percent of households do not have a vehicle.

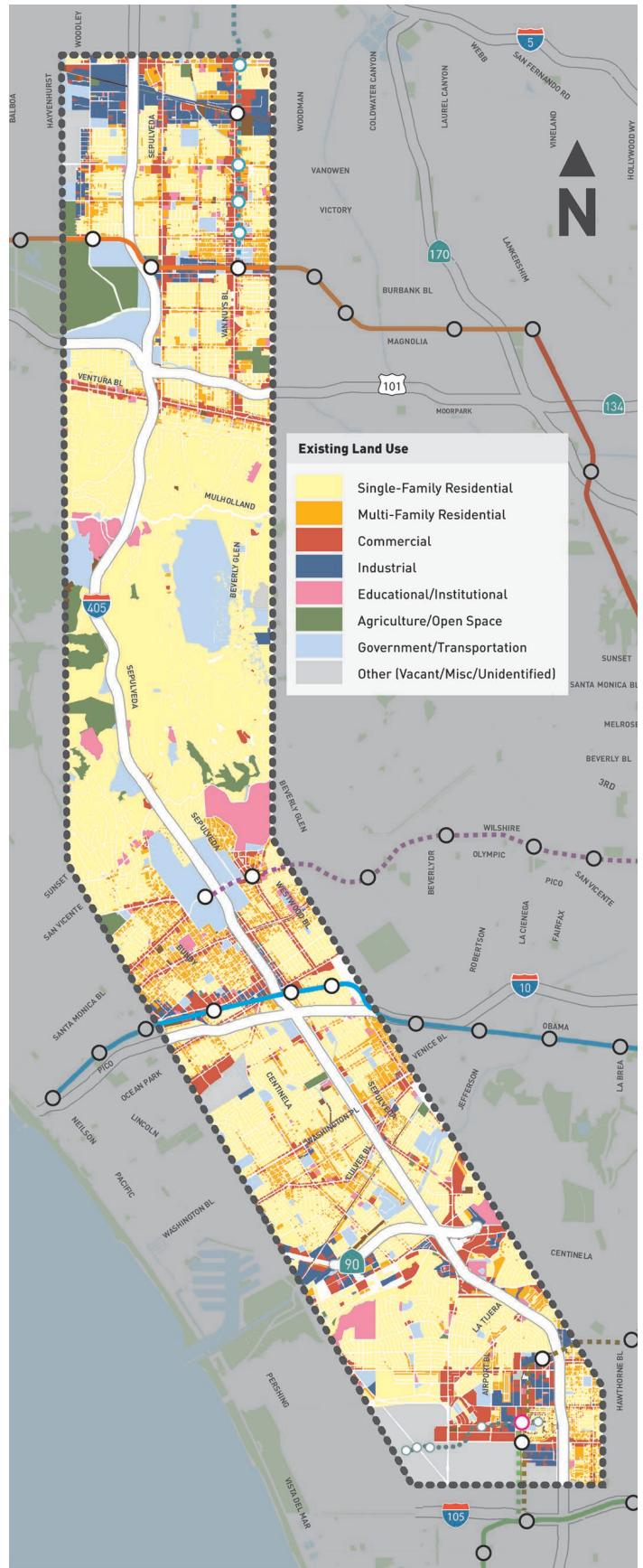


Figure ES-2. Existing Land Uses

Source: Los Angeles County Office of the Assessor, Property Tax Assessment Roll, 2016; Terry A. Hayes Associates, 2018

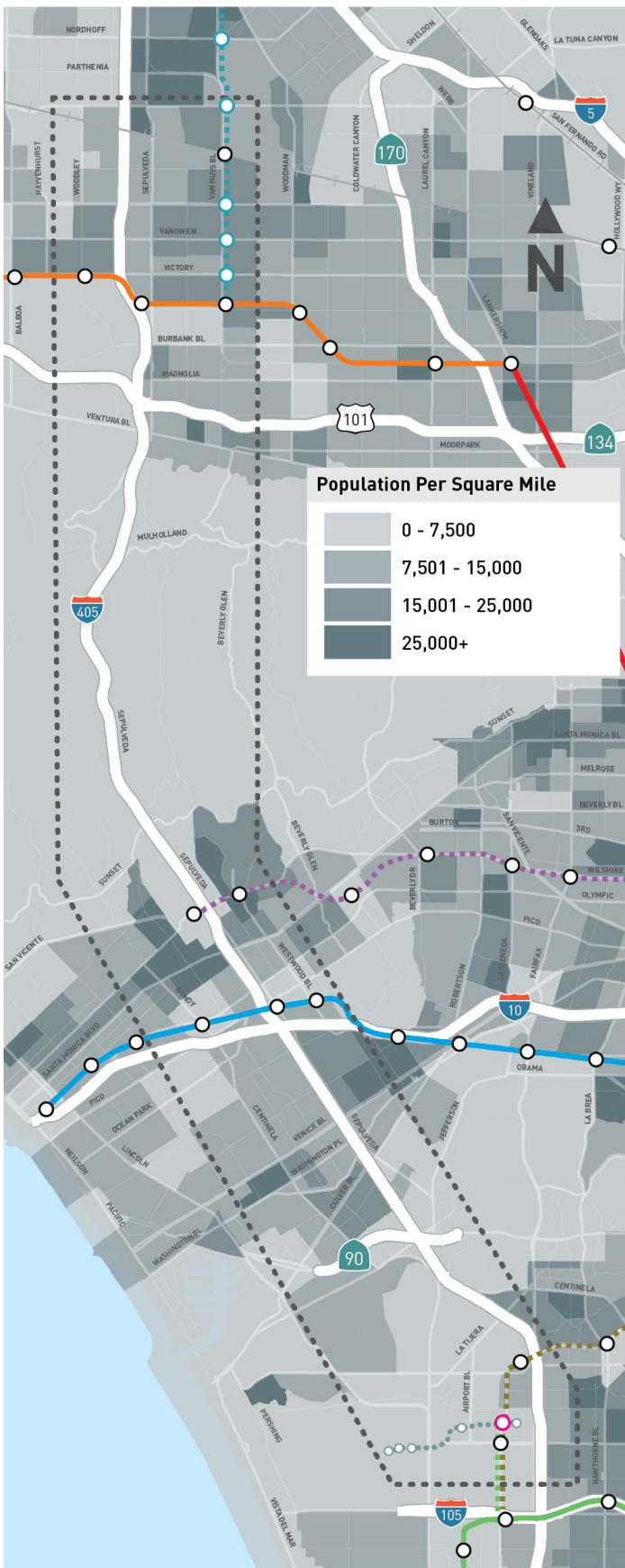


Figure ES-3. Population Density

Source: US Census American Community Survey, 2017; Fehr & Peers, 2018

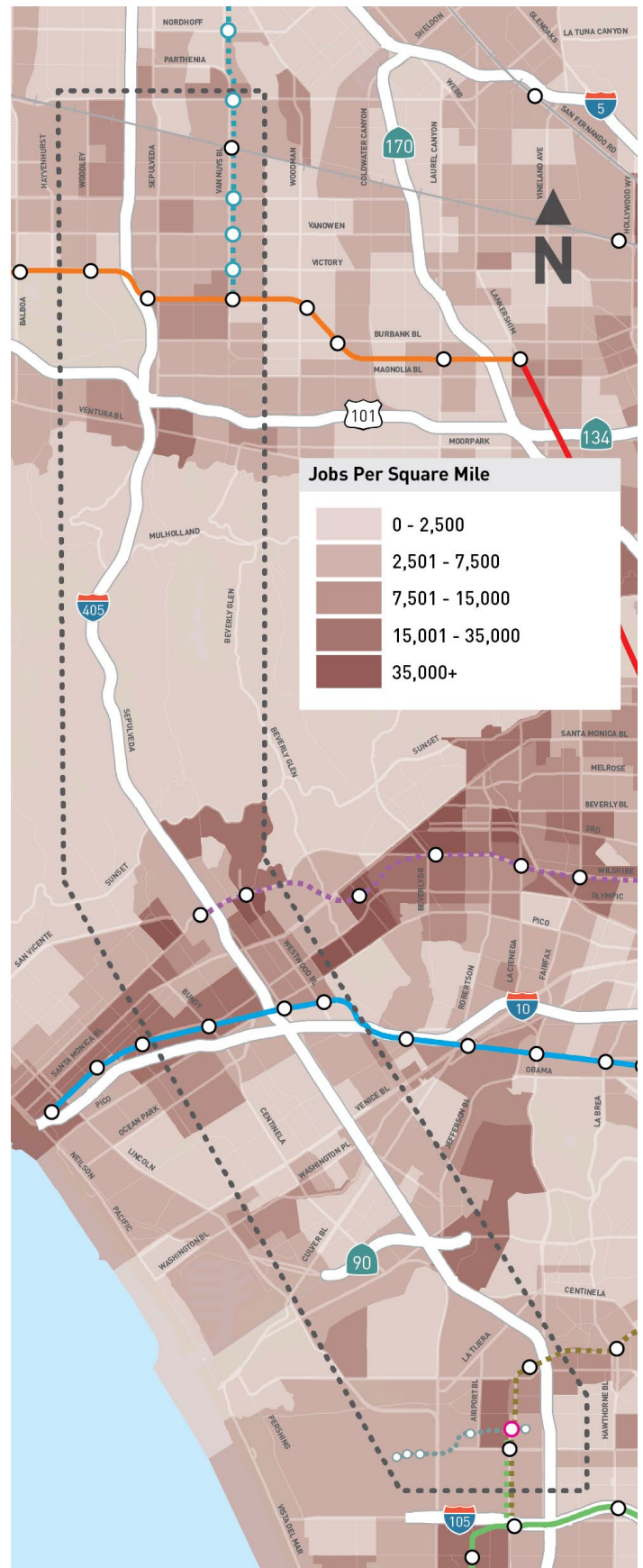


Figure ES-4. Job Density

Source: Longitudinal Employer-Household Dynamics, 2014; Fehr & Peers, 2018

Existing Transportation Conditions

To provide a measure of the volume of daily travel through the Sepulveda corridor made by private vehicles and by transit, total daily person throughput (all people moving through a corridor, whether carried in private vehicles or by transit) was calculated at two points along the Sepulveda corridor: in the Sepulveda Pass just north of Getty Center Drive and at Ballona Creek just north of SR 90. Figures ES-5 and ES-6 summarize the daily person throughput of the roadways at these two points, revealing a transit mode share of about two percent at each location.

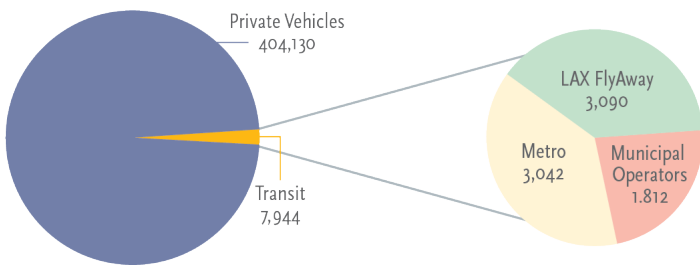


Figure ES-5. Daily Corridor Throughput in Sepulveda Pass

Source: Metro; Municipal operators; Los Angeles World Airports; Fehr & Peers, 2018

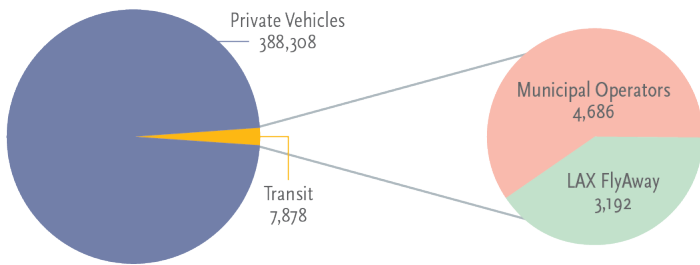


Figure ES-6. Daily Corridor Throughput at Ballona Creek

Source: Culver CityBus, Los Angeles World Airports; Fehr & Peers, 2018

Freeway Conditions

I-405 is heavily traveled throughout the Study Area, with daily volumes of over 300,000 vehicles and daily person throughput of over 400,000 people at some locations within the Study Area. The direction of the peak traffic demand varies over the course of the day, with the greatest demand for travel occurring from the Valley and LAX areas to the Westside during the morning commute period and the reverse pattern during the evening commute period.

The high level of demand on I-405 results in congestion and low travel speeds. Figure ES-7 shows travel speeds during the evening peak hour on I-405; the slowest speeds are generally for travel out of the Westside.

Transit Service

While Metro and municipal transit providers offer a broad range of services within the Study Area, transit connections between the Valley and the Westside are limited. Figure ES-8 displays the frequency of transit service on major corridors throughout the Study Area. The link through the Sepulveda Pass is currently served by routes offering infrequent service or by express services that operate only during peak commuter periods. These are summarized in Table ES-1.

Bus boardings are greatest along corridors that have higher-frequency service throughout the Study Area. Within the Valley, transit ridership is highest around the Metro Orange Line and north of the Metro Orange Line, with ridership decreasing southward until Ventura Boulevard. Boardings for local transit in the Valley are greatest along Van Nuys Boulevard.

Table ES-1. Performance Statistics for Rapid and Express Routes between the San Fernando Valley and the Westside

ROUTE	DESCRIPTION	SPAN OF SERVICE	PEAK-PERIOD HEADWAY	AVERAGE SPEED	ON-TIME PERFORMANCE
Metro Rapid 734	Sylmar to Metro Expo Line	18 hours per day	15-20 minutes	<15 mph	<50%
Metro Rapid 788	Panorama City to Metro Expo Line	Peak period only	15-20 minutes	<15 mph	<50%
LADOT Commuter Express 573	Granada Hills to Century City	Peak period only	10-15 minutes	17 mph	73%
LADOT Commuter Express 574	Sylmar to Redondo Beach	Peak period only	25-30 minutes	24 mph	65%
LAX FlyAway	Van Nuys to LAX	24 hours per day	15 minutes	N/A	N/A

Source: Metro on-time performance data, February-November 2017

Notes: Metro's *Transit Service Policy* (Metro, 2015) defines "on-time" as a bus arriving no more than 1 minute early or 5 minutes late at each time-point along a route.

LADOT = Los Angeles Department of Transportation; mph = miles per hour; N/A = not available

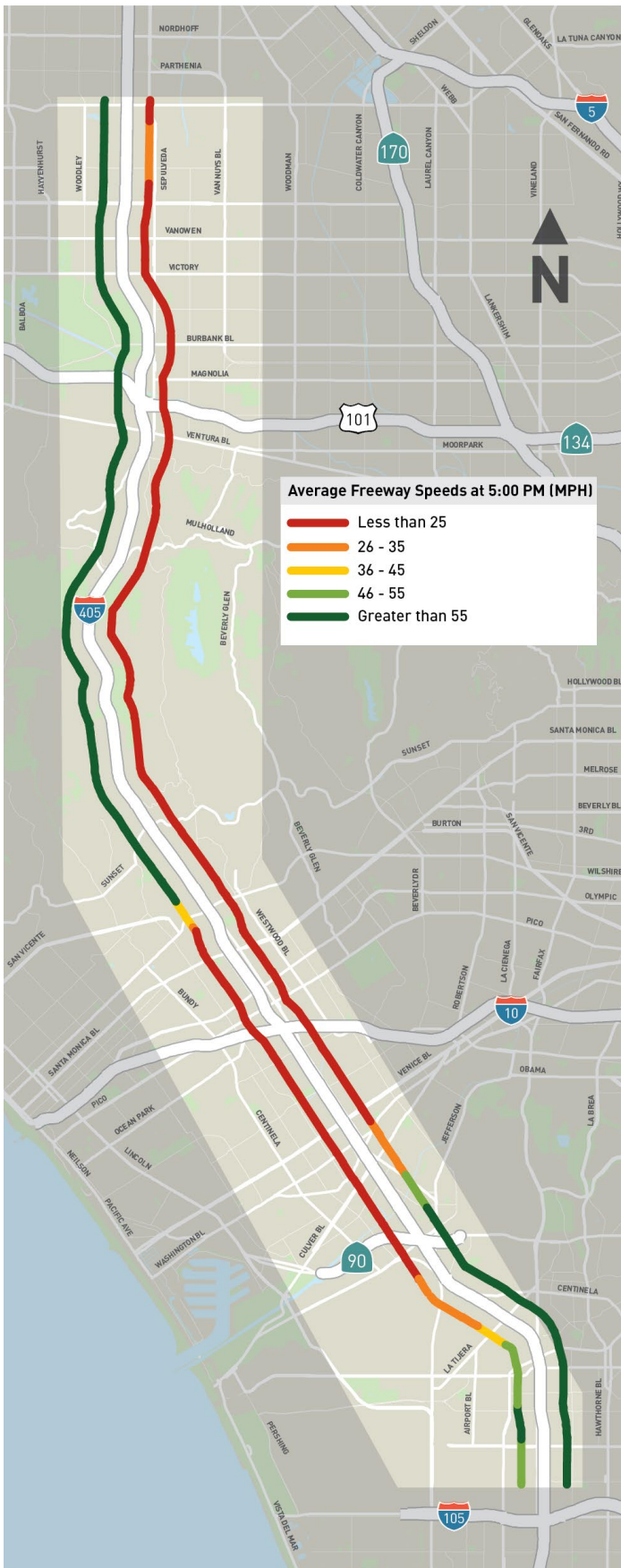


Figure ES-7. Average Speeds on I-405, PM Peak Hour

Source: INRIX; System Metrics Group, 2018

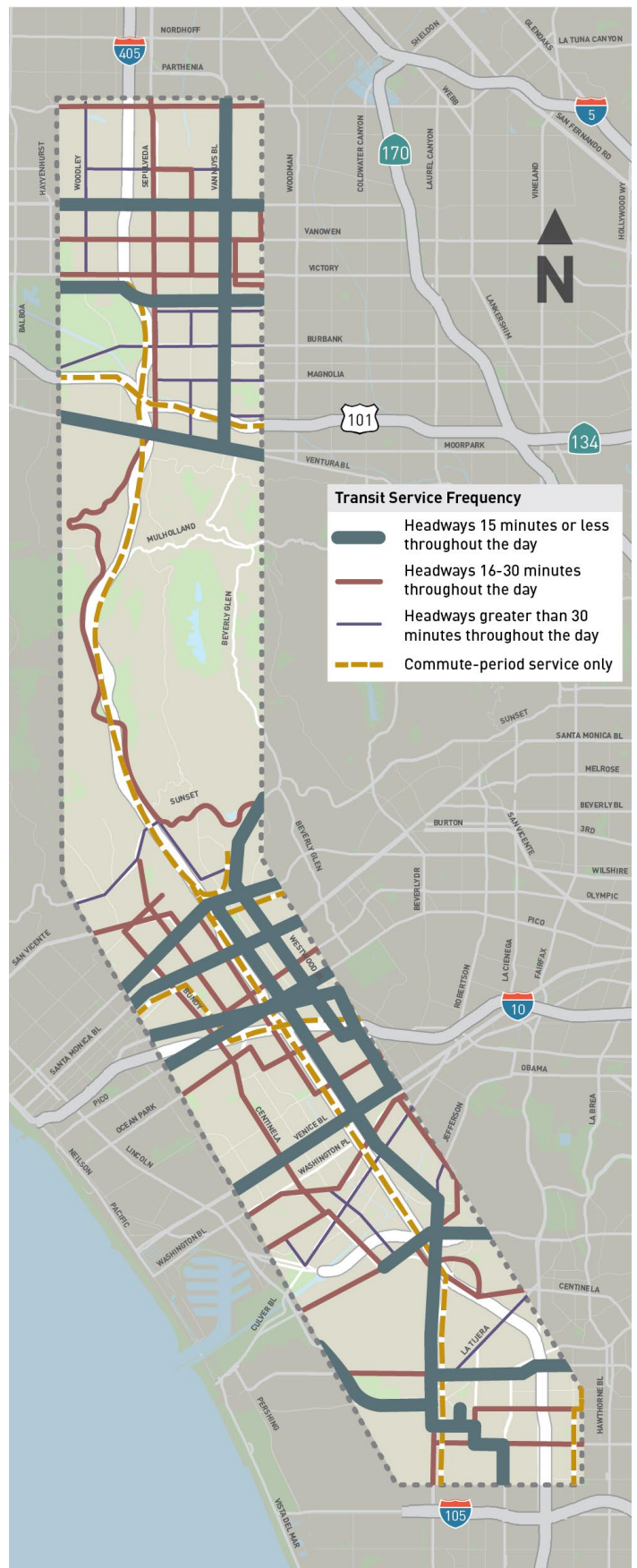


Figure ES-8. Transit Service Frequency

Source: Metro and Municipal Operators, 2018, Fehr & Peers, 2018

On the Westside, the greatest concentrations of transit boardings are in Westwood and on the UCLA campus where frequent headways are maintained throughout the day. Major roads with transit services at headways of 15 minutes or less also have many boardings.

Existing transit ridership is not as high in the LAX area as in the Valley or the Westside. The greatest concentrations of boardings within this area occur along Venice and Sepulveda Boulevards, as well as in the area immediately adjacent to LAX. As throughout the Study Area, these are the corridors with the most frequent transit service for this area, all with headways of 15 minutes or less.

Congestion on roadways and freeways in the Study Area affects transit service as well as privately operated vehicles, making travel times unpredictable and transit service unreliable. As shown in Table ES-1, the Metro bus services that currently operate on I-405 and Sepulveda Boulevard between the Valley and the Westside are on time less than 50 percent of the time during the morning and evening peak periods, and those operated by the Los Angeles Department of Transportation are on time less than 75 percent of the time.

Travel Patterns

In 2017, the Study Area produced approximately 2.26 million trips and attracted approximately 3.04 million trips each day. As much of the travel in the Study Area has an origin and/or destination outside the Study Area, a broader look at trips in the region is required to understand the type of travel demand served by the Sepulveda corridor.

Every trip has two ends—an origin and a destination. Pairs of trip ends with large numbers of trips between them constitute

major travel markets. Figure ES-9 illustrates the primary travel markets for trips through the Sepulveda Pass and across Ballona Creek.

Forecast Growth in Travel

Travel to and from the Study Area is forecast to increase; the total number of trips generated within the Study Area is forecast to grow by approximately 17 percent by 2042 and a total of 24 percent by 2057. This increase is in part the result of expected population and employment growth throughout the areas illustrated in Figure ES-9 that generate the most trips through the Sepulveda corridor, as summarized in Table ES-2.

Project Purpose

The Sepulveda corridor provides a crucial transportation link across the Santa Monica Mountains and through the Westside of Los Angeles, connecting the heavy concentration of households in the San Fernando Valley with major employment and activity centers on the Westside, including such major travel destinations as Westwood, UCLA, Century City, and LAX. More broadly, the corridor serves trips from throughout western Los Angeles County and beyond.

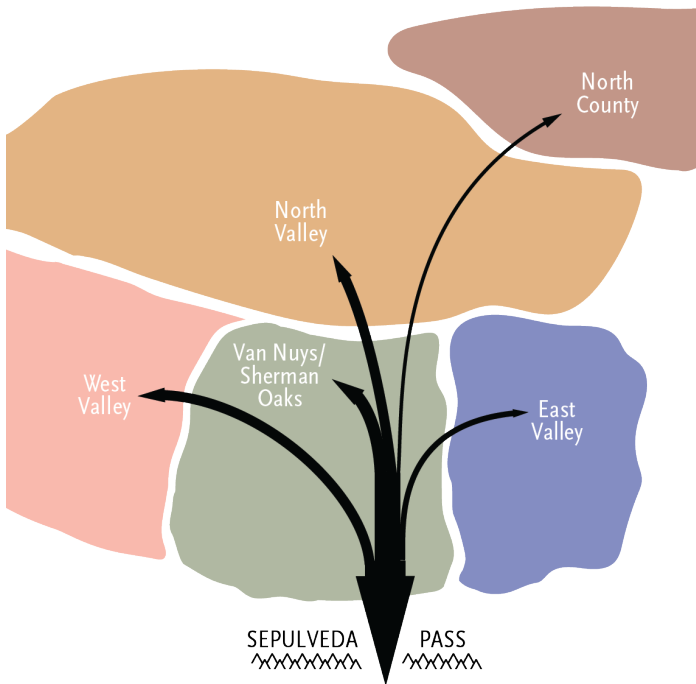
Based on the considerations discussed in this report, Metro has identified the following purpose for the Sepulveda Transit Corridor Project:

The purpose of the Project is to provide a high-quality transit service that effectively serves a large and growing travel market between the San Fernando Valley and the Westside, including the LAX area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit corridors.

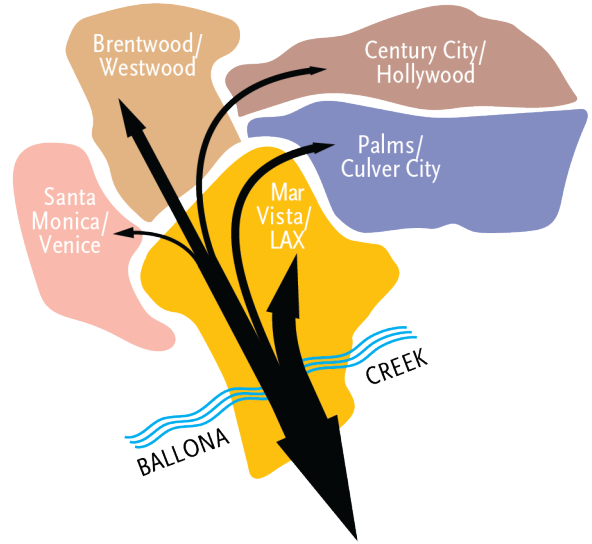
Table ES-2. Population and Employment Growth in Primary Areas Served by the Sepulveda Corridor

	2017	2042	GROWTH 2017-2042	2057	GROWTH 2017-2057
Population	7,741,310	8,807,877	13.8%	9,447,803	22.0%
Employment	3,370,911	4,058,268	20.4%	4,470,618	32.6%

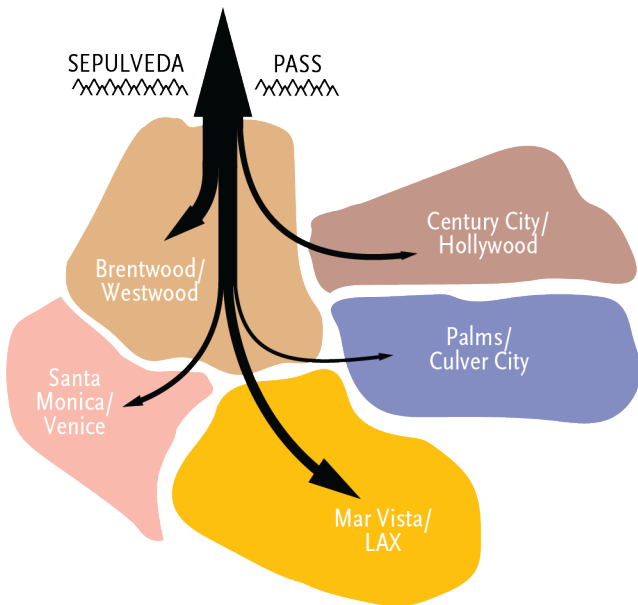
Source: Metro Travel Demand Model, 2017a



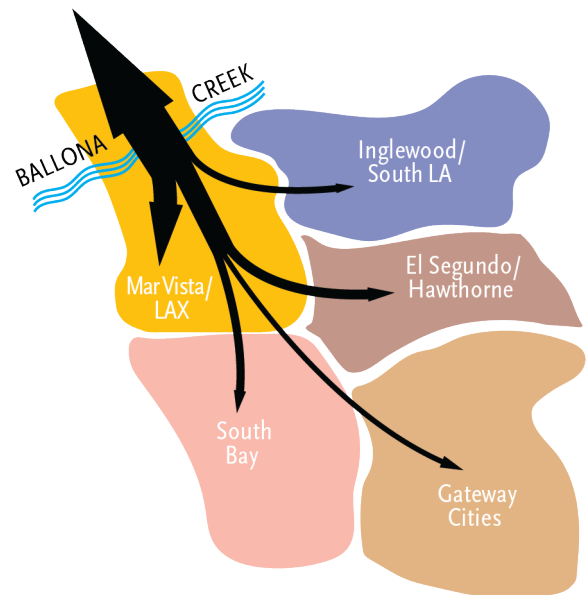
Panel A. The northern ends of trips through the Sepulveda Pass are primarily located in Van Nuys/Sherman Oaks, North Valley, West Valley, East Valley, and North County.



Panel C. The northern ends of trips across Ballona Creek are primarily located in Brentwood/Westwood, Mar Vista/LAX, Century City/Hollywood, Palms/Culver City, and Santa Monica/Venice.



Panel B. The southern ends of trips through the Sepulveda Pass are primarily located in Brentwood/Westwood, Mar Vista/LAX, Century City/Hollywood, Santa Monica/Venice, and Palms/Culver City.



Panel D. The southern ends of trips across Ballona Creek are primarily located in Mar Vista/LAX, El Segundo/Hawthorne, the South Bay, Gateway Cities, and Inglewood/South Los Angeles.

Figure ES-9. Primary Sources of Trips Through the Sepulveda Pass and Across Ballona Creek

Source: Sepulveda Mobility Partners, 2019

Note: Widths of arrows are proportional to the number of trips to/from each area.

ES-3 Evaluation Methodology

Goals and Objectives

Based on Metro's adopted *Performance Metrics Framework for Major Projects* (Metro, 2017b) and the Project's Purpose and Need, Metro has established the five goals listed in Table ES-3 for the Sepulveda Transit Corridor Project, along with objectives that support each goal.

Table ES-3. Project Goals and Objectives

IMPROVE MOBILITY
<ul style="list-style-type: none"> > Increase transit ridership by directly serving locations with the greatest potential for attracting new riders > Increase transit frequency and operating speeds > Reduce the need to transfer and/or the time spent transferring for the most common trips > Improve on-time performance > Provide sufficient capacity to accommodate anticipated demand > Provide convenient connections between existing and planned transit lines
IMPROVE EQUITY OF ACCESS
<ul style="list-style-type: none"> > Improve accessibility for residential and employment centers > Support transit-oriented communities (TOC) policies > Support first/last-mile connections > Promote investment in disadvantaged communities
PROTECT THE ENVIRONMENT AND SUPPORT COMMUNITY AND ECONOMIC DEVELOPMENT
<ul style="list-style-type: none"> > Reduce vehicle miles traveled (VMT) > Reduce air pollutant emissions > Minimize effects to communities > Minimize impacts to transportation network > Minimize other environmental impacts
PROVIDE A COST-EFFECTIVE SOLUTION
<ul style="list-style-type: none"> > Minimize cost to achieve benefits > Match cost to available funding
MINIMIZE PROJECT DELIVERY RISK
<ul style="list-style-type: none"> > Minimize potential for cost increases and delays

Source: Sepulveda Mobility Partners, 2018

Evaluation Process

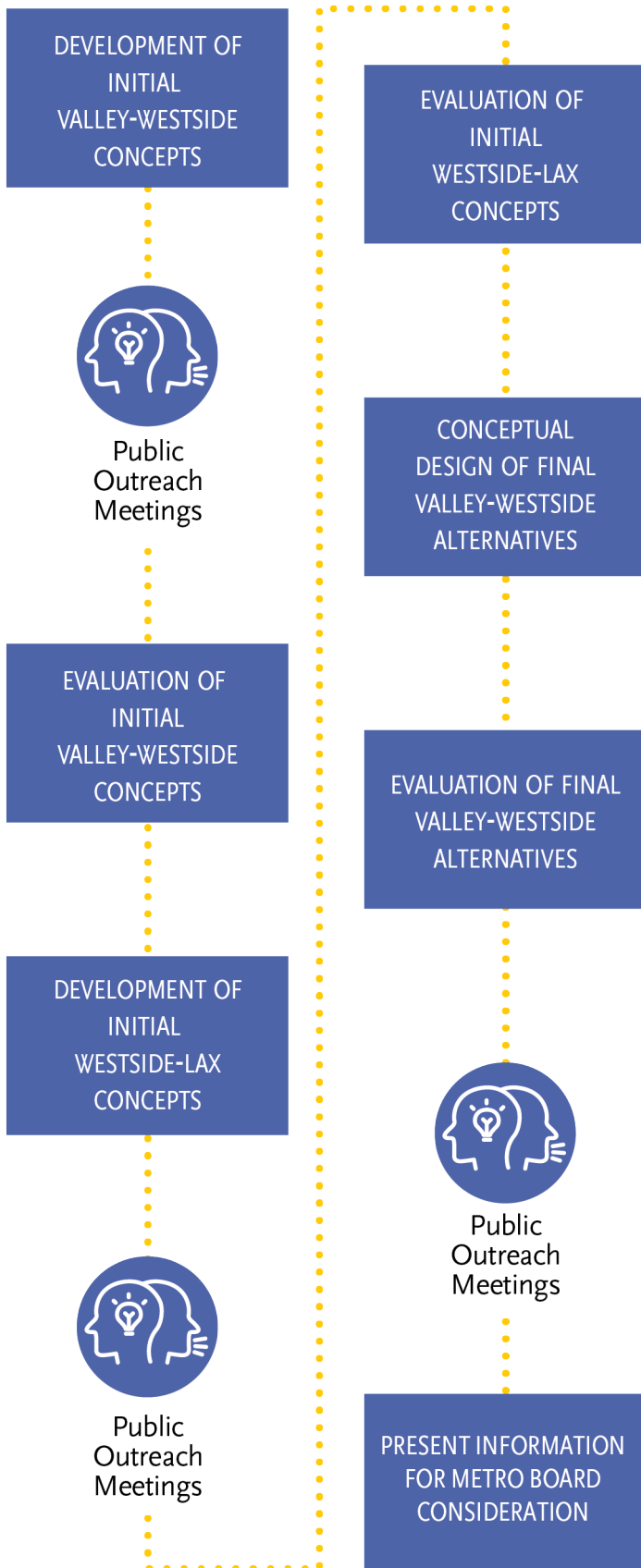
The sequential evaluation process began with transit concepts for the Valley-Westside segment, followed by extensions of those concepts in the Westside-LAX segment. Qualitative and quantitative evaluation criteria were derived from the Project's goals and objectives. At the initial screening stage, the measures relied on either qualitative or high-level quantitative data appropriate to the level of detail available about the transit concepts. During the detailed evaluation, alignments and station locations were more precisely defined, with ridership forecasts and community impacts reflecting this increased detail and the addition of cost and risk-related evaluation criteria.

Figure ES-10 illustrates the process of development and evaluation of the transit concepts. The development and evaluation of the concepts were informed by three rounds of public meetings and extensive agency coordination.

A set of initial transit concepts for the Valley-Westside segment was first evaluated using the high-level evaluation criteria, measuring performance on improving mobility, improving equity of access, and protecting the environment and supporting community and economic development.

Following the evaluation of the Valley-Westside concepts, transit concepts for the Westside-LAX segment were developed as extensions of those concepts. These concepts were then evaluated using the same high-level evaluation criteria.

The Valley-Westside concepts were developed into full alternatives, including specification of operating plans and support facilities, and conceptual designs were prepared for each alternative. Detailed evaluation was then conducted of the alternatives, and evaluation criteria for performance on all goals and objectives were applied for both the Valley-Westside segment and the Westside-LAX segment.



ES-4 Development and Screening of Initial Concepts

Screening of Modes, Termini, Alignment Segments, and Configurations

After a review of the characteristics of a variety of transit technologies and their applicability in the Sepulveda corridor, four modes that were proven in revenue operations, able to operate at high speeds, and that employ a vehicle design capable of quickly loading and unloading passengers were selected for development of the initial transit concepts: heavy rail transit (HRT), light rail transit (LRT), monorail, and rubber-tire trains. The monorail and rubber-tire modes were selected for evaluation because of their unique ability to traverse the grades in the Sepulveda Pass. Because of the similar performance characteristics of these two modes, they were identified as monorail/rubber-tire transit (MRT) and considered to be equivalent in the evaluation of the transit concepts.

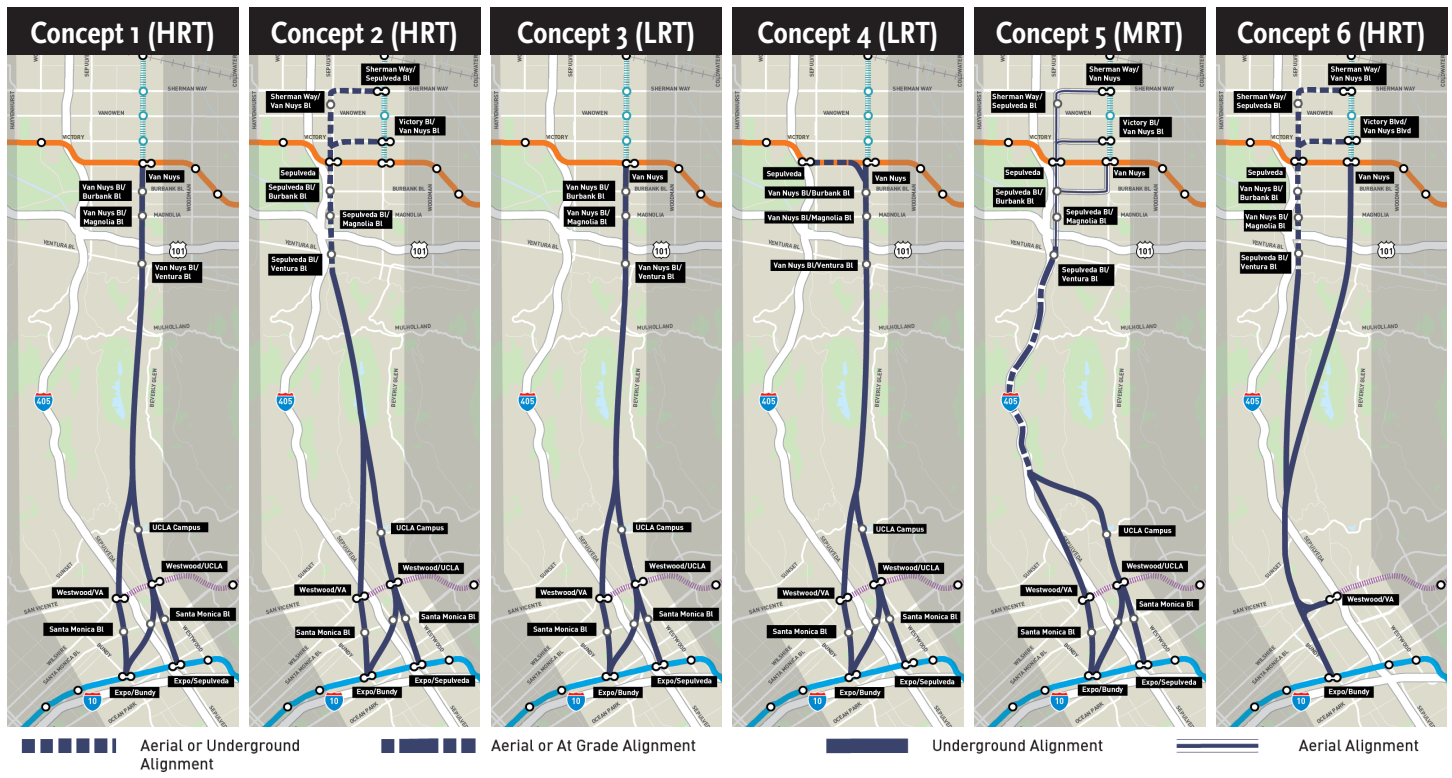
Following the selection of modes to study, southern termini at each of the Metro Expo Line stations within the Study Area were considered, and connection points to the Metro Orange Line at each of the Metro Orange Line stations within the Study Area were considered. The significantly lower existing ridership of the Metro Expo Line Westwood/Rancho Park Station and the Metro Orange Line Woodley Station compared to the other stations on their respective lines and the low density, residential nature of their surrounding land uses led these potential termini to be dismissed from consideration early in the alternative development process.

Alignments were identified that followed roadway rights-of-way or connected potential termini directly. These alignments were screened based on major physical constraints and the ability to connect key activity centers. The design configurations considered for the initial Valley-Westside transit concepts included at grade, aerial, and below grade; the applicability of each configuration was determined based on the physical characteristics of the alignment.

The screening of alignments and configurations resulted in the development of several HRT, LRT, and MRT concepts for initial evaluation, including public review and comment. The initial alignment concepts, alternative termini, and general station locations are shown in Figure ES-11. Transit concepts considered included new lines for the Metro system, extensions of the East San Fernando Valley Light Rail Transit Corridor, and an extension of the Metro Purple Line.

Figure ES-10. Process for Developing and Evaluating Transit Concepts

Source: Sepulveda Mobility Partners, 2018



<p>CONCEPT 1 (HRT)</p> <ul style="list-style-type: none"> > Northern terminus at Metro Orange Line Van Nuys Station > Total alignment length of approximately 10 miles 	<p>CONCEPT 2 (HRT)</p> <ul style="list-style-type: none"> > Northern terminus at Metro East San Fernando Valley Light Rail Transit Corridor Sherman Way or Victory Boulevard Stations > Total alignment length of approximately 9 to 14 miles (3 to 5 miles of aerial guideway) 	<p>CONCEPT 3 (LRT)</p> <ul style="list-style-type: none"> > Northern endpoint at Sylmar/San Fernando Metrolink Station > Two train routings. Every other train would: <ul style="list-style-type: none"> • Continue north to serve East San Fernando Valley Light Rail Transit Corridor stations • Turn around at Metro Orange Line Van Nuys Station and continue southbound service > Total new alignment length of approximately 10 miles
<p>CONCEPT 4 (LRT)</p> <ul style="list-style-type: none"> > Northern endpoints at both Sylmar/San Fernando Metrolink Station and Metro Orange Line Sepulveda Station > Two train routings. Every other train would: <ul style="list-style-type: none"> • Continue north to serve East San Fernando Valley Light Rail Transit Corridor stations • Branch west to Metro Orange Line Sepulveda Station > Total new alignment length of approximately 11 miles, including up to 1 mile of aerial guideway 	<p>CONCEPT 5 (MRT)</p> <ul style="list-style-type: none"> > Northern endpoint at either: <ul style="list-style-type: none"> • Sherman Way • Victory Boulevard • Metro Orange Line Van Nuys Station > Total alignment length of approximately 10 to 15 miles (7 to 9 miles of aerial guideway) 	<p>CONCEPT 6 (HRT)</p> <ul style="list-style-type: none"> > Extension of Purple Line to Metro Orange Line > Northern endpoint at Metro Orange Line Van Nuys Station or East San Fernando Valley Light Rail Transit Corridor Sherman Way or Victory Boulevard Station > Trains would follow three routings: <ul style="list-style-type: none"> • Metro Orange Line to Downtown LA • Metro Orange Line to Metro Expo Line • Downtown LA to Metro Expo Line > Total alignment length of approximately 9 to 15 miles (4 to 5 miles of aerial guideway)

Figure ES-11. Initial Valley-Westside Concepts

Source: Sepulveda Mobility Partners, 2018

Initial Screening

To evaluate the project goal to improve mobility, ridership forecasts were conducted for the year 2042 and included all projects identified as being completed by 2042 in the *Measure M Expenditure Plan* (Metro, 2016a). Figure ES-12 compares the ridership performance of each concept.

Closer inspection of the ridership forecasts revealed that demand in the Sepulveda corridor would be so great that all concepts would increase the demand on the East San Fernando Valley Light Rail Transit Corridor near or beyond its planned capacity, as shown in Figure ES-13. The over-capacity conditions would be most severe for the LRT concepts (Concepts 3 and 4), on which the peak passenger load between the Metrolink Van Nuys Station and the Metro Orange Line would exceed the line's hourly capacity by thousands of riders.

Because of the inability of the connecting service on the East San Fernando Valley Light Rail Transit Corridor to

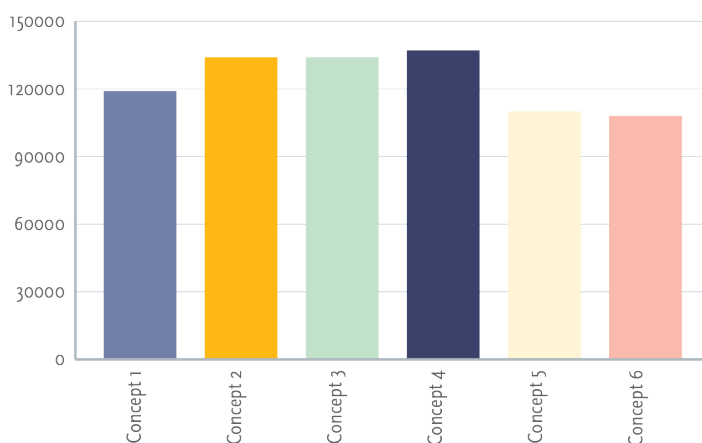


Figure ES-12. Daily Boardings on Initial Concepts

Source: Sepulveda Mobility Partners, 2018

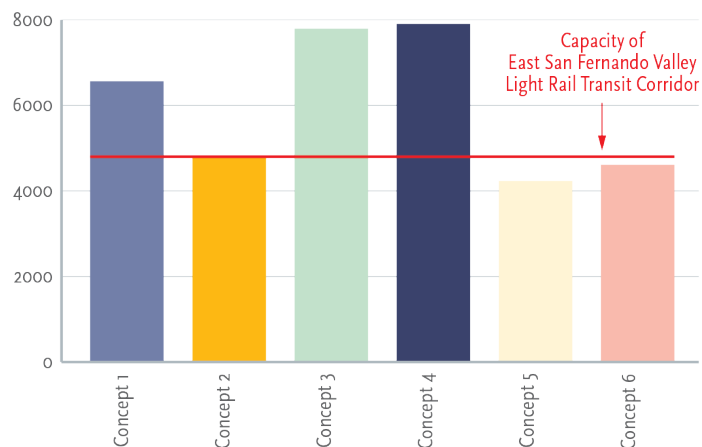


Figure ES-13. East San Fernando Valley Light Rail Transit Corridor Peak Load

Source: Sepulveda Mobility Partners, 2018

Note: LRT capacity of 4,800 passengers per hour is based on a 3-car train running at a 5-minute headway, with each car accommodating approximately 133 passengers.

accommodate the demand attracted by the Sepulveda Transit Corridor Project, none of the initial transit concepts would be able to fully address the Project's Purpose and Need. Therefore, refined concepts were developed for the Valley-Westside.

Refined Valley-Westside Concepts

To serve the demand to access the Sepulveda corridor from the north, the HRT and MRT initial concepts were refined and extended farther north, alleviating passenger loads on the East San Fernando Valley Light Rail Transit Corridor. Additionally, because the option to connect to the Purple Line at the Westwood/VA Station performed poorly in terms of ridership compared to the option to connect at the Westwood/UCLA Station, this option was eliminated from consideration. The refined concepts are illustrated in Figure ES-14.

The LRT concepts (Concepts 3 and 4) were eliminated from further consideration because they could not be refined to provide additional capacity between the Metrolink Van Nuys Station and the Metro Orange Line. The Purple Line Extension (Concept 6) was eliminated because its inability to support a UCLA campus station resulted in the lowest ridership. The remaining concepts were regrouped by mode.

Why not refine LRT?

- > Additional capacity cannot be provided by operating longer LRT trains because longer trains and station platforms on the East San Fernando Valley Light Rail Transit Corridor would block cross streets in the San Fernando Valley.
- > Changing the design of the East San Fernando Valley Light Rail Transit Corridor to support longer trains and/or more frequent service would require grade separations and reduction in the number of stations, changing the local-serving nature of the planned line.

Why not refine the Purple Line extension?

- > An extension of the Purple Line past the Westwood/VA Station would not allow for a station on the UCLA campus, resulting in lower ridership than other concepts.
- > An extension of the Purple Line providing service to both the north and the south would require a complex three-way junction, which would increase property and construction impacts.

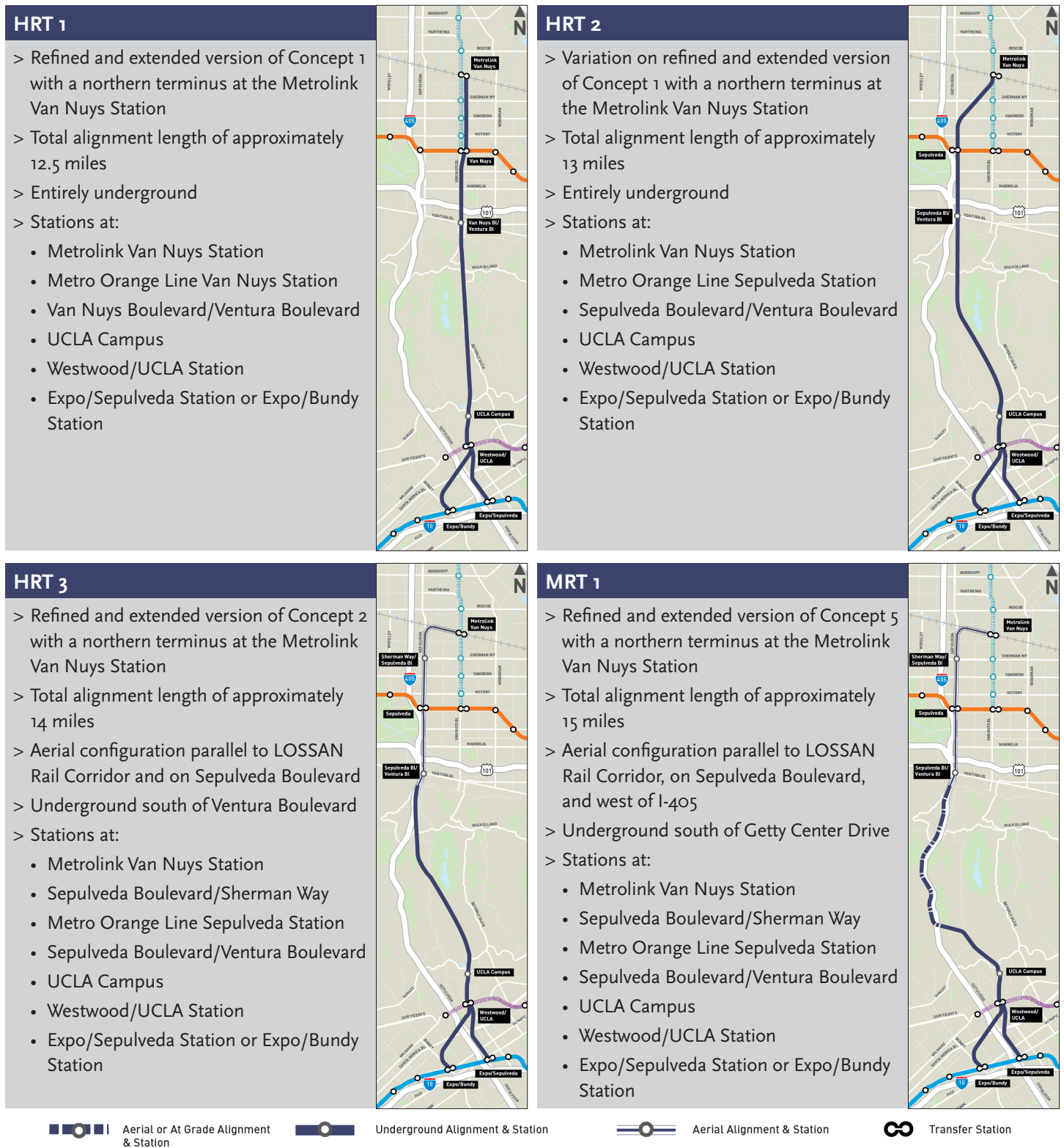


Figure ES-14. Refined Valley-Westside Concepts

Source: Sepulveda Mobility Partners, 2018

Note: Alignment lengths are for option to Expo/Sepulveda. Alignments to Expo/Bundy are approximately 0.5 mile longer.

Evaluation of Refined Concepts

To evaluate the performance of the refined concepts and to confirm that all address the Project's Purpose and Need, the same evaluation criteria that had been applied to the initial concepts were applied to the refined concepts.

Improve Mobility

HRT 3 is forecast to have the highest ridership, as shown in Figure ES-15. However, it would attract some of its riders from people who might otherwise use the East San Fernando Valley Light Rail Transit Corridor. Although all concepts would increase ridership on the East San Fernando Valley Light Rail Transit Corridor, boardings on that project would be lower under HRT 3 than under the other HRT concepts. HRT 1 would have the fastest end-to-end travel time, as shown in Figure ES-16. The concepts all performed similarly on the other objectives for this goal.

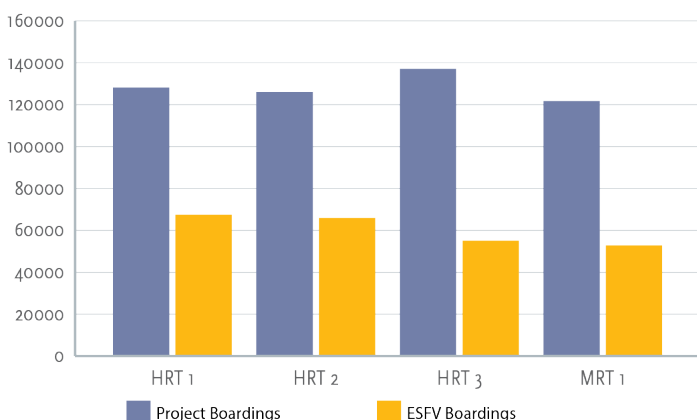


Figure ES-15. Daily Boardings on Refined Concepts

Source: Sepulveda Mobility Partners, 2018

Note: ESFV = East San Fernando Valley Light Rail Transit Corridor

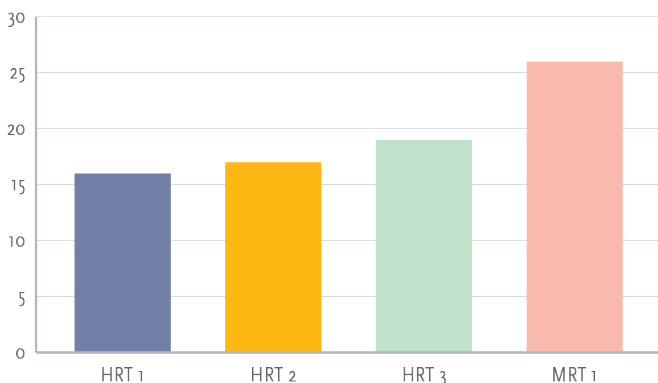


Figure ES-16. Travel Time (in Minutes) for Refined Concepts, Metrolink to Metro Expo Line

Source: Sepulveda Mobility Partners, 2018

Improve Equity of Access

All refined concepts have the same station options on the Westside and the same northern terminus at the Metrolink Van Nuys Station. Therefore, the evaluation of equity of access measures focused on stations that differ across the concepts—intermediate stations on Van Nuys Boulevard and Sepulveda Boulevard in the Valley. Stations on Van Nuys Boulevard generally perform better on equity of access measures than do stations on Sepulveda Boulevard, with more zoning supportive of transit-oriented communities (TOC) and proximity to more minority, low-income, and zero-car households.

Protect the Environment and Support Community and Economic Development

The refined concepts that attract greater ridership also reduce vehicle miles traveled (VMT) and vehicle hours traveled (VHT) the most, which would in turn reduce particulate and greenhouse gas emissions. With the highest ridership, HRT 3 would provide the greatest reductions in VMT and VHT. HRT 1 and HRT 2 would be entirely underground, limiting most potential environmental and community impacts to station areas. HRT 3 and MRT 1, which have aboveground segments, have greater potential visual, construction, and transportation impacts.

Recommendation of Concepts for Further Study

All four concepts were recommended for development into alternatives for further study, including preparation of conceptual drawings. While concepts include only route alignments and train frequencies during peak and off-peak hours, alternatives include all the features required to operate a transit system, such as operating plans throughout the day, calculations of the required size of the vehicle fleet, and identification of ancillary facilities, including a maintenance and storage facility (MSF) for the rail vehicles. The concepts were recommended for development into alternatives for the following reasons:

- > HRT 1 would have the fastest end-to-end travel time and preserves an option on Van Nuys Boulevard in the Valley if any engineering challenges on Sepulveda Boulevard prove to be prohibitive.
- > HRT 2 preserves a tunnel option on Sepulveda Boulevard if any engineering challenges on Van Nuys Boulevard prove to be prohibitive.
- > HRT 3 would have the highest daily project boardings, and its aerial section has the potential to provide a lower-cost alternative to the other HRT concepts.
- > MRT 1 has a longer aerial section with the potential to provide a lower-cost alternative to the HRT concepts.

ES-5 Final Valley-Westside Alternatives

The four refined concepts were developed into final alternatives, including all the features required to operate a transit system, such as operating plans throughout the day, calculations of the required size of the vehicle fleet, and identification of ancillary facilities, including an MSF. The alignments

of each of the final alternatives extend between the Metro Expo Line in the south and the Metrolink Van Nuys Station in the north. The alignments and station locations of the four final alternatives are illustrated in Figure ES-17. All stations would be underground or aerial, depending on the vertical configuration of the alignment at each station location.

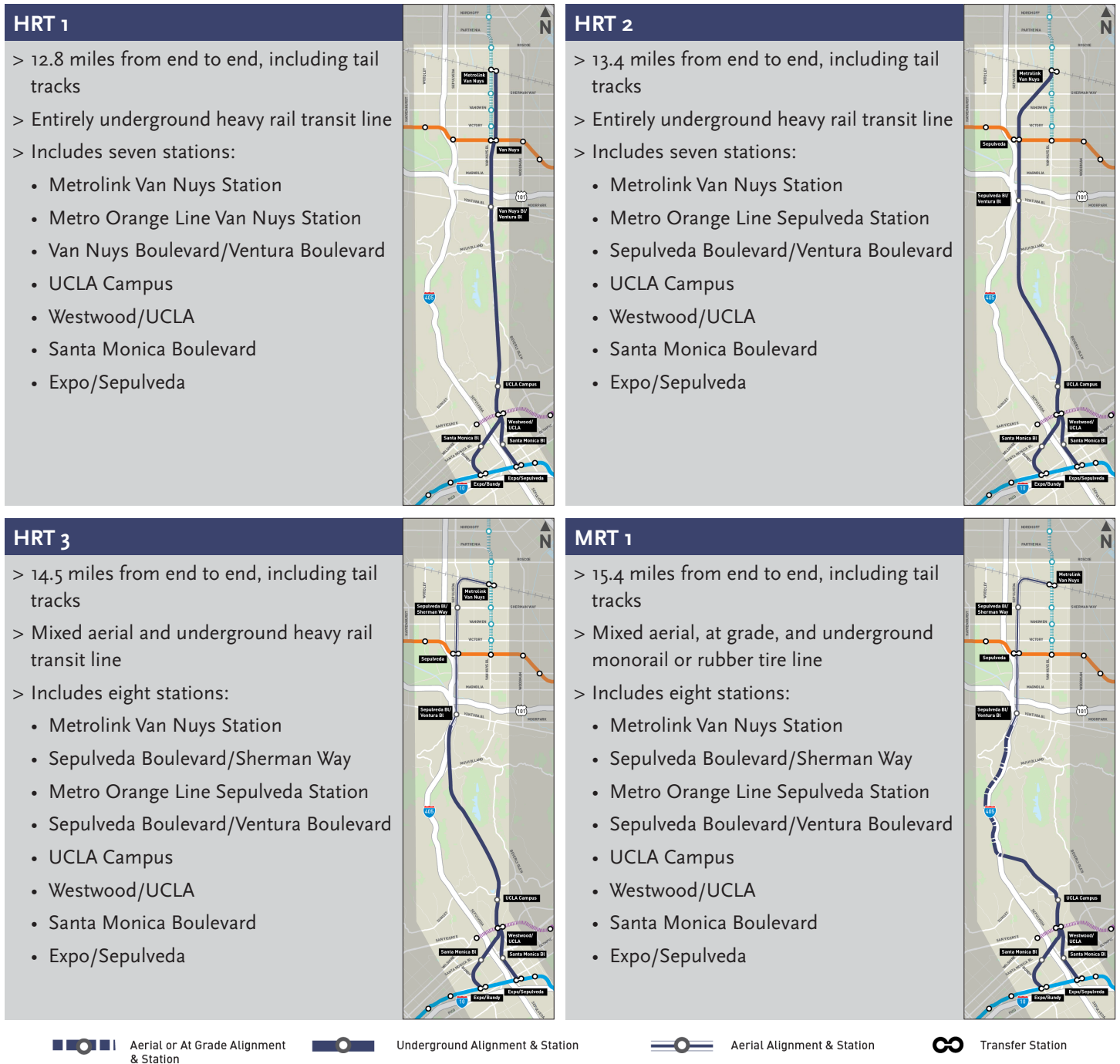


Figure ES-17. Final Valley-Westside Alternatives

Source: Sepulveda Mobility Partners, 2019

Note: Alignment lengths are for option to Expo/Sepulveda. Alignments to Expo/Bundy are approximately 0.5 mile longer.



Figure ES-18. Westside Alignment Option

Source: Sepulveda Mobility Partners, 2019

In the Westside, the base alignment for all alternatives was defined as having a southern terminus at the Expo/Sepulveda Station and a connection to the Metro Purple Line Westwood/UCLA Station at Westwood Boulevard. Two additional alignment options on the Westside, illustrated in Figure ES-18, were developed to provide different ways to connect to the Metro Purple Line and Metro Expo Line:

- > Sepulveda-Gayley Alignment Option
 - Southern terminus at Expo/Sepulveda Station
 - Santa Monica Boulevard Station at Bentley Avenue
 - Station directly under Metro Purple Line Westwood/UCLA Station at Gayley Avenue/Midvale Avenue
- > Bundy-Veteran Alignment Option
 - Southern terminus at Expo/Bundy Station
 - Santa Monica Boulevard Station at Purdue Avenue
 - Station under Veteran Avenue at Wilshire Boulevard with underground pedestrian connection to Metro Purple Line Westwood/UCLA Station



Could an alignment be located in the I-405 median?

A number of major constraints would make an aerial alignment in the median of I-405 challenging:

- > **I-405 ExpressLanes Project.** The combination of an aerial transit guideway and the addition of one lane in each direction would require widening of the freeway in this very constrained area.
- > **Columns in the median supporting the transit guideway.** On curves, these columns would block drivers' view of stopped vehicles or other obstructions, violating Caltrans' safety and design standards.
- > **I-405 has no median between US 101 and Sherman Way.** Adding columns to support a transit guideway in this area would require widening the freeway, which is constrained in this area.
- > **Drainage Infrastructure.** In many parts of the freeway, storm drains are in the median and a drainage pipe is underneath the median to prevent flooding. The foundations of columns for a transit guideway would conflict with these facilities.

Tunnel Configuration Options

Metro’s standard tunnel configuration consists of two tunnels, each approximately 20 feet in diameter. This “twin-bore” configuration, illustrated in Figure ES-19, accommodates one set of tracks in each tunnel and would require mining of cross-passages between the tunnels and up to two vertical shafts in the mountains for ventilation to meet Metro safety standards. A tunnel configuration option consisting of twin-bore 27-foot-diameter tunnels, illustrated in Figure ES-20, would allow for a longitudinal ventilation duct to be incorporated into each tunnel, eliminating the need for ventilation shafts in the mountains but would still require mining of cross-passages. Alternatively, a single-bore 40-foot-diameter tunnel, illustrated in Figure ES-21, would accommodate both sets of tracks and ventilation ducts in a single tunnel, eliminating the need for mined cross-passages and for ventilation shafts.

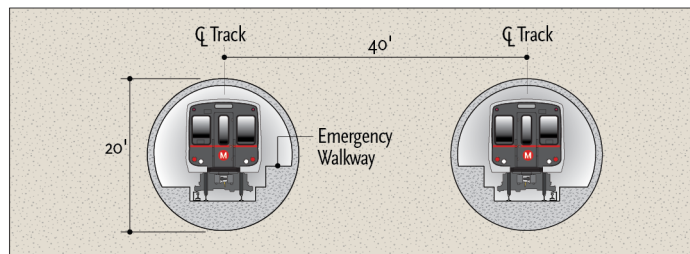


Figure ES-19. Twin-Bore Tunnel Configuration (20' Diameter)

Source: Sepulveda Mobility Partners, 2019

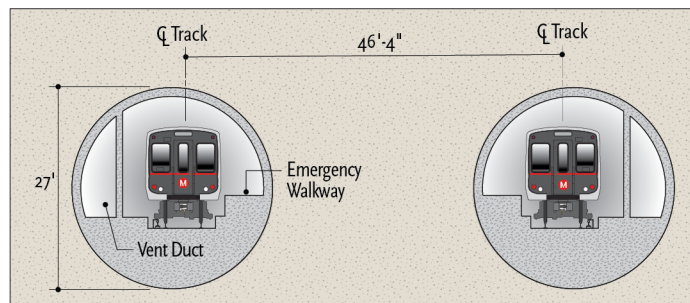


Figure ES-20. Twin-Bore Tunnel Configuration (27' Diameter)

Source: Sepulveda Mobility Partners, 2019

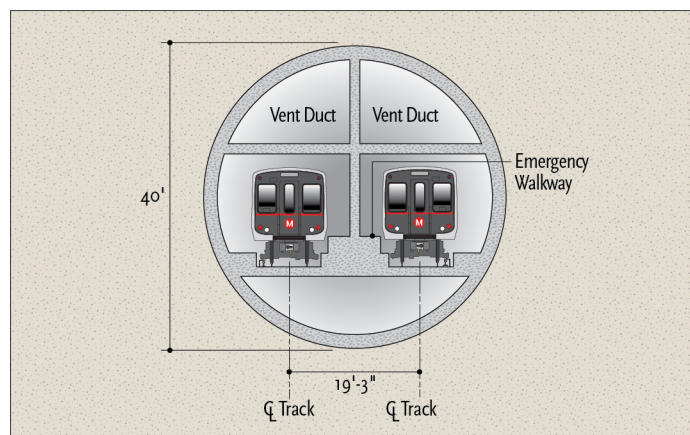


Figure ES-21. Single-Bore Tunnel Configuration (40' Diameter)

Source: Sepulveda Mobility Partners, 2019

Tunnels would generally be constructed using tunnel boring machines (TBM) operating below the ground surface, leaving the ground above the tunnel undisturbed (except at the TBM launch and retrieval locations). Underground stations and crossovers to allow trains to switch tracks would generally be constructed by excavating from the ground surface. With the single-bore configuration, crossovers can be constructed within the tunnel created by the TBM since both tracks are in the single tunnel, further reducing disruption at the surface.

Maintenance and Storage Facility

All alternatives would require an MSF sized to accommodate its fleet. The MSF would be a stand-alone facility capable of performing all levels of service and maintenance of the HRT or MRT vehicles, including overnight storage of vehicles. The MSF would also include facilities for the storage and maintenance of equipment for maintaining the guideway and right-of-way.

During the development of the alternatives, the availability of suitable, industrially zoned land adjacent to the refined concepts was reviewed, and three potential MSF sites were identified:

- > Sepulveda Boulevard at Nebraska Avenue: This 26-acre site is located between I-405 and Sepulveda Boulevard, south of Nebraska Avenue and north of Olympic Boulevard. It could serve all alternatives.
- > Van Nuys Boulevard at Arminta Street: This 25-acre site is located on the north side of Arminta Street, east of Van Nuys Boulevard. It could serve HRT 1 and HRT 2.
- > Metrolink at Woodman Avenue: This 39-acre site is located south of the LOSSAN Rail Corridor, west of Hazeltine Avenue and east of Woodman Avenue. It could serve HRT 3 and MRT 1.

ES-6 Comparative Performance Analysis of Valley-Westside Alternatives

The alternatives were evaluated for their ability to meet the five project goals—improve mobility, improve equity of access, protect the environment and support community and economic development, provide a cost-effective solution, and minimize risk—using evaluation criteria more detailed than those used to evaluate the initial and refined concepts. Table ES-4 compares key results of the evaluation by alternative.

Improve Mobility

HRT 1 and HRT 3 each perform strongly on different measures of mobility improvement. Overall, HRT 3 would have the highest number of daily boardings, new transit trips, and hours of daily time savings, while HRT 1 links major origins and destinations most quickly and directly.

Table ES-4. Performance of Alternatives on Select Project Objectives and Evaluation Measures

MEASURE		HRT 1	HRT 2	HRT 3	MRT 1
Improve Mobility					
Objective: Increase transit ridership by directly serving origin-destination pairs with greatest potential for attracting new riders					
Daily boardings		128,246	126,078	137,177	121,740
New transit trips		54,108	53,691	57,608	49,815
Objective: Increase transit frequency and operating speeds					
Average operating speed (miles per hour)		45.4	42.2	43.6	34.5
Travel time from Metrolink to Expo Line		16 minutes	17 minutes	19 minutes	26 minutes
Daily time savings (hours)		41,307	41,180	43,826	40,400
Improve Equity of Access¹					
Objective: Improve accessibility for residential and employment centers					
2042 population density (persons per square mile)	Metro Orange Line	17,176		7,129	
	Ventura Boulevard	12,809		11,480	
2042 employment density (jobs per square mile)	Metro Orange Line	12,862		13,275	
	Ventura Boulevard	12,050		21,974	
Objective: Investment in disadvantaged communities					
Low-income residents		3,977		792	
Minority residents		8,791		3,070	
Zero-car households		761		190	
Number of low-income riders		81,500	80,200	87,600	79,900
Protect the Environment and Support Community and Economic Development					
Objective: Reduce VMT					
Regional VMT reduction		991,600	985,900	1,038,600	861,800
Objective: Reduce air pollutant emissions					
Regional VHT reduction		69,500	68,700	72,000	60,100
Objective: Minimize effects to communities					
Potential for property impacts		Likely impact	Likely impact	Likely impact	Likely impact
Potential for visual impacts		Unlikely to impact	Unlikely to impact	Likely impact	Likely impact
Objective: Minimize other environmental impacts					
Environmental justice		Potential impact	Potential impact	Likely impact	Likely impact
Noise and vibration		Potential impact	Potential impact	Likely impact	Likely impact
Provide a Cost-Effective Solution					
Objective: Minimize cost to achieve benefits					
Capital cost		\$10.9 to \$13.4 billion	\$11.0 to \$13.6 billion	\$10.0 to \$12.4 billion	\$9.4 to \$11.6 billion
Annual O&M cost		\$112 to 119 million	\$112 to \$129 million	\$123 to \$137 million	\$84 to \$92 million
Annualized capital and O&M cost per project trip		\$9.85 to \$11.69	\$10.13 to \$12.28	\$9.27 to \$11.11	\$9.26 to \$11.15
Cost per hour of time savings		\$30.58 to \$36.30	\$31.03 to \$37.61	\$29.02 to \$34.77	\$27.90 to \$33.58

Table ES-4. Performance of Alternatives on Select Project Objectives and Evaluation Measures (continued)

MEASURE	HRT 1	HRT 2	HRT 3	MRT 1
Minimize Risk				
Objective: Minimize potential for cost increases and delays				
Qualitative assessment of unresolved major engineering challenges	> Potential construction conflict with East San Fernando Valley Light Rail Transit Corridor	> Potential construction conflict with East San Fernando Valley Light Rail Transit Corridor	> Major utility constraints under Sepulveda Boulevard	> Major utility constraints under Sepulveda Boulevard > High-capacity MRT would be new technology in United States

Source: Connetics Transportation Group, 2019; Fehr & Peers, 2018; Sepulveda Mobility Partners, 2019; Terry A. Hayes Associates, 2019; Torti Gallas + Partners, 2019

¹ All equity of access metrics reflect population within one-half mile of the station site. For evaluation purposes, HRT 2, HRT 3, and MRT 1 are considered to have identical station locations.

Notes: Table summarizes major differences among alternatives. Detailed data presented in Appendix C.

Twin-bore tunnel configuration assumed for all alternatives to present largest potential project footprint and impacts; alternative configurations could reduce potential impacts.

Costs shown in 2019 dollars. Costs are for 20-foot diameter twin-bore tunnel configuration. Cost per project trip considers only 2042 ridership forecasts.

O&M = operating and maintenance; VHT = vehicle hours traveled; VMT = vehicle miles traveled

The disparity in ridership between MRT 1 and the HRT alternatives is a result of the slower speeds of MRT technology and its longer route through the Sepulveda Pass. These factors also result in MRT 1 requiring the longest travel times between major origin-destination pairs.

Improve Equity of Access

As with the refined concepts, differences in station access occur in the Valley, where HRT 1 follows Van Nuys Boulevard and HRT 2, HRT 3, and MRT 1 generally follow Sepulveda Boulevard. Therefore, the evaluation of equity of access measures focused on stations that differ across the alternatives.

HRT 1 would serve higher population densities, while HRT 2, HRT 3, and MRT 1 would serve higher employment densities. HRT 1 would also have better bicycle access and have better pedestrian connections with fewer walking barriers. However, while more low-income residents live near Van Nuys Boulevard, HRT 3 along Sepulveda Boulevard serves the most low-income riders because of its overall higher ridership. Overall, HRT 1 is more supportive of TOC than HRT 2, HRT 3, and MRT 1 because of the land uses and development potential around the different Metro Orange Line Stations that would be served by each alternative. Existing zoning around the Metro Orange Line Sepulveda Station does not support TOC to the same degree as the zoning around the Van Nuys Station.

Protect the Environment and Support Community and Economic Development

Reduction in VMT and VHT for each alternative is directly correlated with the ridership it attracts. As a result, reductions are greatest for HRT 3, which has the highest ridership, and are least for MRT 1, which has the lowest ridership.

The potential for traffic, visual, noise, and environmental justice (EJ) impacts are generally greater for alternatives with more aboveground configurations because of the physical space they occupy in a community. Aerial structures are also more susceptible to seismic impacts than are tunnel or at-grade alignments. As a result, HRT 3 and MRT 1 have the most potential for impact in these categories. HRT 1 would also have an increased potential for traffic impact during construction because of overlap with the construction and operation of the East San Fernando Valley Light Rail Transit Corridor.

Many of the potential impacts of the alternatives are associated with the locations of stations and crossovers, which have been assumed to be excavated from above. The potential property impacts could be reduced through refinement of the alignments, changes to guideway or tunnel design, or the use of alternative construction methods. With a single-bore configuration, crossovers can be constructed inside the bored tunnel rather than excavated from the ground above. In certain geological conditions, and for additional cost, stations and crossovers could be mined from underground. Both

methods would decrease the amount of surface, thus property, disturbed during construction.

Provide a Cost-Effective Solution

Cost estimates were prepared for each alternative using a methodology consistent with Federal Transit Administration (FTA) guidelines for estimating capital costs. Because no MRT systems with the capacity required for the Project have been constructed or operated in the United States, MRT 1 costs were based on HRT costs, modified to reflect the unique characteristics of MRT.

Since underground construction is more expensive than aboveground construction, the main factors influencing the capital cost of the alternatives are the overall length of the alignment and the amount of the alignment that is underground. Additionally, annual operating and maintenance (O&M) costs would be lower for MRT 1 than for the HRT alternatives, in part because the industry standard of driverless operations of monorails has been assumed in estimating costs.

Because of the lower capital and O&M costs, MRT 1 performs better than the HRT alternatives in terms of cost per hour of time savings, even though it has lower ridership. However, because MRT 1 has lower ridership, the cost per project trip for HRT 1, HRT 3, and MRT 1 are relatively similar.

Because the preliminary cost of the Sepulveda Transit Corridor Project is greater than the funding identified in the *Measure M Expenditure Plan*, additional funding would be sought from other sources. Two key potential sources of additional funding are the FTA's Capital Investment Grants (CIG) program, which will consider funding transit projects that achieve an annualized cost per project trip of \$10 or less, and partnerships with private business entities. Because design is still in the early stages, all alternatives are therefore considered relatively equally competitive for CIG funding. Additionally, because all alternatives could be operated and maintained independently of other Metro transit facilities, all alternatives are considered equally likely to attract private investment.

Minimize Risk

All large infrastructure projects face risks along the process from project development through design and construction to the commencement of operations. Therefore, the alternatives were evaluated for the ability to minimize risk—issues that may affect the ability of each alternative to achieve project objectives.

Overall risk associated with HRT 3 and MRT 1 is higher than that of HRT 1 and HRT 2, primarily because of the need to relocate parts of the Metropolitan Water District (MWD) Sepulveda Feeder water transmission line. Additionally, the lack of experience in the United States constructing and operating MRT with the capacity required for the Project creates additional uncertainty for MRT 1.

MSF Options

MSF options were also evaluated during this step of the evaluation process. Because riders do not directly interact with MSFs, only the goals to protect the environment and support community and economic development, provide a cost-effective solution, and minimize risk are applicable.

Protect the Environment and Support Community and Economic Development

Because the Metrolink at Woodman and Van Nuys at Arminta sites are primarily occupied by large-scale industrial and commercial uses, fewer businesses would be displaced than at the Sepulveda at Nebraska site. The Sepulveda at Nebraska site also has potential impacts associated with potentially historic structures (buildings over 50 years old with architectural characteristics of the time and culture in which they were built) and water resources (as a result of excavation).

The Van Nuys at Arminta site is in an EJ census tract that does not contain residences, although it is adjacent to EJ communities. It also has a potentially historic structure on the site. The Metrolink at Woodman site is in an EJ census tract that does not contain residences and has the fewest potential impacts of the three options.

Provide a Cost-Effective Solution

The Sepulveda at Nebraska site would be four to five times more costly than either the Metrolink at Woodman site or the Van Nuys at Arminta site because it would have to be constructed below the level of the existing ground to allow rail access to the site while avoiding MWD's Sepulveda Feeder line under Sepulveda Boulevard. Additionally, real estate is more costly in the vicinity of the Sepulveda at Nebraska site than at the other sites.

Minimize Risk

While the MSF options at the Metrolink at Woodman and Van Nuys at Arminta sites do not have additional risks associated with them, the Sepulveda at Nebraska site does. These additional risks are related to excavating the site, crossing a major water transmission line, and vacating public roadways.

ES-7 Identification and Screening of Westside-LAX Concepts

Development of Westside-LAX Concepts

The Westside-LAX concepts were developed as extensions of the refined Valley-Westside concepts, or, in one case, as an extension of the Metro Purple Line. Therefore, each Westside-LAX concept must be compatible with the mode and the terminus of a Valley-Westside concept or the Metro Purple Line. As a consequence, only HRT and MRT concepts connecting to the Expo/Bundy Station, Expo/Sepulveda Station, or Westwood/VA Station were considered.

The Airport Metro Connector (AMC) 96th Street Transit Station on the future Metro Crenshaw/LAX and Metro Green Lines was identified as the logical southern terminus of the Westside-LAX concepts. The Westside-LAX concepts generally follow the major north-south corridors within the southern part of the Study Area: Centinela Avenue, Sepulveda Boulevard, I-405, and Overland Avenue.

An aerial configuration was only considered along I-405 since the refined Valley-Westside segment concepts all end in a tunnel configuration and all the arterial corridors to the south have extensive segments in which the right-of-way is not sufficient to accommodate the addition of an aerial guideway without removal of travel lanes and/or substantial property impacts.

Westside-LAX Concepts

The six Westside-LAX concepts are illustrated in Figure ES-22. Four of the concepts are extensions of Valley-Westside HRT alternatives from the Expo/Sepulveda Station, one is an extension of the Valley-Westside MRT alternative from the Expo/Sepulveda Station, and one is an extension of the Metro Purple Line from the Westwood/VA Station. In addition, one HRT extension concept includes an option to connect to the Expo/Bundy Station instead of the Expo/Sepulveda Station.

Additional rail vehicles would be needed to operate any of the Westside-LAX concepts. None of the MSF sites identified for the Valley-Westside segment of the Project would be large enough to accommodate these additional vehicles. Because land uses change over time, a suitable site to accommodate an expanded fleet should be identified closer to the anticipated date of construction of the Westside-LAX segment.

Evaluation of Westside-LAX Concepts

The Westside-LAX concepts were evaluated in the same manner as the refined Valley-Westside concepts, as well as on cost and cost-effectiveness measures.

Improve Mobility

Ridership forecasts for the entire Project between the Valley and LAX are shown in Figure ES-23. While the Purple Line Extension concept would result in the greatest number of daily boardings, this is in part because passengers using both the Valley-Westside and Westside-LAX segments of the Project would be forced to transfer to complete their journey, and their boardings are counted twice in the ridership since they must board two trains.

In addition, the Purple Line Extension would result in substantially lower ridership on the Valley-Westside segment than the other HRT concepts because it requires an extra transfer for passengers traveling between the Valley or UCLA and LAX. As a result, the Purple Line Extension would also generate fewer new transit trips on the Metro system than the other HRT concepts.

Travel times from the Expo Line to AMC 96th Street Transit Station range from 10.5 to 12.5 minutes across concepts, with HRT Sepulveda being the fastest and MRT I-405 being the slowest.

Improve Equity of Access

Since the Westside-LAX concepts are along three primary corridors (Centinela Avenue, I-405/Sepulveda Boulevard, and Overland Avenue), the concepts were grouped by corridor and the equity of access evaluation was conducted for each of these corridors.

The HRT Overland concept would provide the greatest equity of access benefits. Its intermediate stations at Overland/Venice and Overland/Jefferson are forecast to have employment densities greater than comparable stations on the other corridors. The Overland/Venice Station is also surrounded by transit-supportive land uses and a significant number of low-income, minority, and zero-car households. The Centinela corridor (HRT Centinela and Purple Line Extension) would perform the lowest on this measure because it would provide the weakest opportunities for bicycle and pedestrian access.

Protect the Environment and Support Community and Economic Development

Concepts that are entirely underground perform better than those with aerial sections (HRT I-405 and MRT I-405) on measures of protecting the environment and supporting community and economic development since they have lower potential for property, construction, transportation, noise, vibration, and historic impacts.

HRT Sepulveda and HRT Centinela concepts perform best at protecting the environment because they would not pass through potentially hazardous oil fields or Methane and

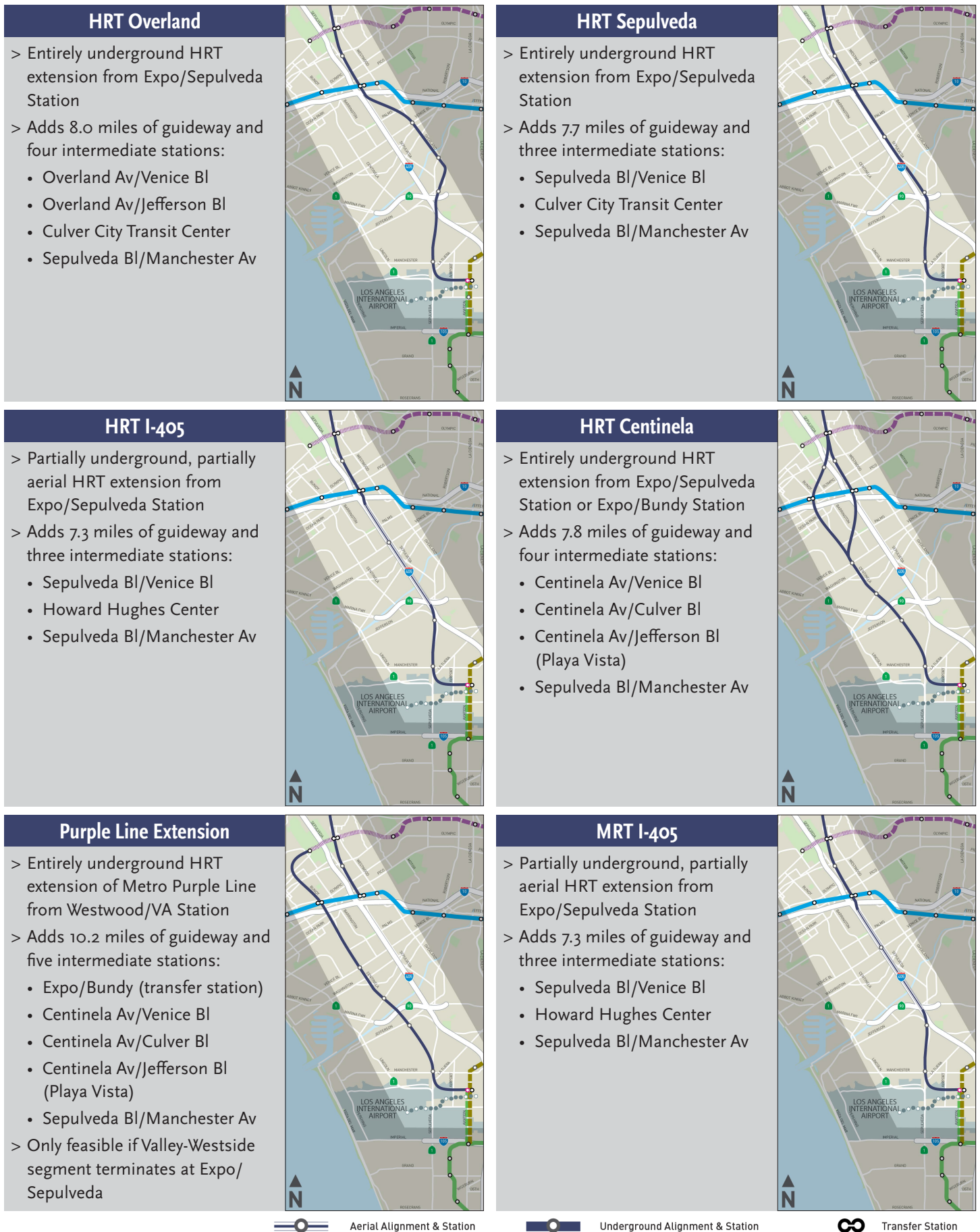


Figure ES-22. Westside-LAX Concepts

Source: Sepulveda Mobility Partners, 2019

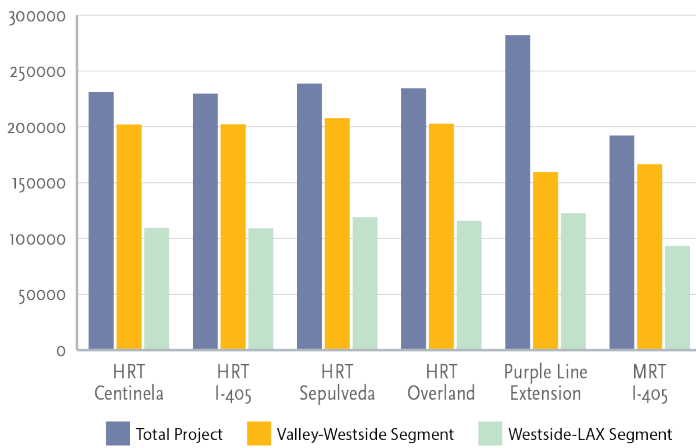


Figure ES-23. Project Trips on Westside-LAX Concepts (2057)

Source: Sepulveda Mobility Partners, 2019

Note: Total project trips are less than the sum of Valley-Westside trips and Westside-LAX trips because some trips use both segments of the Project.

Methane Buffer Zones as other tunnel concepts would. Additionally, the Purple Line Extension concept also has increased potential for historic impacts near the West Los Angeles Veterans Affairs Medical Center and seismic impacts along the portion of its alignment through the Santa Monica Fault Zone.

Provide a Cost-Effective Solution

The main factors influencing the cost of the Westside-LAX concepts are the overall length of the alignment, the amount of the alignment that is underground, and the amount of right-of-way acquisition required.

ES-8 Public Outreach and Agency Coordination

Metro engaged in a robust public outreach process for this Feasibility Study, guided by Metro’s Equity Platform. Metro designed a wide range of opportunities for feedback in an inclusive and transparent way and held multiple forums for bilingual English and Spanish community engagement. This included engaging stakeholders at a variety of events and locations in the Valley and on the Westside, reaching thousands of stakeholders in person. Metro also conducted significant outreach with many public agencies that have jurisdiction throughout the Study Area. Coordination with these agencies allowed concerns to be identified and addressed early in the process.

Project Materials and Resources

To inform and update stakeholders about the Project’s progress, the outreach team developed collateral materials for distribution through various channels and means of communication. A Project website <https://www.metro.net/projects/sepulvedacorridor/>

serves as a central location where the public can go to obtain all project-related information.

The project team also conducted two online bilingual surveys. The first survey focused on learning about those who travel in the Study Area and the characteristics of their travel. The second survey focused generally on the concepts that had been presented at the second round of public meetings in January/February 2019.

Public Meetings

Metro hosted three rounds of informational public meetings (for a total of 10 individual public meetings) as part of the public outreach efforts for the study. Meetings were held to coincide with the introduction, refinement, and evaluation of the transit concepts. All materials were available in English and Spanish, and interpreters were available to translate and assist with submission of comments.

To promote each round of public meetings, Metro distributed thousands of take-ones with information about the meetings in English and Spanish on bus routes that operate in the Study Area. Electronic versions of each meeting notice, with a link to a Spanish translation, were distributed via e-blast to all contacts included in the project database. Support was also requested from elected offices, cities, public facilities, and other key stakeholders to promote public meetings through their own communication tools.

Additionally, targeted outreach in Spanish based on a careful analysis of Spanish speakers with limited English proficiency in the Study Area was conducted to encourage attendance of Spanish speakers.



Throughout the study, hundreds of community members attended public meetings to learn about the Project and provide input.

Source: Arellano Associates, 2019

Outreach at Community Events

Many factors may prevent in-person attendance at public meetings; therefore, the outreach was conducted at places where community stakeholders already gather. This included making announcements and presentations at community meetings, such as neighborhood councils and homeowners' associations. In addition, the outreach team staffed information booths at approximately 20 free or low-cost community festivals that drew thousands of diverse attendees throughout the Study Area.

Public Agency Meetings

Metro coordinated with many public agencies that have jurisdiction throughout the Study Area, holding both multi-agency briefings and individual meetings. This effort was designed to present information on the project concepts, to discuss relevant issues related to each agency's jurisdiction, and proactively consult with these agencies prior to formal agency consultation, which is a prerequisite under the NEPA environmental review process.

Metro held individual meetings with the following agencies to discuss issues related to the Project and resources under each agency's jurisdiction:

- > Caltrans
- > County of Los Angeles Department Regional Planning
- > Los Angeles Department of City Planning (LADCP)
- > Los Angeles Department of Transportation
- > Los Angeles Department of Water and Power
- > Metropolitan Water District
- > Santa Monica Mountain Conservancy
- > Southern California Regional Rail Authority (Metrolink)
- > United States Army Corps of Engineers
- > UCLA

Feedback Received

Although the public meetings were not formal public hearings, Metro received comments at the public meetings and via the project email address and website and through postal mail, with almost unanimous support to move forward with the study and interest in seeing the Project completed as quickly as possible. Public comments generally fell into four different topical areas:

- > Alternative concepts and modes
 - Interest in a convenient ride without needing to transfer from the San Fernando Valley to LAX



Many people who travel in the Sepulveda corridor live and work outside the Study Area, so Metro engaged the community at popular events such as the Santa Monica Summer SOULstice in June 2018.

Source: Arellano Associates, 2019

- Connectivity to other destinations, including Santa Clarita, Santa Monica and the Santa Monica Airport, Culver City, and Playa Vista
- Changes to the East San Fernando Valley Light Rail Transit corridor to improve connectivity
- Stakeholders in the Mar Vista area expressed strong support for the Sepulveda alignment for the Westside-LAX segment
- Sherman Oaks stakeholders expressed opposition to aboveground options and support for an underground option
- > Stations
 - Strong desire for a station at UCLA
 - Interest in both the Expo/Sepulveda and Expo/Bundy Stations as possible southern termini
 - Requests for a station between the Purple and Expo Lines on Santa Monica Boulevard or another point in between
 - Interest in a station at The Getty
 - Preference for a Centinela/Washington station option over Centinela/Venice
 - Evaluation of parking
 - Support for transit connectivity and transit-oriented development around stations
- > Evaluation criteria
 - Concerns regarding noise and vibration during construction and operation of aerial segments
 - Concerns regarding tunneling

> Study scope

- Some suggested extending the geographic scope of the analysis and physical boundaries of the Project farther north and south

ES-9 Next Steps

This Feasibility Study has determined that a reliable, high-capacity fixed-guideway transit system connecting the San Fernando Valley to the Westside and the LAX area could be constructed along several different alignments. Such a transit system, operated as either HRT or MRT, would serve the major travel markets in the Sepulveda corridor and would provide travel times competitive with the automobile. While not recommending a particular alternative, this study has also identified potential environmental and community impacts that could result from construction and operation of this transit line and developed cost estimates for construction and operations.

The Metro Board of Directors will select alternatives to be included in the environmental process based on this study and upcoming proposals resulting from Metro's predevelopment

agreement process. These alternatives will be presented to the public and public agencies for feedback through the NEPA and CEQA scoping process; all reasonable alternatives will be considered during environmental review.

Any fixed-guideway system in the corridor, whether an alternative developed during this study or one developed independently, will confront many of the same key challenges. Based on the design and analysis conducted during this study, the following steps should be taken to address the key challenges:

- > Seek additional community input on station locations and designs
- > Consider interactions with and connections to other Metro Lines
- > Advance engineering studies of key design issues
- > Identify ways to reduce impacts, including further evaluation of tunnel configurations
- > Identify cost reductions and consider project phasing

1 Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro) has prepared a Final Feasibility Report for the Sepulveda Transit Corridor Project (the Project). The corridor extends between the San Fernando Valley and the Westside of Los Angeles, including the Los Angeles International Airport (LAX) area of Los Angeles County. The purpose of the Project is to provide a high-quality transit service that effectively serves the large and growing travel demand between the San Fernando Valley and the Westside, including the LAX area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit lines.

The Sepulveda corridor has been the major transportation corridor between the San Fernando Valley and the Westside for 90 years. Sepulveda Boulevard opened to traffic through the Sepulveda Pass in 1929, featuring a short tunnel segment under Mulholland Drive to reduce the roadway grade. In 1962, a limited-access freeway—California Route 7—opened to traffic, passing under a realigned Mulholland Drive near the top of the Pass. Route 7 became Interstate 405 (I-405) and allowed workers to live in the San Fernando Valley and commute to jobs in the Westside.

As the Valley and the Westside have grown, the Los Angeles County Metropolitan Transportation Authority (Metro), the California Department of Transportation (Caltrans), and their predecessor agencies have undertaken multiple efforts to improve mobility in the corridor. In recent decades, Caltrans added a southbound high-occupancy vehicle (HOV) lane to the freeway in 2002, and Metro and Caltrans partnered to add a northbound HOV lane that opened to traffic in 2014.

The Sepulveda Transit Corridor Project is included in Metro's 2009 *Long-Range Transportation Plan* (Metro, 2009), in the *Measure R Expenditure Plan* as the "San Fernando Valley I-405 Corridor Connection" (Metro, 2008) and in the *Measure M Expenditure Plan* as the "Sepulveda Pass Transit Corridor" (Metro, 2016a). After the passage of Measure R in 2008, Metro undertook the *Sepulveda Pass Corridor Systems Planning Study* (Metro, 2012), which evaluated both highway and transit improvements extending from the Valley to LAX. The *Measure M Expenditure Plan* provides for implementation of the Sepulveda Transit Corridor Project in two phases: the first segment between the San Fernando Valley and the Westside of Los Angeles (Valley-Westside) by 2033-2035 and an extension to LAX (Westside-LAX) by 2057-2059.

The Project's Study Area is generally centered on I-405, extending approximately two miles to the east and to the west. The northern limit is at Roscoe Boulevard in the San Fernando Valley, and the southern limit is at LAX. The Study Area represents the area in which the transit concepts and ancillary facilities are expected to be located. Figure 1-1 illustrates the Project's Study Area. The Study Area is located in Los Angeles County.

Alternatives developed in this study are intended to represent a range of rail transit modes, alignments, and station locations for addressing the identified transportation needs of the Sepulveda corridor. A reduced number of alternatives will be recommended to the Metro Board of Directors for refinement and further study during a subsequent environmental review process.

This Sepulveda Transit Feasibility Study is being conducted so that the study can be referenced during scoping under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) in the next phase of the Project. The intent is for the results and decisions of this study to support the environmental review process by informing the purpose and need or goals and objectives; transit mode, termini, and general alignments for consideration; and the preliminary screening of alternatives and elimination of unreasonable alternatives. To meet the requirements of 23 Code of Federal Regulations Part 450 – Linking the Transportation and NEPA Processes, the study is being conducted with input from an extensive public outreach effort and through close coordination with local, state, and federal agencies and by ensuring that the process for developing and screening of alternatives, the level of definition of the alternatives, and the types and level of analyses are commensurate with the decisions that need to be made.



Figure 1-1. Study Area

Source: Sepulveda Mobility Partners, 2018

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2 Purpose and Need

The purpose of the Project is to provide a high-quality transit service that effectively serves a large and growing travel market between the San Fernando Valley and the Westside, including the LAX area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit corridors.

This chapter reviews the physical and demographic conditions in the Study Area to provide the basis for an understanding of the challenges to north/south movement through the Sepulveda corridor. The demand for travel between many different origins and destinations is concentrated into a single corridor, leading to congestion and slow travel speeds for private vehicles and transit services. This understanding informs the development of the Purpose and Need for the Project, which guided the development and evaluation of the transit concepts. More details on the topics discussed in this chapter are provided in the *Study Area Definition Report* (Metro, 2018c) and the *Travel Markets Analysis Report* (Metro, 2018d).

2.1 Study Area Characteristics

The Sepulveda Transit Corridor Project Study Area encompasses approximately 60 square miles on both sides of I-405 between Roscoe Boulevard in the San Fernando Valley and 111th Street near LAX. Within the Study Area, there are three distinct, yet interrelated, geographic areas: the San Fernando Valley (the Valley), the Westside, and the LAX area.

The Valley, the northernmost part of the Study Area, is the portion of the Study Area located north of Mulholland Drive. It includes communities such as Encino, Sherman Oaks, and Van Nuys. Within the Study Area, the San Fernando Valley has a well-defined arterial grid, with major streets every half mile, lined largely with a combination of apartment buildings and businesses. The Valley portion of the Study Area is bisected by the Metro Orange Line, which has three stations in the Study Area. The Ventura Freeway (US 101) provides east/west connections through the Valley. The Los Angeles – San Diego – San Luis Obispo (LOSSAN) Rail Corridor, in which both Amtrak and Metrolink provide passenger service, runs through the northern part of the Study Area.

The Westside, the part of the Study Area generally between Mulholland Drive and the Santa Monica Freeway (I-10), includes the City of Los Angeles communities of Bel Air, Brentwood, West Los Angeles, and Westwood, as well as a part of the City of Santa Monica and unincorporated Los Angeles County (including the West Los Angeles Veterans Affairs Medical Center and the Los Angeles National Cemetery). I-10 runs through the southern part of the Westside within the Study Area, and the Metro Expo Line includes three stations in the Study Area.

The southernmost portion of the Study Area includes LAX and portions of the City of Los Angeles' Mar Vista, Palms, and Westchester communities, as well as parts of the cities of Culver City and Inglewood. The Metro Crenshaw/LAX Line, currently under construction, will connect the LAX area to the Metro Expo Line at the Expo/Crenshaw Station about 4.5 miles outside of the Study Area, as well as to the South Bay via the Metro Green Line.

The topography of the majority of the Study Area is generally flat, lying either in the San Fernando Valley or in the Los Angeles Basin. The Santa Monica Mountains lie between the Valley and the Westside. I-405 is the primary transportation corridor between the Valley and the Westside, traversing the Santa Monica Mountains in the Sepulveda Pass. The Pass is highly constrained with steep hillsides, some of which have been cut back to accommodate the freeway and are retained by walls. Within the Pass, I-405 has grades of five percent, with one section steeper than six percent, as shown in Figure 2-1.

2.1.1 Existing Land Uses

As shown in Figure 2-2, residential, commercial, government, industrial, and educational land uses are found throughout the Study Area. However, the different types of land uses are not distributed evenly across the Study Area. Commercial (both retail and office) uses that support high levels of employment tend to be clustered in a limited number of geographic areas, primarily in the Westside and the LAX area. The Study Area also includes several major regional attractions, most notably the University of California, Los Angeles (UCLA) and LAX. This type of land use pattern can result in frequent travel by residents outside of their communities for work, leisure, or educational purposes.

2.1.2 Demographic Patterns

Patterns of population and employment density follow from the distribution of land uses: areas with high concentrations of residential land uses, particularly multi-family residential uses, have high population densities; similarly, areas with high concentrations of commercial land uses, particularly office uses, have high employment densities. Population and employment densities are significant in understanding travel patterns because many daily trips begin at people's homes, and a substantial number of those trips (although not a majority) end at their places of employment, particularly during peak travel hours. When population centers and employment centers are in different areas, many people's daily commutes require them to travel between the two areas.

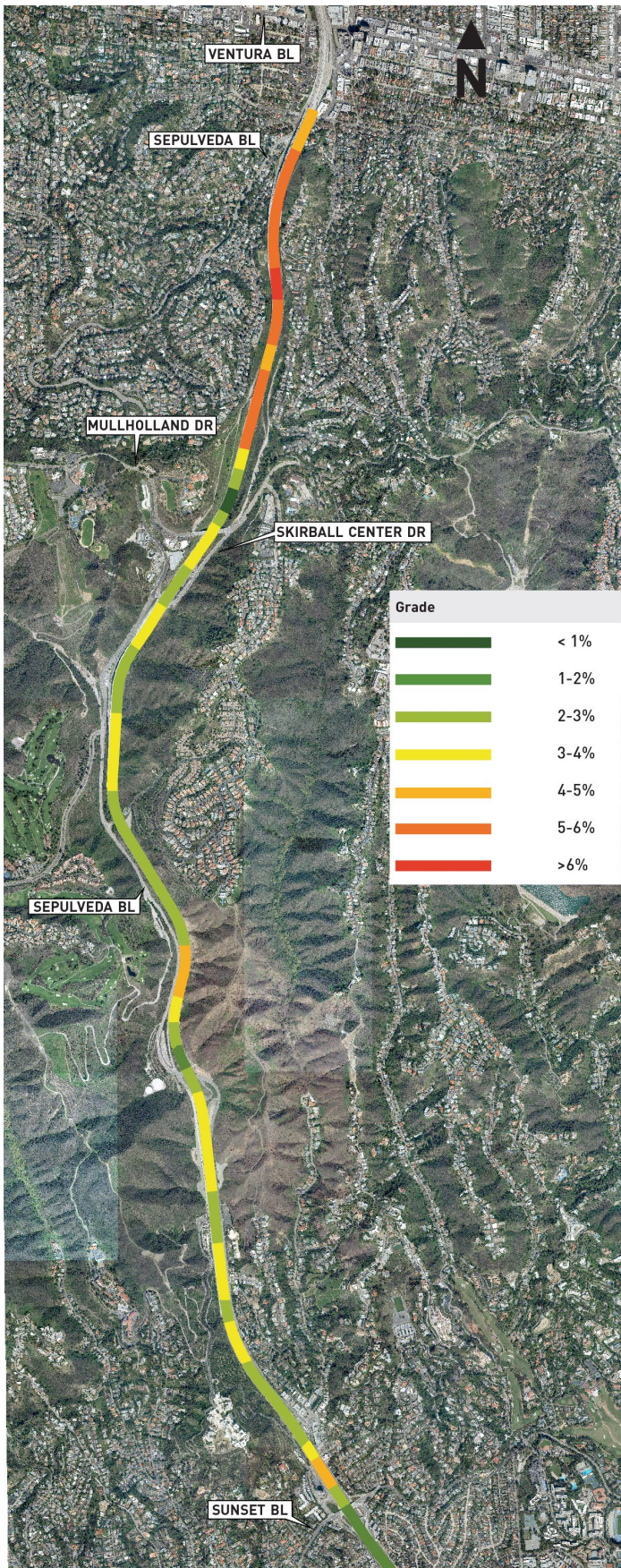


Figure 2-1. Grade through the Sepulveda Pass

Source: Sepulveda Mobility Partners, 2018

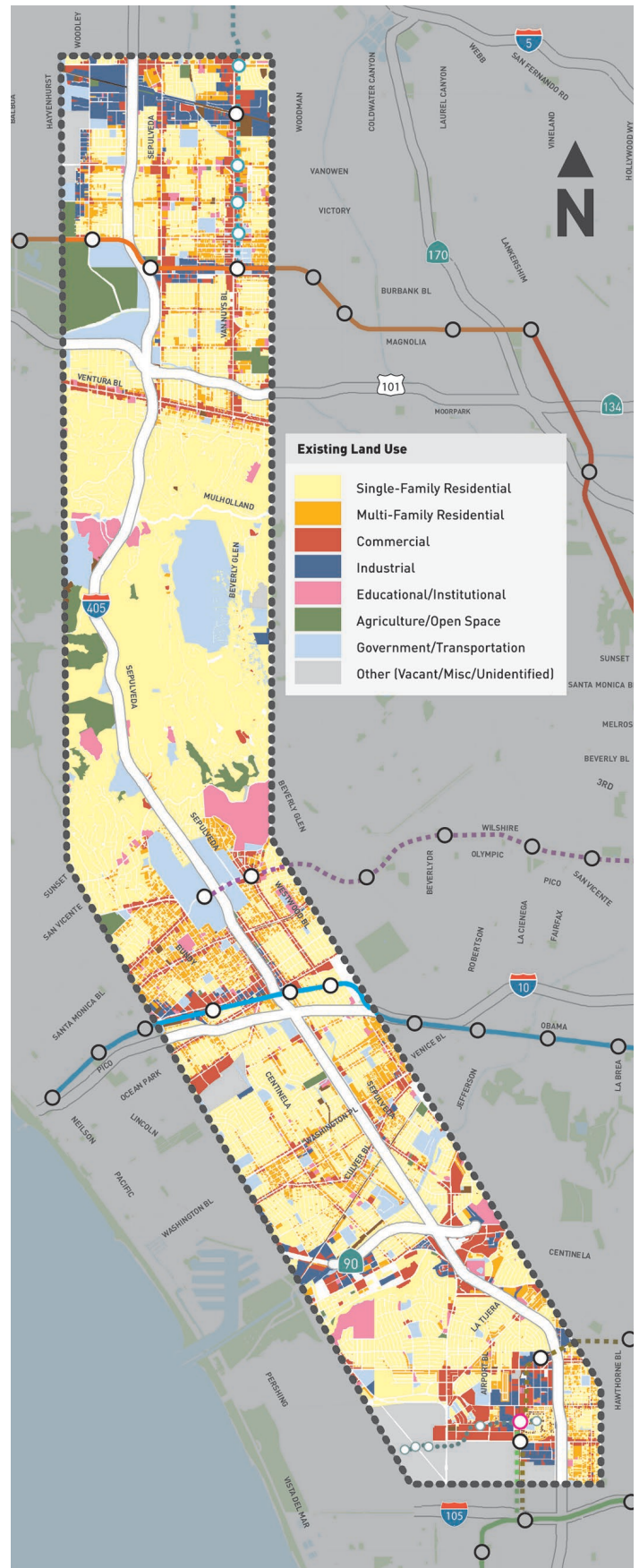


Figure 2-2. Existing Land Uses

Source: Los Angeles County Office of the Assessor, Property Tax Assessment Roll, 2016; Terry A. Hayes Associates, 2018

Figure 2-3 shows the population density for the Study Area and adjacent areas. Several portions of the Study Area are densely populated, with the highest density located in parts of Westwood, West Los Angeles, and Brentwood on the Westside, where the population density exceeds 30,000 people per square mile.

As shown in Figure 2-4, the Westside also has the greatest concentration of jobs within the Study Area. Parts of Santa Monica, West Los Angeles, Westwood, and the UCLA area have between 15,000 and 30,000 jobs per square mile. Although there are some job centers within the Study Area in the Valley and the LAX area, those areas generally have substantially fewer than 15,000 jobs per square mile.

As evidenced by the population and employment densities illustrated in Figure 2-3 and Figure 2-4, locations of residential and employment densities tend to be mismatched in and near the Study Area. In the Valley, population centers are much denser than employment centers, while the reverse is true on the Westside, particularly when considering the adjacent Century City and Beverly Hills areas immediately outside the Study Area.

2.1.3 Vehicle Ownership

Vehicle ownership is a key factor influencing transit ridership, as households without access to a personal vehicle are more likely to utilize transit. Figure 2-5 shows the percentage of zero-vehicle households throughout the Study Area. The Valley has the highest concentration of zero-vehicle households in the Study Area. Generally, 10 to 20 percent of households in the Valley do not have a vehicle, and in several areas more than 20 percent of households do not have a vehicle, including communities along Van Nuys Boulevard.

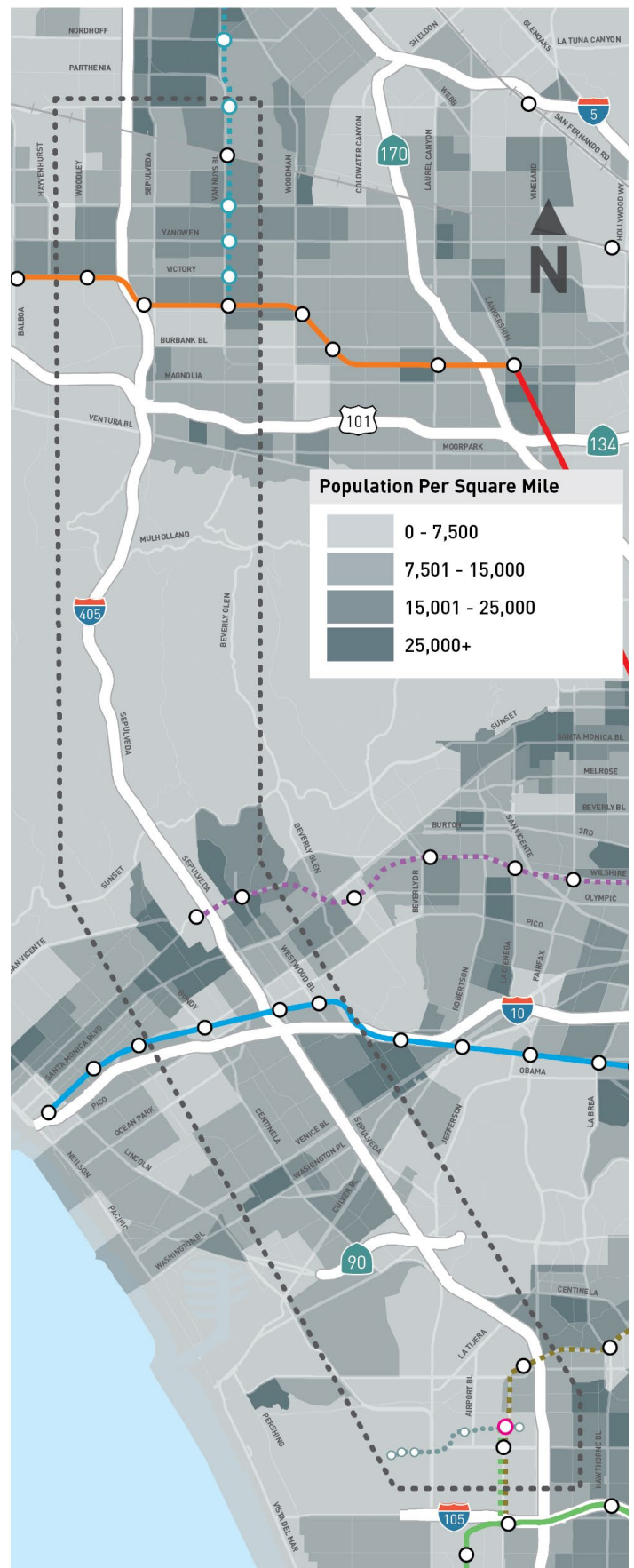


Figure 2-3 Population Density

Source: US Census American Community Survey, 2017; Fehr & Peers, 2018

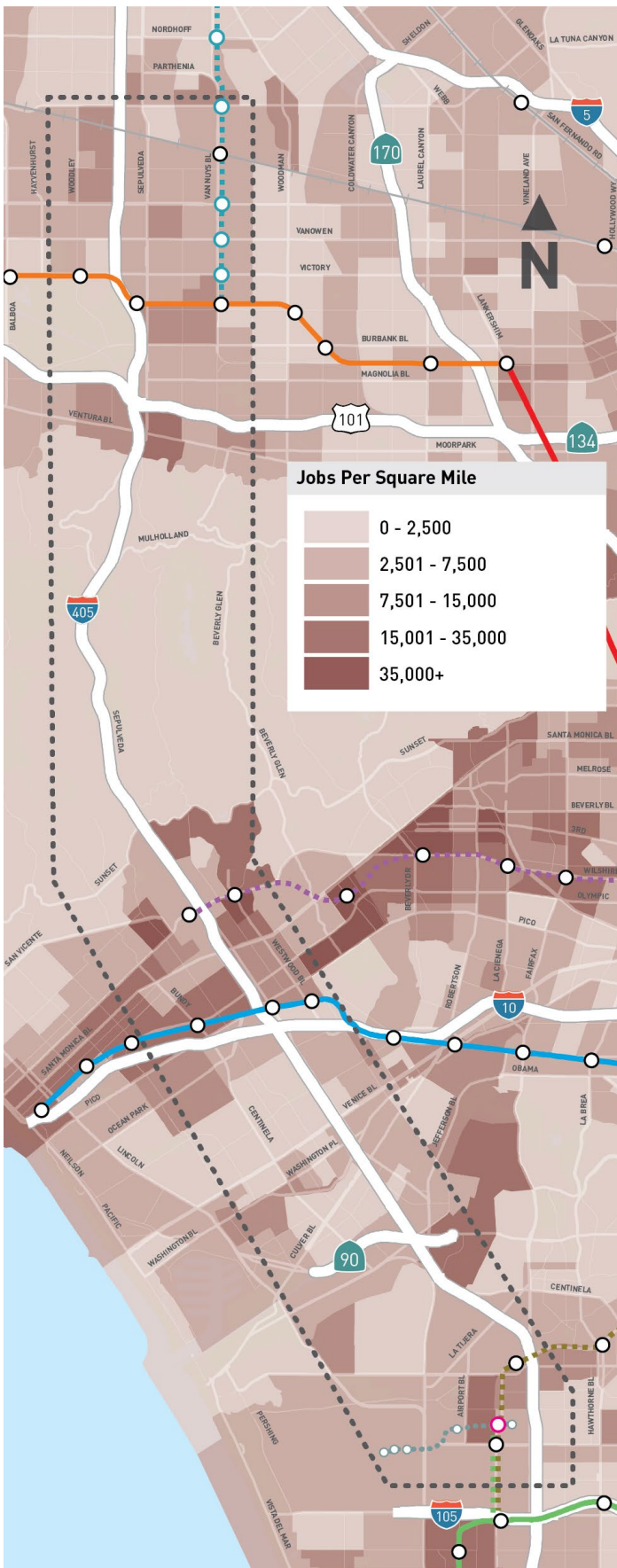


Figure 2-4. Job Density

Source: Longitudinal Employer-Household Dynamics, 2014; Fehr & Peers, 2018

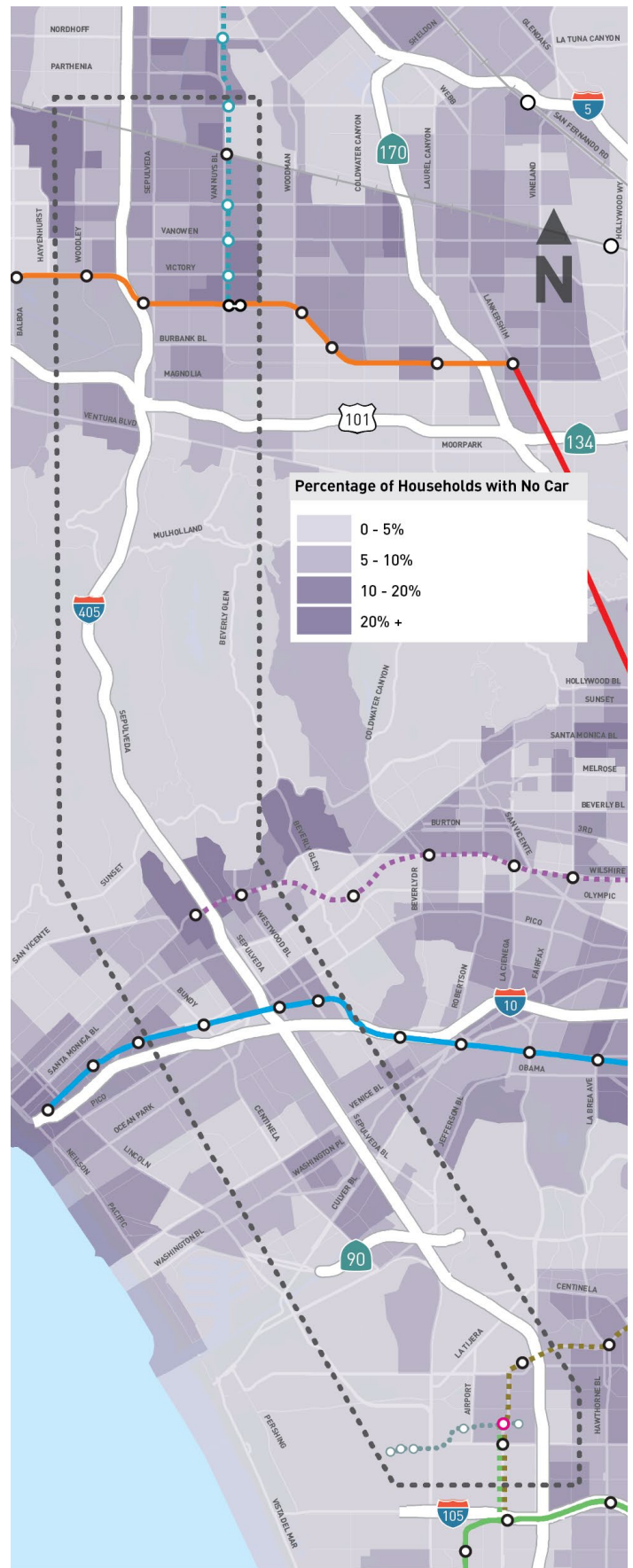


Figure 2-5. Zero-Car Households

Source: US Census American Community Survey, 2017; Fehr & Peers, 2018

2.2 Existing Transportation Conditions

The Sepulveda corridor is the major north-south transportation corridor connecting the Valley, the Westside, and the LAX area. To provide a measure of the volume of daily travel through the Sepulveda corridor made by private vehicles and by transit, total daily person throughput (all people moving through the corridor, whether carried in private vehicles or by transit) was calculated at two points along the Sepulveda corridor: in the Sepulveda Pass just north of Getty Center Drive and at Ballona Creek just north of SR 90.

Figure 2-6 summarizes the daily person throughput of the roadways (I-405 and Sepulveda Boulevard), north of Getty Center Drive in the Sepulveda Pass. More than 412,000 people pass that point daily, with approximately 404,000 in private vehicles and 8,000 using transit, resulting in a transit mode share of just under two percent.

Figure 2-7 summarizes the daily person throughput of the roadways (I-405 and Sepulveda Boulevard) at Ballona Creek, north of SR 90. More than 396,000 people pass this location daily, with approximately 388,000 in private vehicles and slightly under 8,000 using transit, resulting in a transit mode share of approximately two percent at this location as well.

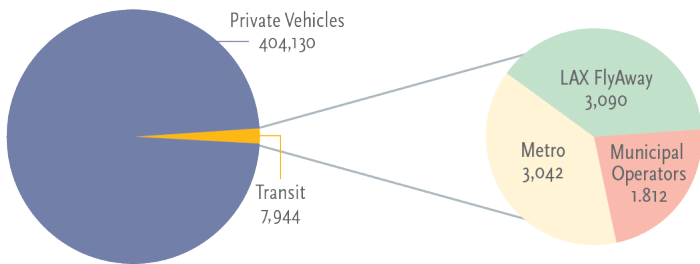


Figure 2-6. Corridor Throughput in Sepulveda Pass

Source: Metro; Municipal operators; Los Angeles World Airports; Fehr & Peers, 2018

Note: For methodology, refer to Study Area Definition Report

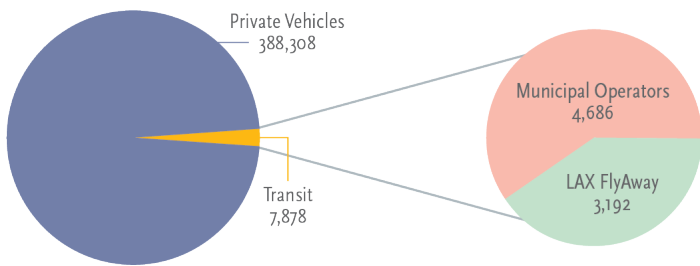


Figure 2-7. Corridor Throughput at Ballona Creek

Source: Culver CityBus, Los Angeles World Airports; Fehr & Peers, 2018

Note: For methodology, refer to Study Area Definition Report (Metro, 2018c)

2.2.1 Freeway Conditions

I-405 is heavily traveled throughout the Study Area, with daily volumes of over 200,000 vehicles in the Valley, over 250,000 in the Sepulveda Pass, and over 300,000 vehicles between Wilshire Boulevard and SR 90, as well as near LAX. The direction of the peak traffic demand varies over the course of the day, with the greatest demand for travel occurring from the Valley and LAX areas to the Westside during the morning commute period and the reverse pattern during the evening commute period.

The high level of demand on I-405 results in congestion and low travel speeds. Commuters to the Westside from the Valley and the LAX area experience the greatest delays: during the morning peak hours, delays are greatest traveling to the Westside, and this pattern is reversed during the evening peak hours. Figure 2-8 shows travel speeds during the evening peak hour on I-405; the slowest speeds are generally for travel out of the Westside.

2.2.2 Transit Service

2.2.2.1 Service Frequency and Travel Times

Both Metro and municipal transit providers offer a broad range of services within the Study Area. Figure 2-9 displays the frequency of transit service on major corridors throughout the Study Area.

While there is a network of relatively frequent transit services within the Valley and the Westside and LAX areas, transit connections between the Valley and the Westside are limited. The link through the Sepulveda Pass is currently served by routes offering less frequent service or by express services that operate only during peak commuter periods.

Metro Rapid lines 734 and 788 currently connect the East San Fernando Valley to the Westside via the Sepulveda Pass. Route 734 operates between Sylmar and the Metro Expo Line Expo/Sepulveda Station. In the AM peak, a trip from Sylmar to the Expo Line Station is scheduled to take approximately one hour and 40 minutes. Route 788 operates between Panorama Mall and the Metro Expo Line Expo/Sepulveda Station. In the AM peak, a trip from Panorama Mall to the Expo Line is scheduled to take approximately one hour and 20 minutes.

The Los Angeles Department of Transportation (LADOT) Commuter Express Routes 573 and 574 also provide express service between the Valley and the Westside during peak hours only. Route 573 serves the Westwood area, while route 574 serves the LAX area.



Figure 2-8 Average Speeds on I-405, PM Peak Hour

Source: INRIX; System Metrics Group, 2018

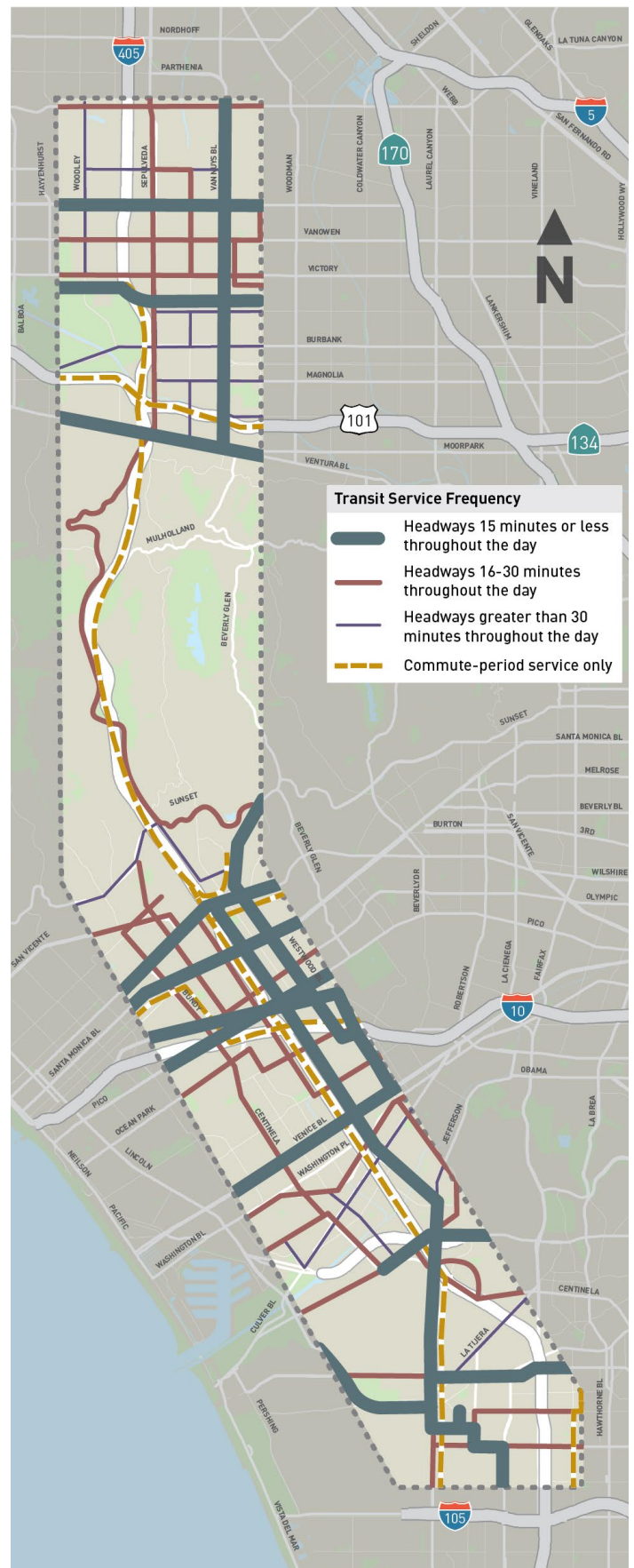


Figure 2-9 Transit Service Frequency

Source: Metro and Municipal Operators, 2018, Fehr & Peers, 2018

2.2.2.2 Transit Boardings and Loads

Transit boardings are greatest along corridors that have higher-frequency service throughout the Study Area, as shown in Figure 2-10. Within the Valley, transit ridership is highest around the Metro Orange Line and north of the Metro Orange Line, with ridership decreasing southward until Ventura Boulevard. Boardings for local transit in the Valley are concentrated along Van Nuys and Sepulveda Boulevards, with the greatest boardings along Van Nuys Boulevard.

On the Westside, the greatest concentrations of transit boardings are in Westwood and on the UCLA campus where frequent headways are maintained throughout the day. Olympic, Santa Monica, and Wilshire Boulevards, which all have transit services with headways of 15 minutes or less, also have many boardings.

There are some areas of concentrated transit boardings between the Westside and LAX; however, the number of boardings are not as large as near UCLA in the Westside or Van Nuys Boulevard in the Valley. The greatest concentrations within this area occur along Venice and Sepulveda Boulevards, as well as in the area immediately adjacent to LAX. As throughout the Study Area, these are the corridors with the most frequent transit service for this area, all with headways of 15 minutes or less.

Table 2-1 presents the average daily loads, the number of passengers in a vehicle at a given time, on the Metro Rapid and LADOT Commuter Express buses that connect the Valley to the Westside. As shown in Table 2-1, the load factors, or the ratio of the number of passengers to the number of seats on the vehicle, indicate that these routes currently have enough capacity to accommodate higher ridership. Therefore, current transit ridership through the Pass is not limited by the available capacity.

2.2.2.3 On-Time Performance

Congestion on roadways and freeways in the Study Area affects transit service as well as privately operated vehicles, as there are no north-south rail or dedicated busway travel options in the Study Area, making travel times unpredictable and transit service unreliable. As shown in Table 2-2, the Metro bus services that currently operate on I-405 and Sepulveda Boulevard between the Valley and the Westside are on time less than 50 percent of the time during the morning and evening peak periods, and LADOT buses are on time less than 75 percent of the time. Several factors contribute to the slow speeds and unreliable travel times on these routes—most notably that the buses operate in mixed traffic and are subject to roadway congestion. The routes are also slowed by the multiple stops they make in the Valley, Westwood, and LAX areas.



Figure 2-10 Daily Transit Boardings

Source: Metro; Fehr & Peers, 2018

Table 2-1. Loads on Rapid and Express Routes between the San Fernando Valley and the Westside

ROUTE	AVERAGE DAILY LOAD THROUGH THE PASS	PASSENGERS PER TRIP THROUGH THE PASS	LOAD FACTOR THROUGH SEPULVEDA PASS
Metro Rapid 734	1,160	24	0.42
Metro Rapid 788	400	16	0.54
LADOT Commuter Express 573	898	29	0.59
LADOT Commuter Express 574	294	29	0.60
LAX FlyAway	3,090	26	0.49

Source: Metro, 2017; LADOT

Note: Load = number of passengers in the vehicle

Table 2-2. Performance Statistics for Rapid and Express Routes between the San Fernando Valley and the Westside

ROUTE	DESCRIPTION	SPAN OF SERVICE	PEAK-PERIOD HEADWAY	AVERAGE SPEED	ON-TIME PERFORMANCE
Metro Rapid 734	Sylmar to Metro Expo Line	18 hours per day	15-20 minutes	<15 mph	<50%
Metro Rapid 788	Panorama City to Metro Expo Line	Peak period only	15-20 minutes	<15 mph	<50%
LADOT Commuter Express 573	Granada Hills to Century City	Peak period only	10-15 minutes	17 mph	73%
LADOT Commuter Express 574	Sylmar to Redondo Beach	Peak period only	25-30 minutes	24 mph	65%
LAX FlyAway	Van Nuys to LAX	24 hours per day	15 minutes	N/A	N/A

Source: Metro on-time performance data, February-November 2017

Notes: Metro's *Transit Service Policy* (Metro, 2015) defines "on-time" as a bus arriving no more than 1 minute early or 5 minutes late at each time-point along a route.

LADOT = Los Angeles Department of Transportation; mph = miles per hour; N/A = not available

2.3 Travel Patterns

In 2017, the Study Area produced approximately 2.26 million trips and attracted approximately 3.04 million trips each day. Of the trips produced within the Study Area, approximately 47 percent left the Study Area, and, of trips attracted to the Study Area, approximately 61 percent originated outside the Study Area. Because so much of the travel in the Study Area has an origin and/or destination outside the Study Area, a broader look at the region is required to understand the type of travel demand served by the Sepulveda corridor.

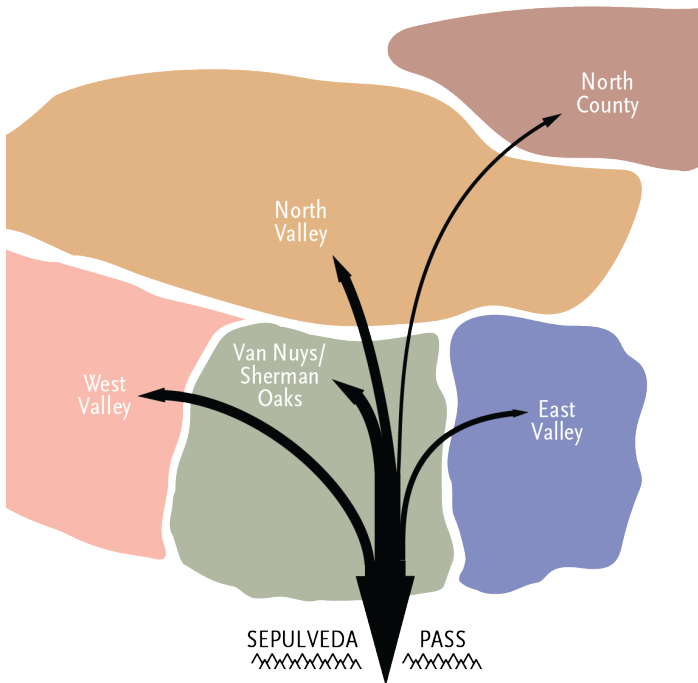
Every trip has two ends—an origin and a destination. Pairs of trip ends with large numbers of trips between them constitute major travel markets. Figure 2-11 illustrates the primary travel markets for trips through the Sepulveda Pass and across Ballona Creek.

Figure 2-11 presents an analysis of the endpoints of trips that travel through the corridor in the Sepulveda Pass or at Ballona Creek. Panel A of the figure illustrates the northern ends of trips that travel through the Sepulveda Pass. The northern

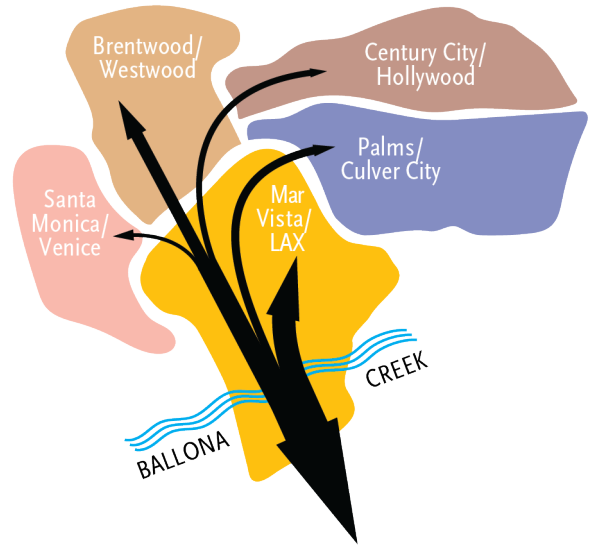
ends of these trips are spread throughout the San Fernando Valley and North Los Angeles County, with three large areas in the Valley having shares ranging from 21 percent to 25 percent. The northern end of 87 percent of these trips is located in one of five areas: Van Nuys/Sherman Oaks (25 percent), North Valley (21 percent), West Valley (21 percent), East Valley (12 percent), and North County (8 percent).

Panel B illustrates the southern ends of trips that travel through the Sepulveda Pass. The southern ends of these trips are concentrated in discrete areas on the Westside and near LAX, with 81 percent of these trip ends located in one of five areas: Brentwood/Westwood (31 percent), Mar Vista/Westchester/LAX (20 percent), Century City/Beverly Hills/Hollywood (12 percent), Santa Monica/Venice (10 percent), and Palms/Culver City/Mid-City (8 percent).

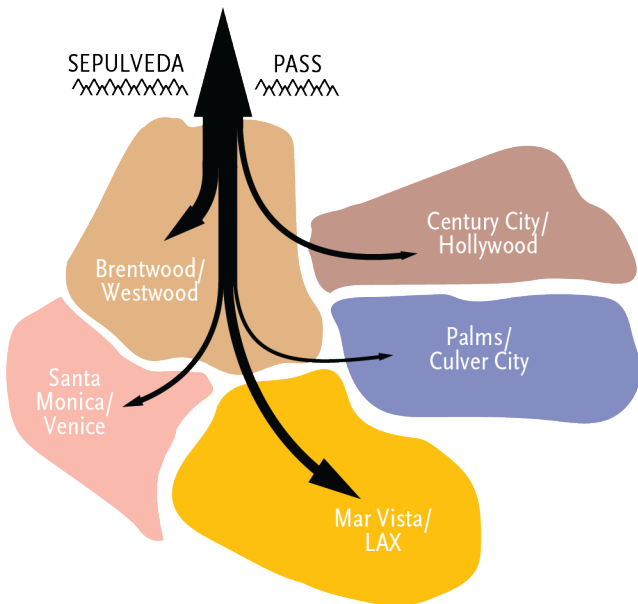
As shown in Panel C, the northern end of trips through the Sepulveda corridor at Ballona Creek reflect a convergence on the Westside similar to the pattern seen for the southern end of trips through the Sepulveda Pass. The northern end of



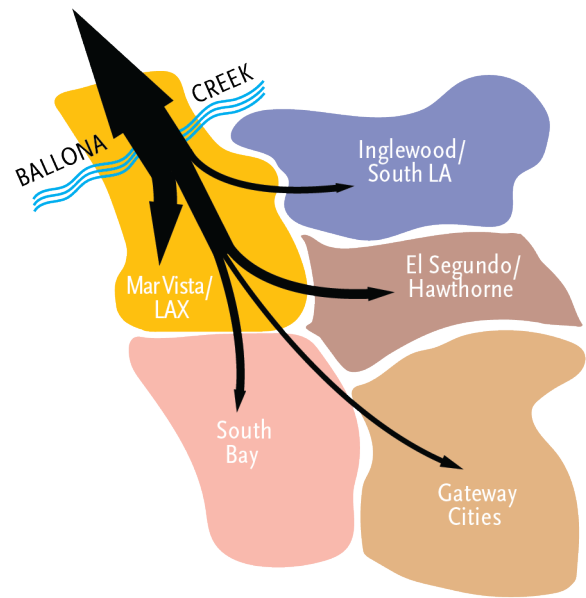
Panel A. The northern ends of trips through the Sepulveda Pass are primarily located in Van Nuys/Sherman Oaks, North Valley, West Valley, East Valley, and North County.



Panel C. The northern ends of trips across Ballona Creek are primarily located in Brentwood/Westwood, Mar Vista/LAX, Century City/Hollywood, Palms/Culver City, and Santa Monica/Venice.



Panel B. The southern ends of trips through the Sepulveda Pass are primarily located in Brentwood/Westwood, Mar Vista/LAX, Century City/Hollywood, Santa Monica/Venice, and Palms/Culver City.



Panel D. The southern ends of trips across Ballona Creek are primarily located in Mar Vista/LAX, El Segundo/Hawthorne, the South Bay, Gateway Cities, and Inglewood/South Los Angeles.

Figure 2-11 Primary Sources of Trips Through the Sepulveda Pass and Across Ballona Creek

Source: Sepulveda Mobility Partners, 2019

73 percent of these trips is in one of five areas south of the Santa Monica Mountains: Brentwood/Westwood (23 percent), Mar Vista/Westchester/LAX (23 percent), Century City/Beverly Hills/Hollywood (10 percent), Palms/Culver City/Mid-City (10 percent), and Santa Monica/Venice (7 percent).

As shown in Panel D, many of these trips that cross Ballona Creek are relatively local, with the southern end of almost half of these trips in Mar Vista/Westchester/LAX (46 percent). Most of the rest of the southern trip ends are distributed throughout El Segundo/Hawthorne/Westmont (19 percent), the South Bay (16 percent), the Gateway Cities (10 percent), and Inglewood/South Los Angeles (7 percent).

Overall, these patterns demonstrate the significance of the Westside for travelers using the corridor coming from both north and south of the Study Area, as well as within the Study Area itself. As these travel patterns show, trips through the Sepulveda Pass have relatively few origins or destinations south of SR 90, and trips through the corridor at SR 90 have relatively few origins or destinations north of the Sepulveda Pass.

2.4 Forecast Growth in Travel

Travel to and from the Study Area is forecast to increase; the total number of trips generated within the Study Area (productions plus attractions) is forecast to grow by approximately 17 percent by 2042 and a total of 24 percent by 2057. This increase is in part the result of expected population and employment growth. Table 2-3 summarizes the existing and forecast population and employment growth throughout the areas that generate the most trips through the Sepulveda corridor (those illustrated in Figure 2-11).

2.5 Planned Transportation Improvements

As shown in Figure 2-12, existing rail and busway lines within and near the Study Area primarily serve east-west travel; there is no rail line or busway that directly connects the Valley, Westside, and LAX areas. Among these east-west lines are the Metro Orange Line, the Metro Expo Line, and the Metro Green Line.

As also shown in Figure 2-12, multiple new rail and busway lines and improvements to existing lines are under construction or planned within and near the Study Area. Among east-west lines, the extension of the Metro Purple Line into the Study Area is scheduled to open in 2026, and improvements to the Metro Orange Line are currently in the design phase, with conversion to rail scheduled for 2057.

The East San Fernando Valley Light Rail Transit Corridor and Metro Crenshaw/LAX Line will provide north-south transit service through different portions of the Study Area to connect to major activity centers; however, these planned lines are largely outside of the Study Area, and only at the Study Area's northern or southern ends. A northern extension of the Crenshaw/LAX Line to the Metro Red Line is currently scheduled to be completed in 2047.

In the Sepulveda corridor itself, ExpressLanes on I-405 are scheduled for implementation in 2026.

2.6 Project Purpose

The Sepulveda corridor provides a crucial transportation link across the Santa Monica Mountains and through the Westside of Los Angeles, connecting the heavy concentration of households in the San Fernando Valley with major employment and activity centers on the Westside, including such major travel destinations as Westwood, UCLA, Century City, and LAX. More broadly, the corridor serves trips from throughout western Los Angeles County and beyond.

With increasing population, employment, and travel, congestion on I-405 and other Study Area roadways is likely to increase and extend over longer periods of the day unless there is substantial investment in new system capacity. As congestion grows, San Fernando Valley residents will see their access to Westside destinations decline. While Metro is considering the conversion of the existing HOV lanes on I-405 to ExpressLanes, and possibly adding an ExpressLane in each direction, opportunities to add highway capacity are severely constrained by topographic conditions in the Santa Monica Mountains. Because existing and future travel demand in the corridor far exceeds the

Table 2-3. Population and Employment Growth in Areas Served by the Sepulveda Corridor

	2017	2042	GROWTH 2017-2042	2057	GROWTH 2017-2057
Population	7,741,310	8,807,877	13.8%	9,447,803	22.0%
Employment	3,370,911	4,058,268	20.4%	4,470,618	32.6%

Source: Metro Travel Demand Model, 2017a



Figure 2-12 Rail, Busway, and Highway Projects in Planning or Construction

Source: Sepulveda Mobility Partners, 2018

available highway capacity, the addition of highway lanes would increase vehicle miles traveled (VMT), vehicle hours traveled (VHT), and greenhouse gas emissions without providing a reliable travel option that is not subject to roadway congestion.

Metro intends to extend the Purple Line to Westwood by 2026. This will enable people to travel from the San Fernando Valley to Westwood via a combination of the Metro Orange Line, the Metro Red Line, and the Metro Purple Line. This route is indirect and will involve multiple transfers. A direct route between the San Fernando Valley and the Westside, operating on a dedicated guideway to increase speed and reliability, would be more competitive with the automobile and attract more riders to transit.

The southern part of the LAX area is currently served by the Metro Green Line, and it will be better served when the

Crenshaw/LAX Line begins operations. A trip from the Valley to the LAX area will then be possible by taking the Metro Orange Line to the Metro Red Line, then transferring to either the Metro Expo and Crenshaw/LAX Lines or to the Metro Blue and Green Lines.

Based on the considerations discussed in this chapter, Metro has identified the following purpose for the Sepulveda Transit Corridor Project:

The purpose of the Project is to provide a high-quality transit service that effectively serves a large and growing travel market between the San Fernando Valley and the Westside, including the LAX area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit corridors.

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3 Evaluation Methodology

Transit concepts for the Valley-Westside and Westside-LAX segments were developed through an iterative evaluation process using performance metrics based on Metro's goals and objectives for the Project.

This chapter describes the process by which transit concepts were developed and evaluated for the Sepulveda Transit Corridor Project. It also reviews the objectives of the Project and presents the performance criteria used in the evaluation of how well each transit concept satisfies those objectives.

3.1 Goals and Objectives

Metro’s 2009 *Long-Range Transportation Plan (LRTP)* (Metro, 2009) expresses a vision for public transportation as follows: “The public transportation system in Los Angeles County will provide services over the next 30 years that provide faster, more convenient ways to travel without a car.” In November 2015, the Metro Board adopted *Performance Metrics Framework for Major Projects* (Metro, 2017b) that included goals and objectives to implement the LRTP’s vision. Based on Metro’s adopted goals and the Project’s Purpose and Need, Metro has established five goals for the Sepulveda Transit Corridor Project:

- > Improve mobility
- > Improve equity of access
- > Protect the environment and support community and economic development
- > Provide a cost-effective solution
- > Minimize project delivery risk

Metro identified a set of specific objectives, as described in Table 3-1, that support each of the Project’s goals and then developed evaluation criteria to measure the performance of each transit concept on each objective.

3.2 Evaluation Process

The initial transit concepts were first evaluated using high-level evaluation criteria. The concepts were then refined, and more detailed evaluation criteria were applied to the refined concepts. The evaluation process was conducted sequentially to the transit concepts for the Valley-Westside segment and then to the concepts for the Westside-LAX segment since the Valley-Westside segment is planned to be constructed and open for service in 2033-2035, while the Westside-LAX segment will open later, in 2057-2059. Conceptual designs were prepared for the refined Valley-Westside concepts, developing them into full alternatives, including specification of operating plans and support facilities. Detailed evaluation was then conducted of these alternatives.

Table 3-1. Project Goals and Objectives

IMPROVE MOBILITY
> Increase transit ridership by directly serving locations with the greatest potential for attracting new riders
> Increase transit frequency and operating speeds
> Reduce the need to transfer and/or the time spent transferring for the most common trips
> Improve on-time performance
> Provide sufficient capacity to accommodate anticipated demand
> Provide convenient connections between existing and planned transit lines
IMPROVE EQUITY OF ACCESS
> Improve accessibility for residential and employment centers
> Support transit-oriented communities (TOC) policies
> Support first/last-mile connections
> Promote investment in disadvantaged communities
PROTECT THE ENVIRONMENT AND SUPPORT COMMUNITY AND ECONOMIC DEVELOPMENT
> Reduce vehicle miles traveled (VMT)
> Reduce air pollutant emissions
> Minimize effects to communities
> Minimize impacts to transportation network
> Minimize other environmental impacts
PROVIDE A COST-EFFECTIVE SOLUTION
> Minimize cost to achieve benefits
> Match cost to available funding
MINIMIZE PROJECT DELIVERY RISK
> Minimize potential for cost increases and delays

Source: Sepulveda Mobility Partners, 2018

Figure 3-1 illustrates the process of development and evaluation of the transit concepts, including the incorporation of input from three rounds of public meetings. Table 3-2 presents the dates of these meetings and the information about the transit concepts shared with the public at each meeting. More information about the public outreach process is provided in Chapter 8 and in Appendix A: Public Input.

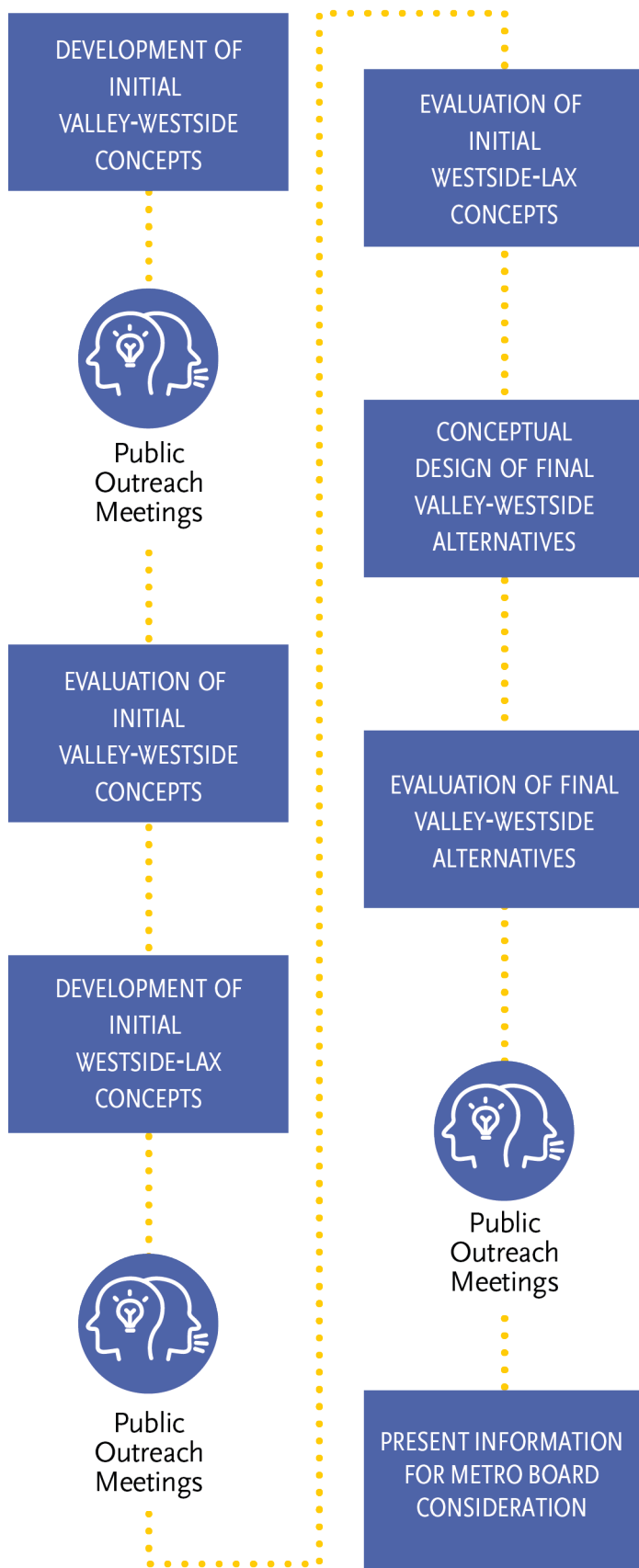


Figure 3-1. Process for Developing and Evaluating Transit Concepts
 Source: Sepulveda Mobility Partners, 2018

Table 3-2. Public Meetings Dates and Topics

DATE	TOPICS PRESENTED
September 2018	> Description of initial Valley-Westside concepts
January and February 2019	> Evaluation of initial Valley-Westside concepts > Description of refined Valley-Westside concepts > Evaluation of refined Valley-Westside concepts > Description of Westside-LAX concepts
July and August 2019	> Description of final Valley-Westside alternatives > Evaluation of final Valley-Westside alternatives > Evaluation of Westside-LAX concepts

3.3 Evaluation Measures

To evaluate the transit concepts, qualitative and quantitative performance measures were derived from the Project’s goals and objectives concerning mobility, equity, and ability to protect the environment and support community and economic development.

At the initial screening stage, the measures relied on either qualitative or high-level quantitative data appropriate to the level of detail available about the transit concepts. This included ridership forecasts for generalized alignments, demographics and land uses near general station locations, and sensitive resources in the vicinity of the alignments that could be impacted by the Project.

At the detailed evaluation stage, the measures relied on more specific data and project design. During the detailed evaluation, alignments and station locations were more precisely defined, with ridership forecasts and community impacts reflecting this increased detail. This included information about the potential property impacts as a result of building the Project, cost estimates to build and operate the Project, and specific design challenges that need to be resolved.

Tables 3-3 through 3-7 present the evaluation criteria used in the initial evaluation of the transit concepts and the detailed evaluation of alternatives, organized by project objective. The methodology used to conduct the ridership forecasting is documented in the *Travel Demand Model Methodology Report* (Metro, 2019g).

Table 3-3. Improve Mobility Evaluation Criteria

INITIAL EVALUATION CRITERIA	DETAILED EVALUATION CRITERIA
Objective: Increase transit ridership by directly serving locations with the greatest potential for attracting new riders	
> Number of daily boardings	> All initial evaluation criteria
> Number of new transit trips	> Station boardings and alightings
Objective: Increase transit frequency and operating speeds	
> Average operating speeds	> All initial evaluation criteria
> Service frequencies	> Service frequencies for peak and non-peak periods
	> Transit travel times between key origin-destination pairs
	> Hours of user benefits
Objective: Minimize need for transfers and/or time spent transferring	
> Number of transfers between major origin-destination pairs, neighborhoods <ul style="list-style-type: none"> • Van Nuys ↔ UCLA • West Valley ↔ UCLA • North Valley ↔ UCLA • Van Nuys ↔ Century City • West Valley ↔ Century City • North Valley ↔ Century City • Van Nuys ↔ Santa Monica • West Valley ↔ Santa Monica • North Valley ↔ Santa Monica 	> Number of transfers between major origin-destination pairs, specific locations <ul style="list-style-type: none"> • Sawtelle Boulevard/Olympic Boulevard ↔ Van Nuys Civic Center • Laurel Canyon Boulevard/Paxton Street ↔ UCLA Medical Center • Balboa Boulevard/Ventura Boulevard ↔ Downtown Los Angeles/Bunker Hill • Van Nuys Boulevard/Sherman Way ↔ Santa Monica Water Garden
	> Out-of-vehicle travel time
Objective: Increase on-time performance and reliability	
> Percent of alignment in exclusive right-of-way	> All initial evaluation criteria
> Presence of rail junction	
Objective: Provide sufficient capacity to accommodate anticipated demand	
> Number of passengers at maximum load point	> All initial evaluation criteria
Objective: Provide convenient connections between existing and planned transit	
> Number and quality of connections to existing and planned Metro rail and busway lines	> All initial evaluation criteria
	> Transfer and wait times at transfer stations

Table 3-4. Improve Equity of Access Evaluation Criteria

INITIAL EVALUATION CRITERIA	DETAILED EVALUATION CRITERIA
Objective: Improve accessibility for residential and employment centers	
<ul style="list-style-type: none"> > 2042 population density (within ½ mile of stations) > 2042 employment density (within ½ mile of stations) > Number and size of planned high-density/mixed use developments (within ½ mile of stations) 	<ul style="list-style-type: none"> > All initial evaluation criteria
Objective: Support TOC policies	
<ul style="list-style-type: none"> > Transit-supportive characteristics <ul style="list-style-type: none"> • Major destinations or activity hubs within walking distance • Planned development for new major destinations or activity hubs within walking distance • Presence of major barriers to access the station from nearby neighborhoods • Ability of station to contribute to a walkable neighborhood • Impact of potential station access infrastructure on quality of built environment • Planned or funded infrastructure projects near the station that are conducive to transit use • Potential for the proposed station to be integrated into existing, future, or adjacent development to support ridership 	<ul style="list-style-type: none"> > All initial evaluation criteria
Objective: Support first/last-mile connections	
<ul style="list-style-type: none"> > Number of connections to bicycle and quality pedestrian facilities (within ½ mile of stations) 	<ul style="list-style-type: none"> > All initial evaluation criteria > Share of station access made by non-motorized modes of transportation
Objective: Investment in disadvantaged communities	
<ul style="list-style-type: none"> > Number of environmental justice (EJ) populations (within ½ mile of stations) > Number of zero-car households (within ½ mile of stations) 	<ul style="list-style-type: none"> > All initial evaluation criteria > Hours of travel time savings for low-income residents

Table 3-5. Protect the Environment and Support Community and Economic Development Evaluation Criteria

INITIAL EVALUATION CRITERIA	DETAILED EVALUATION CRITERIA
Objective: Reduce VMT	
> Regional VMT reduction	> All initial evaluation criteria > Corridor VMT reduction
Objective: Reduce air pollutant emissions	
> Regional VHT reduction	> All initial evaluation criteria > Corridor VHT reduction
Objective: Minimize effects to communities	
> Potential for property impacts > Potential for traffic and noise impacts during construction > Potential for visual impacts	> All initial evaluation criteria
Objective: Minimize impacts to transportation network	
> Estimated traffic lane miles to be removed > Estimated parking lanes to be removed > Estimated length of bicycle and pedestrian facilities to be added or removed	> All initial evaluation criteria
Objective: Minimize other environmental impacts	
> Environmental justice – impacts to communities that are more than 50 percent minorities or more than 50 percent impoverished. > Other potential impacts to environmental resources.	> All initial evaluation criteria > Qualitative assessment of potential impacts to major environmental resources: <ul style="list-style-type: none"> • Archaeological resources • Hazardous materials • Historic resources • Noise and vibration • Section 4(f) resources—publicly owned park and recreation areas that are open to the general public, publicly owned wildlife and waterfowl refuges, and public or privately owned historic sites • Seismic hazards • Water resources

Table 3-6. Provide a Cost-Effective Solution Evaluation Criteria

INITIAL EVALUATION CRITERIA	DETAILED EVALUATION CRITERIA
Objective: Minimize cost to achieve benefits	
> Not included in initial evaluation	<ul style="list-style-type: none"> > Annualized capital and operating and maintenance (O&M) cost per new transit trip > Cost per hour of user benefit
Objective: Match cost to available funding	
> Not included in initial evaluation	<ul style="list-style-type: none"> > Capital cost compared to available local funds > Competitiveness for FTA funds based on Capital Investment Grants justification criteria <ul style="list-style-type: none"> • Current financial conditions • Commitment of funds • Feasibility of financial plan • Environmental benefits • Mobility improvements • Congestion relief • Cost-effectiveness • Economic development • Land use > Qualitative assessment of potential to attract private-sector funding

Table 3-7. Minimize Risk Evaluation Criteria

INITIAL EVALUATION CRITERIA	DETAILED EVALUATION CRITERIA
Objective: Minimize potential for cost increases and delays	
> Not included in initial evaluation	<ul style="list-style-type: none"> > Qualitative assessment of unresolved major engineering challenges > Dependence on decisions made by other projects or other agencies

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4 Development and Screening of Initial Concepts

The initial transit concepts included a variety of modes and alignments that offered the potential to meet the travel needs in the Sepulveda corridor. Refined concepts provided additional capacity in the San Fernando Valley.

This chapter describes the process of developing and evaluating the initial set of transit concepts for the Valley-Westside segment of the Sepulveda Transit Corridor Project, beginning with the identification of appropriate modes, design configurations, and termini. More detail about the process, the concepts considered, and the evaluation can be found in the *Initial Screening Report* (Metro, 2019a).

4.1 Development Process for Initial Concepts

4.1.1 Screening of Modes

The development of transit concepts began with the evaluation of various transit modes for their applicability to the Sepulveda corridor. Several characteristics of the Study Area discussed in Chapter 2 are of particular note in assessing the suitability of a transit mode for the corridor:

- > The San Fernando Valley, the Westside, and the LAX area all have multiple employment concentrations and multiple activity centers, with some activity centers separated by a distance of one mile or less.
- > The San Fernando Valley and the Westside are separated by the Santa Monica Mountains, so there is a distance of over five miles between the activity centers of these two areas.
- > Existing Metro transit service over the Sepulveda Pass has a scheduled average speed of less than 16 miles per hour (mph) during peak hours and an on-time performance of less than 50 percent.
- > The existing transportation facility in the corridor (I-405) has grades of over six percent.

Therefore, based on the conditions in the Study Area, only transit technologies that satisfy the following criteria were determined to be appropriate for consideration in the corridor:

- > Proven in revenue operations on a line-haul system
- > Able to support multiple stations serving a variety of origins and destinations
- > Able to sustain a speed of at least 45 mph between stations to be competitive with the automobile
- > Able to accelerate and decelerate quickly between closely spaced stations
- > Employ a vehicle design capable of quickly loading and unloading passengers
- > Able to operate as an extension of an existing or planned transit technology within the Study Area or support an efficient transfer station design

Based on a review of the characteristics of a variety of transit technologies, four modes were selected for development of the initial transit concepts: heavy rail transit (HRT), light rail transit (LRT), monorail, and rubber-tire transit. Table 4-1 presents more information about each of these modes, as well as modes that were reviewed but not selected for further study.

4.1.2 Screening of Termini, Alignment Segments, and Configurations





After selection of modes for consideration in the corridor, the next step in the development of the initial concepts was to identify northern and southern termini for the Valley-Westside segment. A northern terminus at each of the Metro Orange Line stations within the Study Area (Van Nuys, Sepulveda, and Woodley) was considered, and a southern terminus at each of the Metro Expo Line stations within the Study Area (Westwood/Rancho Park, Sepulveda, and Bundy) was considered. The significantly lower existing ridership of the Metro Orange Line Woodley Station and the Metro Expo Line Westwood/Rancho Park Station compared to the other stations on their respective lines and the low density, residential nature of their surrounding land uses led these potential termini to be dismissed from consideration early in the alternative development process.

To facilitate the development of the initial concepts for the Valley-Westside segment, the area traversed by the segment was divided into three separate sections with distinct physical characteristics:

- > San Fernando Valley: North of Valley Vista Boulevard
- > Sepulveda Pass: Valley Vista Boulevard to Sunset Boulevard
- > Westside: Sunset Boulevard to I-10

Alignments were identified within each section that followed roadway rights-of-way or connected potential termini directly. These alignment segments were screened based on major physical constraints, the ability to connect key activity centers, and any advantages offered that other alignment options lacked. Major physical constraints were determined by comparing typical transit design configurations and alignments for the modes selected for development to existing right-of-way widths and the surrounding community or environment. Appendix A of the *Initial Screening Report* (Metro, 2019a) describes alignments not pursued as part of the initial concepts and describes in detail the reasons for not pursuing them.

Table 4-1. Transit Modes Considered

HEAVY RAIL TRANSIT (HRT)	LIGHT RAIL TRANSIT (LRT)	MONORAIL	RUBBER TIRE
			
<p>HRT supports multiple stations, can sustain speeds over 45 mph, accelerates and decelerates quickly, and supports rapid loading and unloading of passengers due to the number of double-stream doors on vehicles. It could operate as an extension of an existing heavy rail line, with efficient transfers to other lines.</p>	<p>LRT supports multiple stations, can sustain speeds over 45 mph, accelerates and decelerates quickly, and supports rapid loading and unloading of passengers due to the number of double-stream doors on vehicles. It could operate as an extension of an existing or planned light rail line, with efficient transfers to other lines.</p>	<p>Because they offer similar benefits, it was determined that monorail and rubber tire (MRT) technology would be considered as one mode for the purpose of this study. Both can sustain speeds over 45 mph and can accelerate and decelerate quickly. Both support multiple stations, can sustain speeds over 45 mph, accelerate and decelerate quickly, support rapid loading and unloading of passengers, and can provide efficient transfers to other lines. Both offer potential benefits in the Sepulveda corridor, as they can traverse steeper grades than steel wheel vehicles.</p>	

The following modes were not considered further in the development of the initial transit concepts in this study:

- > Commuter Rail as currently operated in Los Angeles County does not typically support rapid loading and unloading of passengers because vehicles are designed to maximize seating capacity.
- > Maglev speed and acceleration advantages are of little practical value in the context of an urban transportation system with station spacing of one to five miles.
- > Gondola systems are in very limited use around the world, particularly as a transit technology. Their top sustained speed is below 30 mph, and support of multiple stations is very challenging as cabs must leave and reenter the guideway at each station.
- > Cog rail has a top sustained speed below 30 mph.
- > Personal Rapid Transit typically uses small battery-powered vehicles with limited range and a 25 mph maximum speed. Stations require individual berths for the loading of each vehicle, so the design of a station that facilitates transfers with a high-capacity system would be challenging because of the number of vehicle berths that would be required.

Considered and Eliminated




The significantly lower existing ridership of the Woodley Station on the Metro Orange Line and the Westwood/Rancho Park Station on the Metro Expo Line compared to the other stations on these lines within the Study Area, as well as the low density, residential nature of the land uses adjacent to these stations led these potential termini and alignment options unique to these termini to be dismissed from consideration early in the alternatives development process.

The design configurations considered for the initial Valley-Westside transit concepts included at grade, aerial, and below grade:

- > At-grade configuration – Because of the train lengths and/or train frequencies needed to accommodate demand in the corridor, an at-grade configuration was only considered through the Sepulveda Pass, where the alignment would not cross roadways or other fixed-guideway systems.
- > Aerial Configuration – An aerial configuration was considered where the width of the public right-of-way could accommodate the placement of columns to support the guideway.
- > Below-Grade Configuration – A below-grade configuration was considered for sections of the corridor where right-of-way constraints could prohibit an aerial alignment without substantial acquisition of properties or other impacts.

Table 4-2 summarizes the reasons that each configuration was or was not considered in each section of the corridor.

Table 4-2. Design Configurations Considered

AT GRADE	AERIAL	BELOW GRADE
		
San Fernando Valley		
Configuration rejected because required train lengths would block consecutive cross streets.	Configuration considered.	Configuration considered.
Sepulveda Pass		
Configuration considered for MRT adjacent to freeway where there are no roadway crossings; grade is too steep for HRT or LRT.	Configuration considered for MRT adjacent to the freeway; grade is too steep for HRT and LRT.	Configuration considered.
Westside		
Configuration rejected because required train lengths would block consecutive cross streets.	Configuration rejected because major north-south roadways do not have sufficient continuous width to accommodate structure columns.	Configuration considered.

4.2 Initial Valley-Westside Concepts

The screening of alignment sections and configurations resulted in the development of several HRT, LRT, and MRT concepts to undergo initial evaluation, including public review and comment. The initial alignment concepts, alternative termini, and general station locations are shown in Figure 4-1

The initial transit concepts each consist of an alignment from the San Fernando Valley to the Westside, connecting the East San Fernando Valley Light Rail Transit Corridor to the Metro Purple Line and Expo Line via HRT, LRT, or MRT. The concepts vary in termini, connection points, modes, and alignments, but all attempted to meet the Project's Purpose and Need by serving the primary travel markets in the corridor.

Initial transit concepts connecting to the Metro Orange Line at the Sepulveda Station were extended farther north to provide a direct connection to the East San Fernando Valley Light Rail Transit Corridor, resulting in additional possible northern termini at stations on that planned transit line. Transit concepts considered included both new lines for the Metro system and an extension of the Metro Purple Line.

Concepts and Options

Each transit concept was defined by its mode and primary route. Concept 1 and Concept 2 are both HRT, but Concept 1 is primarily on Van Nuys Boulevard and Concept 2 is primarily on Sepulveda Boulevard. Concept 3 and Concept 4 are both LRT, but Concept 4 has a branch to Sepulveda Boulevard. Concept 5 is the only monorail or rubber tire concept. Concept 6 is an extension of another planned Metro Rail line.

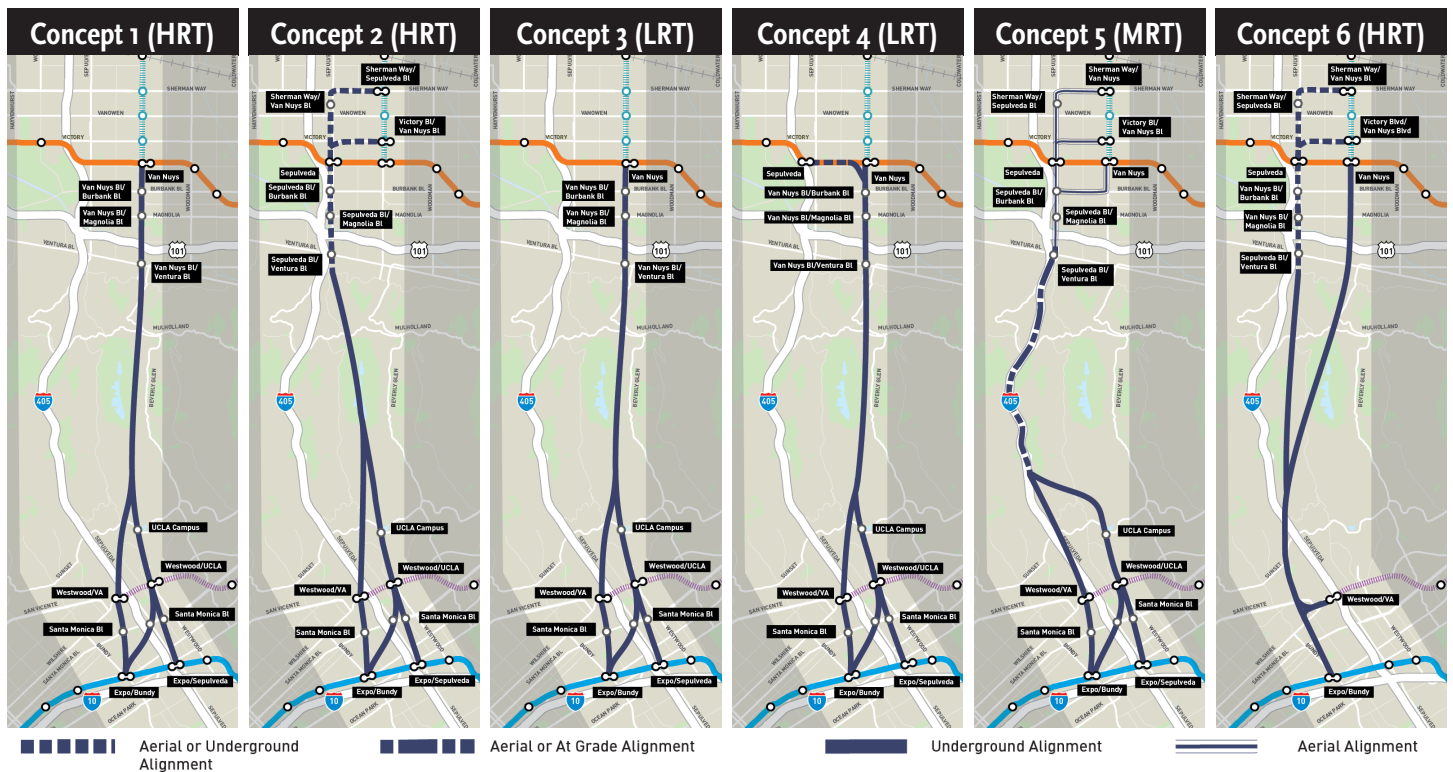


Figure 4-1 Initial Valley-Westside Concepts

Source: Sepulveda Mobility Partners, 2018

4.2.1 Concept 1

Concept 1 is an approximately 10-mile HRT line entirely underground. Its northern terminus would be located at the Metro Orange Line Van Nuys Station where it would connect with the southern terminus of the planned East San Fernando Valley Light Rail Transit Corridor via transfer. South of the Santa Monica Mountains, Concept 1 would connect with the Metro Purple Line at the Westwood/UCLA Station or the Westwood/VA Station. The option connecting at the Westwood/VA Station would then continue to the Metro Expo Line at the Expo/Bundy Station. The option connecting at the Westwood/UCLA Station could continue to the Metro Expo Line at either the Expo/Sepulveda Station or the Expo/Bundy Station. Concept 1 would operate at 4-minute peak headways and 10-minute off-peak headways, consistent with other Metro HRT systems.

4.2.2 Concept 2

Concept 2 is an approximately 9- to 14-mile HRT line, either entirely in a tunnel or with an option of 3 to 5 miles of aerial guideway on Sepulveda Boulevard and Victory Boulevard or Sherman Way in the San Fernando Valley. Its northern terminus would be located above or below the planned Victory Station or Sherman Way Station on the East San Fernando Valley Light Rail Transit Corridor, with its connection to the Metro Orange Line at the Metro Orange Line Sepulveda Station. South of the Santa Monica Mountains on the Westside, alignment, connection, and terminus options would be the same as those in Concept 1. Concept 2 would operate at 4-minute peak headways and 10-minute off-peak headways, consistent with other Metro HRT systems.

4.2.3 Concept 3

Concept 3 is an approximately 10-mile extension of the East San Fernando Valley Light Rail Transit Corridor south through the Santa Monica Mountains and Westside to the Metro Expo Line that would transition to a tunnel south of the Metro Orange Line and remain entirely underground to the Metro Expo Line. As an extension of a planned LRT line, it would also be LRT. Service from the Sylmar/San Fernando Metrolink Station to the Metro Expo Line would operate at 5 minute peak headways, consistent with other Metro LRT systems. Another service from the Metro Orange Line to the Metro Expo Line would also operate at 5-minute peak headways. With two services operating at 5-minute headways, the headway between the Metro Orange Line and Metro Expo Line would be 2.5 minutes. South of the Santa Monica Mountains on the Westside, alignment, connection, and terminus options would be the same as those in Concept 1.

4.2.4 Concept 4

Concept 4 is an approximately 10-mile extension of the East San Fernando Valley Light Rail Transit Corridor south through the Santa Monica Mountains and Westside to the Metro Expo

Line that would transition to a tunnel south of the Metro Orange Line and remain entirely underground to the Metro Expo Line. This LRT line would include a junction south of the Metro Orange Line. Half of the trains would travel on the East San Fernando Valley Light Rail Transit Corridor from Sylmar to the Westside, and the other half would travel from the Metro Orange Line Sepulveda Station to the Westside, with both ending at the Expo Line in the south. Each branch would operate at 5-minute headways during the peak period, resulting in a combined 2.5-minute peak headway between the Metro Orange Line and the Metro Expo Line. South of the Santa Monica Mountains on the Westside, the alignment, connection, and terminus options would be the same as those in Concept 1.

4.2.5 Concept 5

Concept 5 is an approximately 10- to 15-mile rubber tire or monorail train with 6 to 10 miles of aerial guideway through the Sepulveda Pass and on Sepulveda Boulevard and Sherman Way, Victory Boulevard, Burbank Boulevard, or Van Nuys Boulevard and 4 miles of tunnel. Its northern terminus would be at the planned Victory Station or Sherman Way Station on the East San Fernando Valley Light Rail Transit Corridor or the Metro Orange Line Van Nuys Station, which is the planned East San Fernando Valley Light Rail Transit Corridor southern terminus. On the Westside, the alignment, connection, terminus options, and headways would be the same as those in Concept 1.

Concept 5 is the only concept that proposes traversing the Santa Monica Mountains aboveground rather than in a tunnel. Coming out of the Westside, the alignment would transition from a tunnel to an aerial configuration just north of the Getty Center Drive interchange on I-405 and use aerial structure and cut-and-fill throughout the Sepulveda Pass, adjacent to I-405. Once in the San Fernando Valley, the alignment would remain aerial.

4.2.6 Concept 6

Concept 6 is a 9- to 15-mile extension of the Metro Purple Line to the San Fernando Valley and the Metro Expo Line from its current planned terminus at the Westwood/VA Station. The alignment would tunnel through the mountains and remain in a tunnel to a terminus at the Metro Orange Line Van Nuys Station, or portal in the San Fernando Valley for an aerial alignment on Sepulveda Boulevard, terminating at the planned East San Fernando Valley Light Rail Transit Corridor at the Sherman Way Station or Victory Station, as in Concept 2. The southern terminus would connect to the Metro Expo Line at the Expo/Bundy Station.

For this concept, a three-way junction would need to be constructed in Brentwood just west of the Westwood/VA Station to allow for the operation of three routes: Valley (Metro Orange Line or East San Fernando Valley Light Rail Transit

Corridor) to Westside (Metro Expo Line), Downtown Los Angeles to Valley, and Downtown to Westside. Each line would operate at 8-minute peak headways for a combined 4-minute peak headway on each branch of the lines.

4.3 Initial Screening

The purpose of the evaluation of the initial concepts is to screen lower performing concepts using the initial evaluation criteria described in Chapter 3 and to identify refinements of the higher performing concepts that can be carried into the final evaluation. This section summarizes the evaluation of the initial transit concepts, organized by the project goals. The detailed evaluation of the initial concepts is provided in Appendix B of the *Initial Screening Report* (Metro, 2019a).

To evaluate the project goal to improve mobility, ridership forecasts were conducted for the year 2042. The 2042 transit network is assumed to include all projects identified as being completed by 2042 in the *Measure M Expenditure Plan* (Metro, 2016a). Figure 4-2 compares the ridership performance of each concept. A summary of the travel forecasting results for the initial concepts can be found in Appendix B: Travel Forecast Results.

Closer inspection of the ridership forecasts revealed that demand on the Sepulveda corridor would be so great that all concepts would increase the demand on the East San Fernando Valley Light Rail Transit Corridor near or beyond its planned capacity. As shown in Figure 4-3, this issue was most notable for the LRT concepts (Concept 3 and Concept 4), which would function as extensions of the East San Fernando Valley Light Rail Transit Corridor. Although the LRT concepts would provide a headway of only 2.5 minutes south of the

Base Concepts

Each concept included multiple options for northern and southern termini, resulting in a total of 27 different end-to-end alignments. Comparisons of ridership forecasts across the options revealed two patterns: the farther north the option’s terminus, the greater the ridership, and almost no difference between the Expo/Bundy and Expo/Sepulveda terminus options. To simplify and equitably compare the initial concepts, this section presents most measures for each concept with only its northernmost terminus option and a single southern terminus at the Expo/Sepulveda Station.

Peak Load Point

A peak load point is the point on a transit line at which the number of riders is greatest, or at its “peak.” This point is designated by the stop at which this load is achieved. A transit line should have the capacity to accommodate its peak load.

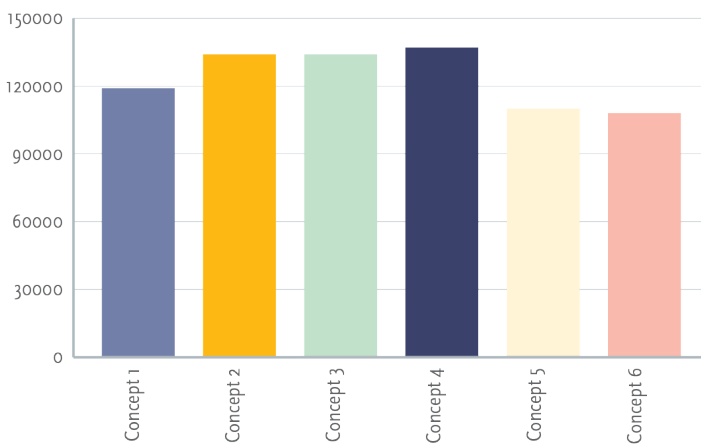


Figure 4-2. Daily Boardings on Initial Concepts

Source: Sepulveda Mobility Partners, 2018

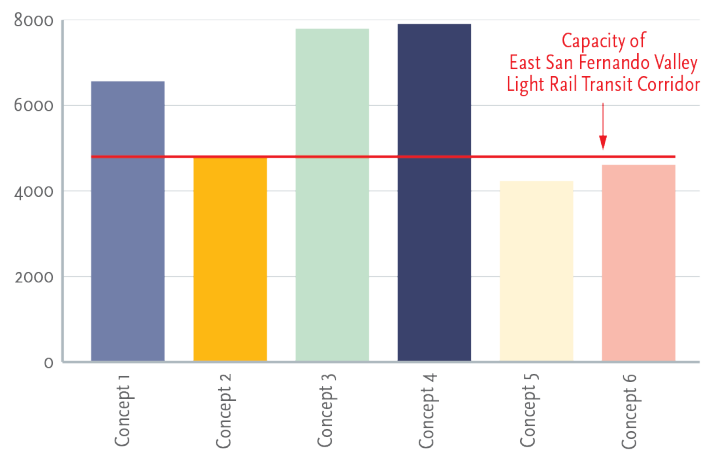


Figure 4-3. East San Fernando Valley Light Rail Transit Corridor Peak Load

Source: Sepulveda Mobility Partners, 2018

Note: LRT capacity of 4,800 passengers per hour is based on a 3-car train running at a 5-minute headway, with each car accommodating approximately 133 passengers. Peak loads occur in the southbound direction in the AM and the northbound direction in the PM.

Metro Orange Line, the peak load point on these concepts would occur north of the Metro Orange Line, where the headway would be 5 minutes, resulting in a capacity of 4,800 riders per hour. For both Concepts 3 and 4, this peak load would exceed the line's hourly capacity by thousands of riders.

Because of the inability of the connecting service on the East San Fernando Valley Light Rail Transit Corridor to accommodate the demand attracted by the Sepulveda Transit Corridor Project, none of the initial transit concepts would be able to fully address the Project's Purpose and Need or serve the identified travel markets. Therefore, it was necessary to develop refined concepts for the Valley-Westside segment.

The evaluation of the initial concepts with respect to other project objectives yielded further insights that guided the refinement of the concepts. For example, the options to connect to the Metro Purple Line at its Westwood/VA Station had daily ridership forecast almost 25 percent lower than the corresponding options to connect at the Westwood/UCLA Station, primarily because the Westwood/UCLA Station alignment options allow for a station on the UCLA campus while the Westwood V/A options do not.

Concepts were also evaluated on the project goal to improve equity of access. All concepts performed relatively similarly overall on the equity of access evaluation measure, with different strengths and weaknesses based on the route. Concepts with stations on Sepulveda Boulevard in the Valley served the highest employment densities, while concepts with stations on Van Nuys Boulevard served the highest population densities and the most potential EJ and transit-dependent populations. Overall, neither the Sepulveda Boulevard nor Van Nuys Boulevard alignments served all potential riders and markets the best on every equity of access measure.

In accordance with the project goal to protect the environment and support community and economic development, all concepts would need to address potential environmental concerns, including property impacts, noise impacts, visual impacts, traffic and parking impacts, and other physical changes to communities. Concepts with aerial or at-grade alignment options would likely have greater environmental impacts related to surface conflicts, such as visual, noise, vibration, and property, compared to concepts with underground alignments.

While the aerial alignment components of Concepts 2, 5, and 6 would all result in more potential property impacts than would the all-tunnel concepts, Concept 6 to extend the Metro Purple Line would have additional property and construction impacts because of its need for a complex three-way junction on the Westside.

4.4 Refined Valley-Westside Concepts

The increased demand on the East San Fernando Valley Light Rail Transit Corridor beyond its planned capacity resulted in the need to revise the initial concepts to provide additional capacity to serve the travel markets to the north of the Sepulveda Transit Corridor Project.

One possibility considered was to increase capacity on the East San Fernando Valley Light Rail Transit Corridor, consistent with its approval by the Metro Board of Directors as an at-grade LRT system. Capacity on a rail line can be increased by increasing the train frequency or using a longer trainset. However, operational factors and design factors related to at-grade crossings and block length, as well as the local community-serving intent of the East San Fernando Valley Light Rail Transit Corridor, made modifying its design and service plan to support a more frequent than 5-minute headway not practical.

Therefore, to serve the demand to access the Sepulveda corridor from the north, the HRT and MRT initial concepts were refined and extended farther north, alleviating passenger loads on the East San Fernando Valley Light Rail Transit Corridor. The LRT concepts (Concepts 3 and 4) were eliminated from further consideration because they could not be refined to provide additional capacity between the Metrolink Van Nuys Station and the Metro Orange Line. The Purple Line Extension (Concept 6) was eliminated because its inability to support a UCLA campus station resulted in the lowest ridership. Additionally, because the option to connect to the Purple Line at the Westwood/VA Station performed poorly in terms of ridership compared to the option to connect at the Westwood/UCLA Station across all concepts, this option was eliminated from consideration.

After Concepts 3, 4, and 6 were eliminated, the remaining concepts were regrouped by mode, as illustrated in Figure 4-4. Concept 1 on Van Nuys Boulevard in the Valley was refined and extended to become HRT 1, with a variation becoming HRT 2. Concept 2 on Sepulveda Boulevard was refined and extended to become HRT 3, and Concept 5 was refined and extended to become MRT 1. All of the refined concepts have a northern terminus at the Metrolink Van Nuys Station in the San Fernando Valley. Because of the regional nature of the ridership and the relatively poor performance of the intermediate stations both in the Valley and in the Westside, the intermediate station options at Magnolia Boulevard and Santa Monica Boulevard were not considered as part of the refined concepts. All concepts would operate at 4-minute peak headways and 10-minute off-peak headways.

4.4.1 HRT 1

In the Valley, HRT 1 would remain underground beneath or adjacent to Van Nuys Boulevard, with a northern terminus at the Metrolink Van Nuys Station on the LOSSAN Rail Corridor, a station at the Metro Orange Line Van Nuys Station, and a station at Van Nuys Boulevard and Ventura Boulevard. There would not be intermediate stations between the Metro Orange Line and Metrolink Ventura Line.

South of Ventura Boulevard, HRT 1 would be in a tunnel under the Santa Monica Mountains and below the UCLA campus,

with a station centrally located on the campus. The alignment would then continue south to connect to the Westwood/UCLA Station of the Metro Purple Line.

Terminus at Expo/Sepulveda Station

Under this option, the alignment would travel in a southwest direction from the Westwood/UCLA Station to parallel Sepulveda Boulevard and connect with the Expo/Sepulveda Station. The Sepulveda Transit Corridor station would be underground, while the Expo/Sepulveda Station is aerial, resulting in a two-level separation between stations.

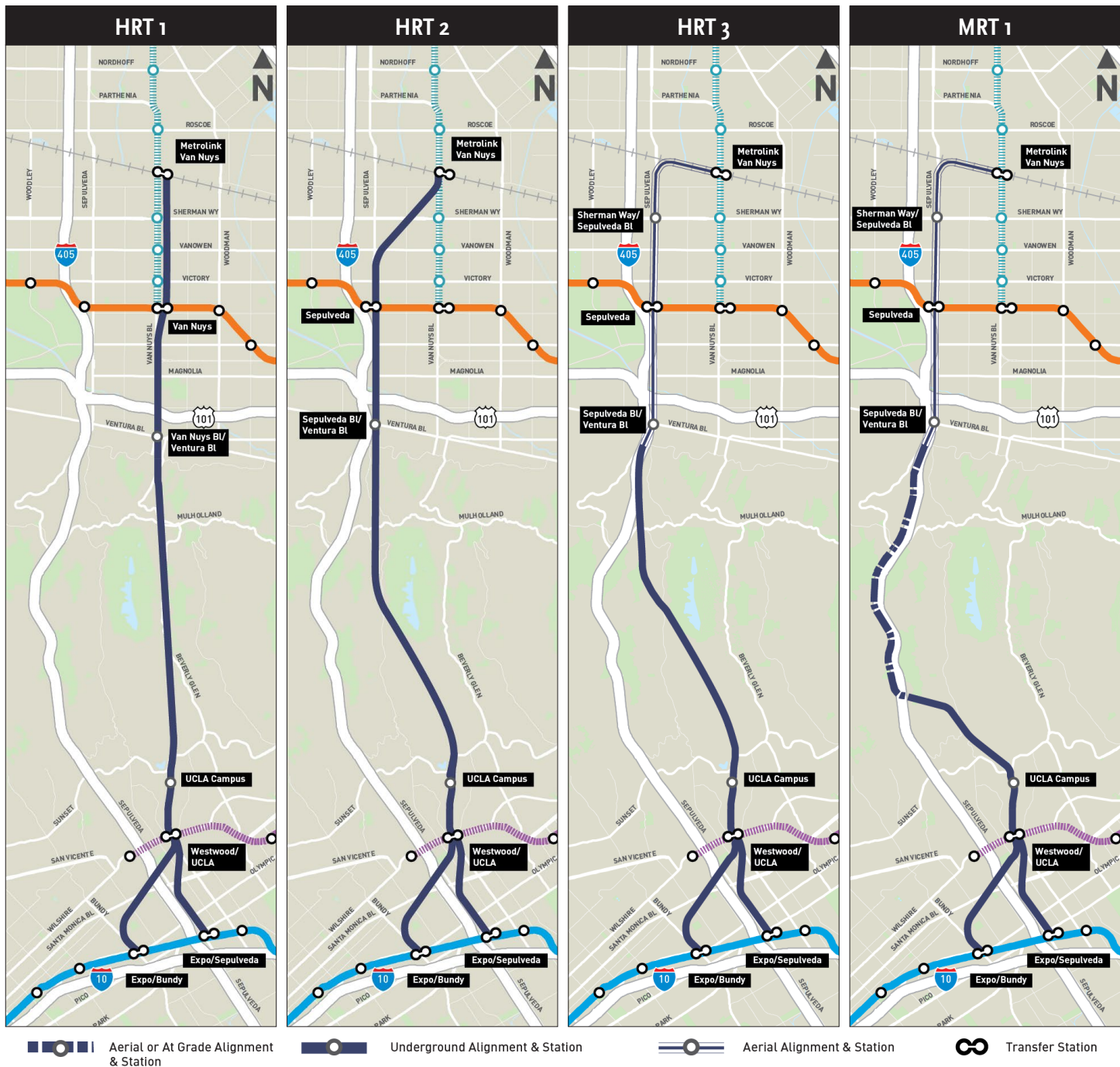


Figure 4-4. Refined Valley-Westside Concepts

Source: Sepulveda Mobility Partners, 2019

Why not refine LRT?

- > Additional capacity cannot be provided by operating longer LRT trains because longer trains and station platforms on the East San Fernando Valley Light Rail Transit Corridor would block cross streets in the San Fernando Valley.
- > Changing the design of the East San Fernando Valley Light Rail Transit Corridor to support longer trains and/or more frequent service would require grade separations and reduction in the number of stations, changing the local-serving nature of the planned line.

Why not refine the Purple Line extension?

- > An extension of the Purple Line past the Westwood/VA Station would not allow for a station on the UCLA campus, resulting in lower ridership than other concepts.
- > An extension of the Purple Line providing service to both the north and the south would require a complex three-way junction, which would increase property and construction impacts.

Terminus at Expo/Bundy Station

Under this option, the alignment would travel in a southwest direction from the Westwood/UCLA Station under I-405 to Bundy Drive and connect to the Expo/Bundy Station. The Sepulveda Transit Corridor station would be underground, while the Expo/Bundy Station is aerial, resulting in a two-level separation between stations.

4.4.2 HRT 2

HRT 2 would remain underground in the San Fernando Valley, with a northern terminus at the Metrolink Van Nuys Station on the LOSSAN Rail Corridor. From the Metrolink Van Nuys Station, it would travel underground to Sepulveda Boulevard. There would be a station at the Metro Orange Line Sepulveda Station, and a station at Sepulveda Boulevard and Ventura Boulevard. There would not be intermediate stations between the Metro Orange Line and Metrolink Ventura Line. Alignment options for this concept on the Westside would be the same as for HRT 1.

4.4.3 HRT 3

HRT 3 would be in an aerial configuration at its connection to the Metrolink Van Nuys Station, traveling west toward Sepulveda Boulevard in the LOSSAN Rail Corridor and turning south into the Sepulveda Boulevard right-of-way where it would remain aerial through most of the San Fernando Valley. The alignment would then enter a tunnel near the location where Sepulveda Boulevard crosses under I-405. There would be one intermediate station between the Metro Orange Line and Metrolink Ventura Line at Sepulveda Boulevard and Sherman Way. As with HRT 1 and 2, there would also be stations at the Metro Orange Line and Ventura Boulevard. Alignment options for this concept on the Westside would be the same as for HRT 1.

4.4.4 MRT 1

MRT 1 would be in an aerial configuration at its connection to the Metrolink Van Nuys Station, traveling west toward Sepulveda Boulevard in the LOSSAN Rail Corridor and turning south into the Sepulveda Boulevard right-of-way, where it would remain aerial through most of the San Fernando Valley. The alignment would remain aboveground through the Sepulveda Pass. As with HRT 3, there would be one intermediate station between the Metro Orange Line and Metrolink Ventura Line at Sepulveda Boulevard and Sherman Way and stations at the Metro Orange Line and Ventura Boulevard.

The alignment would continue aboveground through the Sepulveda Pass, crossing to the west side of I-405 and running parallel to it for the remainder of the aboveground section. The configuration through the Sepulveda Pass would be a combination of aerial structure and at grade, depending on

the height and grade of the ground surface. The alignment would cross back to the east side of I-405 and transition to a below-ground configuration just south of the Getty Center Drive interchange on I-405.

The alignment south of the tunnel portal would continue southeast to the UCLA campus, where it would match the HRT concept alignments and configuration on the Westside.

4.5 Evaluation of Refined Concepts

As with the evaluation of the initial concepts, the purpose of the evaluation of the refined concepts is to screen lower performing concepts and to identify further refinements of the higher performing concepts to develop the final alternatives. The detailed evaluation of each refined concept is provided in Appendix B of the *Initial Screening Report* (Metro, 2019a). The detailed results of the ridership forecasting for the refined concepts can be found in the *Travel Forecasting Results Report* (Metro, 2019h).

4.5.1 Improve Mobility

As shown in Figure 4-5, the mobility evaluation confirmed that all refined concepts avoid overloading the East San Fernando Valley Light Rail Transit Corridor. By allowing passengers traveling to the Westside to transfer to the Sepulveda corridor farther north, the refined concepts keep the East San Fernando Valley Light Rail Transit Corridor from exceeding its capacity and preserve its ability to serve local trips within the San Fernando Valley.

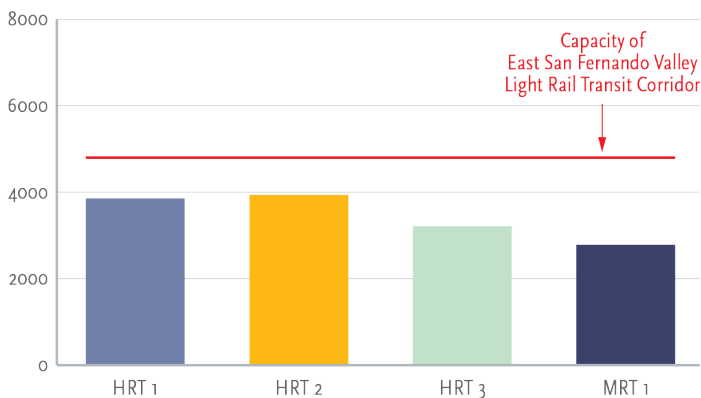


Figure 4-5. East San Fernando Valley Light Rail Transit Corridor Peak Load with Refined Concepts

Source: Sepulveda Mobility Partners, 2019; Metro Ridership Model, 2018

Note: LRT capacity of 4,800 passengers per hour is based on a 3-car train running at a 5-minute headway, with each car accommodating approximately 133 passengers. Peak loads occur in the southbound direction in the AM and the northbound direction in the PM.

Expo Line Terminus Options (all concepts)

Because forecasts show little difference in ridership between Expo Line terminus options, the Expo/Sepulveda option only is presented for purposes of comparing concepts.

With the confirmation that the refined concepts have addressed the system impacts, the transit concepts were evaluated to determine the relative benefits and potential impacts of each concept using the initial evaluation criteria described in Chapter 3.

Table 4-3 summarizes the results of the evaluation of the criteria related to improving mobility. Overall, the HRT refined concepts perform better than the MRT concept on mobility measures, with HRT 3 forecast to have the highest ridership and HRT 1 the fastest end-to-end travel time. Other mobility evaluation measures do not show a significant difference among concepts. A summary of the travel forecasting results for the refined concepts can be found in Appendix B: Travel Forecast Results.

4.5.2 Improve Equity of Access

All refined concepts have the same station options on the Westside and the same northern terminus at the Metrolink Van Nuys Station. Therefore, the evaluation of equity of access measures focused on stations that differ across the concepts. Table 4-4 presents the major differences between the equity

of access measures for the stations that differ between the two alignment corridors in the Valley—Van Nuys Boulevard and Sepulveda Boulevard. Stations on Van Nuys Boulevard generally perform better on equity of access measures than do stations on Sepulveda Boulevard. Data for additional stations shared by all concepts is presented in Appendix B of the *Initial Screening Report* (Metro, 2019a).

4.5.3 Protect the Environment and Support Community and Economic Development

Table 4-5 compares how the refined concepts perform on measures related to protecting the environment and supporting community and economic development. The concepts that attract the greater ridership also result in the greatest reductions in VMT and VHT. With the highest ridership, HRT 3 would provide the greatest reductions in VMT and VHT. Concepts with aboveground segments have greater potential property acquisition, construction, and transportation impacts. HRT 1 and HRT 2 would be entirely underground, limiting most potential environmental and community impacts to station areas.

Table 4-3. Performance of Refined Concepts on Mobility Objectives

	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Increase transit ridership by directly serving origins and destinations with greatest potential for attracting new riders				
Daily boardings	122,661	120,095	133,008	105,482
New transit trips	49,939	49,707	54,616	39,529
Objective: Increase transit frequency and operating speeds				
Travel time ¹ (minutes)	15	16	18	26
Service frequencies	No differences in peak or off-peak service frequencies			
Objective: Minimize need for transfers and/or time spent transferring				
Concepts require the same number of transfers for all regional destinations.				
Objective: Increase on-time performance and reliability				
All concepts in 100% exclusive right-of-way and have no junctions.				
Objective: Provide sufficient capacity to accommodate anticipated demand				
All concepts have capacity to accommodate anticipated demand.				
Objective: Provide convenient connections between existing and planned transit lines				
Metrolink	1-level transfer	1-level transfer	1-level transfer	1-level transfer
East San Fernando Valley Light Rail Transit Corridor	1-level transfer	1-level transfer	2-level transfer	2-level transfer
Metro Orange Line	2-level transfer	2-level transfer	1-level transfer	1-level transfer
Metro Purple Line	1-level transfer	1-level transfer	1-level transfer	1-level transfer
Metro Expo Line	2-level transfer	2-level transfer	2-level transfer	2-level transfer

Source: Sepulveda Mobility Partners, 2018; Metro Travel Demand Model, 2017a; Connetics Transportation Group, 2018

¹ Travel times shown are from Van Nuys Metrolink to Expo Line.

Table 4-4. Performance of Refined Concepts on Equity of Access Objectives

	HRT 1 ¹		HRT 2, HRT 3, MRT 1 ¹	
Objective: Improve accessibility for residential and employment centers				
Station	Van Nuys/Ventura	Metro Orange Line Van Nuys	Sepulveda/Ventura	Metro Orange Line Sepulveda
Persons/square mile	12,809	17,176	11,480	7,129
Jobs/square mile	12,050	12,862	21,974	13,275
Objective: Support transit-oriented communities policies				
Support for transit-oriented communities policies	Moderately to highly supportive at: > Van Nuys/Ventura > Metro Orange Line Van Nuys		Moderately supportive at: > Sepulveda/Ventura > Metro Orange Line Sepulveda	
Objective: Support first/last-mile connections				
Support connections	Existing and planned pedestrian, cycling, and transit access to potential stations along Van Nuys Boulevard provides more supportive connections than Sepulveda Boulevard		Less supportive first/last-mile connections at Sepulveda/Ventura and Metro Orange Line Sepulveda	
Objective: Investment in disadvantaged communities				
Community	Van Nuys/Ventura	Metro Orange Line Van Nuys	Sepulveda/Ventura	Metro Orange Line Sepulveda
Low-income residents	720	3,257	400	392
Minority residents	1,635	7,138	1,647	1,423
Zero-car households	170	591	123	67

Source: Sepulveda Mobility Partners, 2018; Fehr & Peers, 2018; Torti Gallas + Partners, 2018

¹ All equity of access metrics reflect population within one-half mile of the station site. At this early level of design, HRT 3 and MRT 1 are considered to have identical station locations and configurations.

4.5.4 Recommendation of Concepts for Further Study

All four concepts were recommended for development into alternatives for further study, including preparation of conceptual drawings. While concepts include only route alignments and train frequencies during peak and off-peak hours, alternatives include all the features required to operate a transit system, such as operating plans throughout the day, calculations of the required size of the vehicle fleet, and identification of ancillary facilities, including a maintenance and storage facility (MSF) for the rail vehicles. The concepts were recommended for development into alternatives for the following reasons:

- > HRT 1 would have the fastest end-to-end travel time and preserves an option on Van Nuys Boulevard in the Valley if any engineering challenges on Sepulveda Boulevard prove to be prohibitive.
- > HRT 2 preserves a tunnel option on Sepulveda Boulevard if any engineering challenges on Van Nuys Boulevard prove to be prohibitive.
- > HRT 3 would have the highest daily project boardings, and its aerial section has the potential to provide a lower-cost alternative to the other HRT concepts.
- > MRT 1 has a longer aerial section with the potential to provide a lower-cost alternative to the HRT concepts.

Table 4-5. Performance of Refined Concepts on Environmental and Community Objectives

	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Reduce vehicle miles traveled (VMT)				
VMT reduction	968,515	959,549	1,044,835	760,499
Objective: Reduce air pollutant emissions				
VHT reduction	67,911	66,701	72,204	52,540
Objective: Minimize effects to communities				
	Likely property impacts; moderate construction impacts; limited visual impacts	Likely property impacts; moderate construction impacts; limited visual impacts	Likely property impacts; greater construction impacts to sensitive receptors and potential visual impacts near aerial segments	Likely property impacts; greater construction impacts to sensitive receptors and potential visual impacts near aerial segments
Objective: Minimize impacts to transportation network				
	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed	Up to 4.1 miles of parking lanes to be removed	Up to 4.1 miles of parking lanes to be removed
Objective: Minimize other environmental impacts				
	Moderate level of potential impacts due to underground segments	Moderate level of potential impacts due to underground segments	Moderate to greater amount of potential community and environmental impacts and impacts to EJ communities due to aerial segments	Greater amount of potential community and environmental impacts and impacts to EJ communities due to aerial segments

Source: Sepulveda Mobility Partners, 2018; Terry A. Hayes Associates, 2018

Note: Information in table represents major differences among refined concepts. Detailed analyses presented in Appendix B of the *Initial Screening Report*

EJ = environmental justice; VHT = vehicle hours traveled; VMT = vehicle miles traveled

5 Final Valley-Westside Alternatives

The final Valley-Westside alternatives meet the travel needs in the Sepulveda corridor, incorporating designs that are feasible given the constraints in the corridor.

This chapter describes the final Valley-Westside alternatives—the three HRT alternatives and one MRT alternative for which conceptual drawings were prepared and additional analysis was conducted. While the concepts described in the previous chapter included only route alignments and train frequencies during peak and off-peak hours, these alternatives include all the features required to operate a transit system, such as operating plans throughout the day, calculations of the required size of the vehicle fleet, and identification of ancillary facilities, including an MSF. An important step in developing the conceptual drawings for the alternatives was to identify key engineering constraints along the proposed alignments, which are also discussed in this chapter. More detailed descriptions of the alternatives and the engineering constraints are provided in the *Conceptual Alternatives Report* (Metro, 2019b), the *Engineering Analysis Report* (Metro, 2019c), the *Geotechnical Conditions Report* (Metro, 2019i), the *Underground Structures Feasibility Report* (Metro, 2019j), and the *Operating and Maintenance Cost Estimates Report* (Metro, 2019d).

5.1 Overview of Alternatives

All four final alternatives extend from the Metro Expo Line in the south to the Metrolink Van Nuys Station in the north. In the Westside, the base alignment for all alternatives was defined as having a southern terminus at the Expo/Sepulveda Station and connecting to the planned Metro Purple Line Westwood/UCLA Station under Westwood Boulevard. Alignment options with a southern terminus at the Expo/Bundy Station and with different roadway alignments at the Westwood/UCLA Station were developed to permit the

evaluation of a variety of means to connect to the Metro Expo and Purple Lines. Because these alignment options apply to multiple alternatives, they are discussed separately, following the discussion of the four base alignments.

All of the alternatives include substantial tunnel segments, which could be designed and constructed in one or more of several different configurations. Tunnel configuration options are discussed following the descriptions of the alternatives.

5.1.1 Alignments and Station Locations

The alignments of the four final alternatives are illustrated in Figure 5-1. As shown in the figure, all of the alternatives include a station located near Santa Monica Boulevard in response to public comments received during the second round of public meetings.

The station locations included in each alternative are summarized in Table 5-1. All stations would be underground or aerial, depending on the vertical configuration of the alignment at that location. Stations would be designed to accommodate up to six-car trains for HRT stations and trains of equivalent length for MRT stations.

5.1.2 Operating Plans

The service plan for the Project would be consistent with the existing Metro HRT lines—the Metro Red and Purple Lines—with a proposed service span of 21 hours per day Sunday through Thursday and longer hours on Fridays and Saturdays. The proposed service frequencies are listed in Table 5-2.

Table 5-1. Proposed Sepulveda Transit Corridor Project Stations

STATION	ALTERNATIVES			
	HRT 1	HRT 2	HRT 3	MRT 1
Expo/Sepulveda Station ¹	U	U	U	U
Santa Monica Boulevard/Sepulveda Boulevard ²	U	U	U	U
Westwood/UCLA Station	U	U	U	U
UCLA Campus	U	U	U	U
Ventura Boulevard/Sepulveda Boulevard		U	A	A
Ventura Boulevard/Van Nuys Boulevard	U			
Metro Orange Line Sepulveda Station		U	A	A
Metro Orange Line Van Nuys Station	U			
Sherman Way/Sepulveda Boulevard			A	A
Metrolink Van Nuys Station	U	U	A	A

¹Expo/Bundy under Bundy-Veteran alignment option

²Santa Monica Boulevard/Purdue Avenue under Bundy-Veteran alignment option

U = underground, A = aerial

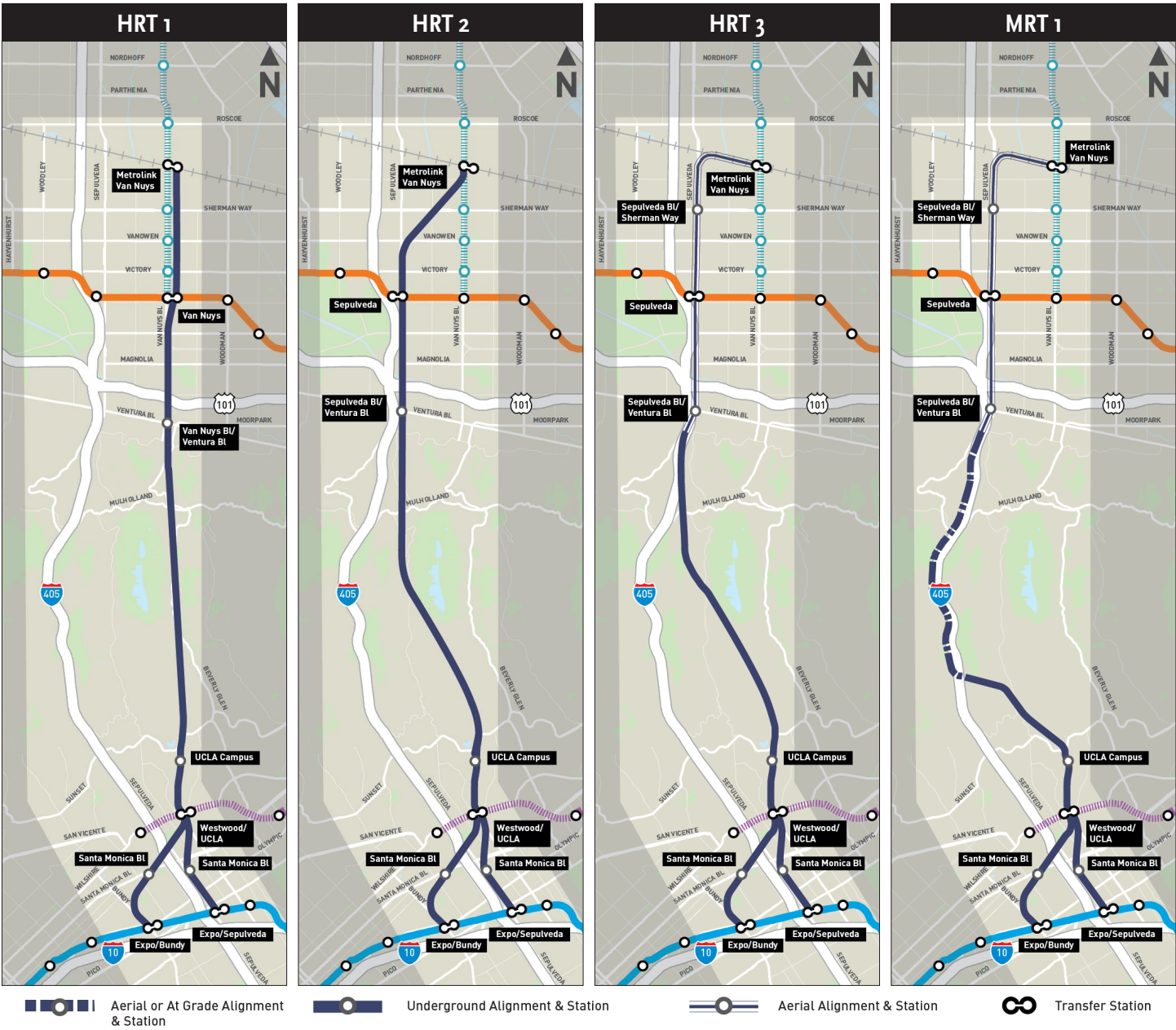


Figure 5-1. Final Valley-Westside Alternatives

Source: Sepulveda Mobility Partners, 2018

Table 5-2. Proposed Sepulveda Transit Corridor Project Service Frequencies

DAY OF WEEK	EARLY (4-6AM)	AM PEAK (6-9AM)	MIDDAY (9AM-3PM)	PM PEAK (3-7PM)	EARLY EVE (7-9PM)	EVENING (9PM-12AM)	NIGHT (12-1AM*)
Monday-Thursday	15 min	4 min	10 min	4 min	10 min	20 min	20 min
Friday	15 min	4 min	10 min	4 min	10 min	20 min	20 min
Saturday	20 min	10 min	10 min	10 min	10 min	20 min	20 min
Sunday/Holiday	20 min	10 min	10 min	10 min	10 min	20 min	20 min

*2am on Friday and Saturday

It is expected that some Metro and municipal bus services would be modified to eliminate duplicative service and to support regional access to the Project. The Project would charge the standard fare used across the Metro system.

5.2 Detailed Description of Alternatives

5.2.1 Key Engineering Constraints

This section describes some of the key physical constraints that influenced the design of the alternatives. These constraints are illustrated in Figure 5-2 and are discussed below generally from south to north through the Study Area.

5.2.1.1 Metropolitan Water District of Southern California Sepulveda Feeder Line

The Metropolitan Water District (MWD) Sepulveda Feeder Pipeline is an 8-foot-diameter water transmission pipeline that extends 41 miles from the Jensen Water Treatment Plant in the City of Los Angeles north of the I-5/I-210 interchange, crossing the Santa Monica Mountains, to an interconnection with the Second Lower Feeder in the City of Torrance. Within the Study Area, it is generally located under Sepulveda Boulevard south of Hatteras Street in the San Fernando Valley. Further information about the Sepulveda Feeder can be found in the *Engineering Analysis Report* (Metro, 2019c).

MWD is undertaking a multi-year effort to line the Sepulveda Feeder with a steel liner that would substantially eliminate rupture potential and the associated risk to nearby transit system facilities. However, construction and operation of an underground station in proximity to the Sepulveda Feeder was deemed to still contain risk. Due to the cost and potential schedule impacts of relocating the Sepulveda Feeder, avoidance of the water line was selected as the best option for underground stations.

Avoidance alternatives were not available for aerial alignments on Sepulveda Boulevard in the San Fernando Valley because the columns necessary to support a guideway in the center of the roadway would directly conflict with the water main. Therefore, along aerial segments that would be located near the Sepulveda Feeder, relocation of the Sepulveda Feeder is proposed.

5.2.1.2 Santa Monica Fault

Within the Study Area, the Santa Monica Fault is generally expected to be located north of Santa Monica Boulevard. Therefore, the station boxes for the Santa Monica Boulevard Station have been located to the south of Santa Monica Boulevard to avoid locating them in the fault zone. Further refinement to the alignments may be necessary after the exact location and orientation of the fault have been determined to minimize the exposure of the alignment to the fault. Further



Figure 5-2. Key Engineering Constraints

Source: Sepulveda Mobility Partners, 2019

information on the Santa Monica Fault can be found in the *Geotechnical Conditions Report* (Metro, 2019i).

5.2.1.3 Metro Purple Line and Building Foundations on Wilshire Boulevard

The alignments of the alternatives crossing Wilshire Boulevard are largely constrained by foundations of tall buildings located along Wilshire Boulevard at each of the three potential connection points to the Purple Line Westwood/UCLA Station: Veteran Avenue, Gayley Avenue, and Westwood Boulevard. In addition, the alignment along Veteran Avenue would have to avoid impact to federal lands located west of Veteran Avenue, including the Los Angeles National Cemetery. Further information on building foundations can be found in the *Underground Structures Feasibility Report* (Metro, 2019j).

5.2.1.4 Parklands, Habitat, and Waters of the United States

The alignments attempt to avoid or minimize potential impacts to parklands maintained by the Santa Monica Mountains Conservancy on both sides of I-405. In addition, the west side of I-405 between Skirball Center Drive and Mulholland Drive is an established wildlife corridor, and wildlife crossings of the freeway are found at Mulholland Drive, Skirball Center Drive, and Bel Air Crest Road. In addition, some seasonal streams in the Sepulveda Pass may be jurisdictional waters of the United States. Further information on parklands and wildlife crossings can be found in the *Study Area Definition Report* (Metro, 2018c).

5.2.1.5 Storm Drains

As is typical in an urban area, numerous storm drains of varying dimensions are located throughout the Study Area, and most storm drains can be protected in place during construction. However, some major storm drains belonging to the Los Angeles County Flood Control District (LACFCD) present longitudinal conflicts with the alternatives:

- > A storm drain runs beneath Van Nuys Boulevard from Saticoy Street near the northern end of the Study Area to the southern terminus of Van Nuys Boulevard and discharges into the Los Angeles River. Underground stations in conflict with this storm drain would have to relocate it.
- > Another storm drain runs beneath Sepulveda Boulevard for a short distance between Erwin Street and Oxnard Street in the San Fernando Valley. Underground stations in conflict with this storm drain would have to relocate it, while support columns for aerial stations would have to avoid it.
- > A third storm drain is located on Sepulveda Boulevard in the Valley between I-405 and Sutton Street. This storm drain is adjacent to the MWD Sepulveda Feeder in this location. Both facilities would need to be relocated to allow for placement of columns in the roadway median.



Conceptual rendering. Subject to change.

Figure 5-3. Looking South at Expo/Sepulveda Station

Source: Sepulveda Mobility Partners, 2019

Further information on storm drains can be found in the *Engineering Analysis Report* (Metro, 2019c).

5.2.2 HRT 1

The base alignment of the proposed HRT 1, an entirely underground HRT line, is illustrated in Figure 5-1. Including tail tracks, the HRT 1 alignment is 12.8 miles from end to end and would include seven stations.

HRT 1 would have a southern terminus at an underground station located on private property just north of the Expo/Sepulveda Station on the Metro Expo Line. A crossover and tail tracks for turning trains at the end of the line would extend south of the station. Figure 5-3 shows a conceptual rendering of the station entrance, adjacent to the existing Expo/Sepulveda Station, which would be the same for all alternatives.

North of the station, the alignment would turn slightly east toward Bentley Avenue and continue in a tunnel under Bentley Avenue. Tunneling under Bentley Avenue rather than Sepulveda Boulevard avoids the 96-inch MWD Sepulveda Feeder under Sepulveda Boulevard. Just south of Santa Monica Boulevard, there would be an underground station with an entrance between Sepulveda Boulevard and Bentley Avenue.

North of Santa Monica Boulevard, the alignment would turn to the northeast to reach Westwood Boulevard, traveling under residences, businesses, and smaller roadways. Continuing north under Westwood Boulevard, it would reach a proposed station at Wilshire Boulevard and the Purple Line, at the east end of the Purple Line station. This station would provide a connection to the Purple Line station.

North of the Purple Line, the alignment would continue northeast toward the UCLA campus. Once on campus, the tunnel would turn to align north-south under Westwood Plaza.

A station would be located under Westwood Plaza just north of the UCLA Medical Center.

After leaving the UCLA campus, HRT 1 would continue north under the Santa Monica Mountains. The alignment would roughly follow, although not parallel, Beverly Glen Boulevard for much of its length under the mountains. Once in the San Fernando Valley, the tunnel would continue north under Van Nuys Boulevard. There would be an underground station at Ventura Boulevard.

The tunnel would remain under Van Nuys Boulevard to a station beneath the Metro Orange Line, which would provide a connection with the Metro Orange Line and the East San Fernando Valley Light Rail Transit Corridor. The Metro Orange Line busway and station would be grade-separated at this location as part of the Metro Orange Line Improvements Project, which would result in a two-level transfer from the underground Sepulveda Transit Corridor Project station to the aerial Metro Orange Line station. The future East San Fernando Valley Light Rail Transit Corridor station is planned to be at grade.

North of the Metro Orange Line, HRT 1 would continue north under Van Nuys Boulevard until Sherman Way, where it would curve slightly to the east and parallel Van Nuys Boulevard under the properties on the east side of the roadway. An off-street underground station would provide a connection with the Metrolink Van Nuys Station, as well as the planned East San Fernando Valley Light Rail Transit Corridor station at this location. The tail tracks of the alignment would extend north past the LOSSAN Rail Corridor to Arminta Street.

5.2.3 HRT 2

HRT 2 would be an entirely underground HRT line, as illustrated in Figure 5-1. Including tail tracks, this alternative is 13.4 miles from end to end and would include seven stations.

As with HRT 1, the base alignment of HRT 2 would have a southern terminus at an underground station at the Expo/Sepulveda Station on the Metro Expo Line. From its southern terminus to the UCLA campus station, the alignment would be the same as that of HRT 1.

North of the UCLA campus, HRT 2 would continue north under the Santa Monica Mountains. While under the mountains, the alignment would turn northwest toward Sepulveda Boulevard. Once in the San Fernando Valley, there would be an underground station at Ventura Boulevard at its intersection with Columbus Avenue, east of Sepulveda Boulevard. As on the Westside, tunneling under a roadway other than Sepulveda Boulevard would avoid the MWD Sepulveda Feeder under Sepulveda Boulevard.

The alignment would continue north under Columbus Avenue. South of Burbank Boulevard, the alignment would curve to the west to line up with Sepulveda Boulevard and connect with the Metro Orange Line. This underground station would require a two-level transfer, as the Metro Orange Line busway and station would be grade-separated at Sepulveda Boulevard as part of the Metro Orange Line Improvements Project. Because the MWD Sepulveda Feeder leaves the Sepulveda Boulevard right-of-way at Hatteras Street, south of the Metro Orange Line, the tunnel and underground station would not conflict with it.

North of the Metro Orange Line, the alignment would turn to the east toward its terminus at the Metrolink Van Nuys Station. It would continue in a northeast direction under residences, businesses, and roadways until it parallels Van Nuys Boulevard to the east. It would have the same off-street underground transfer station with Metrolink and the East San Fernando Valley Light Rail Transit Corridor as HRT 1. The northern tail tracks of the alignment extend north past the railroad right-of-way to Arminta Street.

5.2.4 HRT 3

The base alignment of the proposed HRT 3, a mixed aerial and underground HRT line, is illustrated in Figure 5-1. Including tail tracks, this alternative would be 14.5 miles from end to end and would include eight stations. The alignment for HRT 3 from the Metro Expo Line to the UCLA campus would be the same as HRT 1 and HRT 2.

North of UCLA, the alignment would continue in a tunnel under the Santa Monica Mountains, similar to that of HRT 2. However, instead of continuing to an underground station in the San Fernando Valley, HRT 3 would transition from a tunnel to an aerial structure at Del Gado Drive, just east of I-405. After crossing over Sepulveda Boulevard, there would be an off-street aerial station between the I-405 freeway ramps and Ventura Boulevard, a conceptual rendering of which is shown in Figure 5-4. The alignment would then turn toward the intersection of Sepulveda Boulevard and Ventura Boulevard.



Figure 5-4. HRT 3, Looking North at Sepulveda Boulevard/Ventura Boulevard Station
Source: Sepulveda Mobility Partners, 2019

Once north of the intersection of Sepulveda Boulevard and Ventura Boulevard, the alignment would continue on an aerial structure on the east side of Sepulveda Boulevard until crossing over US 101. North of US 101, the aerial structure would follow the center of the roadway, as illustrated in the conceptual rendering shown in Figure 5-5. In this area, the MWD Sepulveda Feeder would need to be relocated. There would be an aerial station at the Metro Orange Line, over the Metro Orange Line Sepulveda Station, which would be relocated to span Sepulveda Boulevard on a grade-separated structure by the Metro Orange Line Improvements Project. North of the Metro Orange Line, the aerial guideway would continue in the center of Sepulveda Boulevard, with an aerial station just south of Sherman Way. The aerial guideway would continue north on Sepulveda Boulevard until approximately Stagg Street, where it would curve to the east across private property to align with the LOSSAN Rail Corridor used by Metrolink and Amtrak. The aerial guideway would parallel the railroad to the south until its terminus at an aerial station above Van Nuys Boulevard at the Metrolink Van Nuys Station. The tail tracks would extend past the station to the south of the existing Union Pacific Railroad yard.

5.2.5 MRT 1

The alignment of the proposed MRT 1, a mixed aerial, cut-and-fill, and underground monorail or rubber tire line, is illustrated in Figure 5-1. Including tail tracks, this alternative would be 15.4 miles from end to end and would include eight stations.

The alignment of MRT 1 from the Expo Line through the Westside to the UCLA campus station would be the same as described for the other alternatives. North of the UCLA station, the alignment would begin to differ from the HRT alternatives. The alignment would curve west under the campus and Bel Air toward the I-405 interchange with Getty Center Drive. Slightly south of the interchange, it would transition from a tunnel to an aerial structure on the east side of the freeway and then cross over the freeway to the west side.

After crossing I-405, the alignment would turn to the north and parallel the freeway to its west through most of the Sepulveda Pass. The alignment would be on aerial structure or retained fill throughout the Sepulveda Pass and would generally be located between Sepulveda Boulevard and I-405. Figure 5-6 shows a conceptual rendering of the alternative between Skirball Center Drive and Mulholland Drive.

The steep and varying grades throughout the Sepulveda Pass would require inclines of the aerial guideway of up to 6.5 percent in some areas, in addition to a 7 percent grade required for the transition from tunnel to aerial guideway.

Before it reaches the Sepulveda Boulevard crossing under I-405, the aerial guideway would cross over I-405 and briefly remain adjacent to I-405 on the east side of the freeway over private property. It would then turn toward the intersection of Sepulveda Boulevard and Ventura Boulevard. After the aerial guideway crosses Ventura Boulevard, there would be an aerial station near the Sherman Oaks Galleria.

North of the Sepulveda Boulevard/Ventura Boulevard station, MRT 1 would have the same alignment and stations as HRT 3. Figure 5-7 shows a conceptual rendering of the alternative



Figure 5-5. HRT 3, Looking South on Sepulveda Boulevard at Weddington Street

Source: RAW International, 2019



Figure 5-6. MRT 1, Looking North at Mulholland Drive Bridge

Source: RAW International, 2019



Figure 5-7. MRT 1, Looking South on Sepulveda Boulevard at Weddington Street

Source: RAW International, 2019



Figure 5-8. MRT 1, Looking North at Metrolink Van Nuys Station

Source: RAW International, 2019

on Sepulveda Boulevard in this area, and Figure 5-8 shows a conceptual rendering of the station adjacent to the Metrolink Van Nuys Station.

5.2.6 Westside Alignment Options

In addition to the base alternatives of the alignments, two alignment options on the Westside were developed to provide different ways to connect to the Metro Purple Line and Metro Expo Line. As illustrated in Figure 5-9, the “Sepulveda-Gayley” alignment option would have a southern terminus at the Expo/Sepulveda Station like the base alternative, but it would connect to the Metro Purple Line Westwood/UCLA Station at Gayley Avenue instead of Westwood Boulevard. The “Bundy-Veteran” alignment option would have a southern terminus at the Expo/Bundy Station instead of the Expo/Sepulveda Station, and it would connect to the Metro Purple Line Westwood/UCLA Station from Veteran Avenue.

5.2.6.1 Sepulveda-Gayley Alignment Option

The Sepulveda-Gayley alignment option would be the same as the base alignment from its southern terminus at the Expo/Sepulveda Station to the proposed station at Santa Monica Boulevard. North of Santa Monica Boulevard, the alignment would continue toward the intersection of Midvale Avenue and Wilshire Boulevard. Midvale Avenue continues as Gayley Avenue north of Wilshire Boulevard and curves to the northeast. This differs from other intersections in the area, including those of Westwood Boulevard and Veteran Avenue, which are oriented toward the northwest. This allows for the possibility of a station at the intersection of Gayley Avenue and Wilshire Boulevard, directly under the future Purple Line station platform. North of the Metro Purple Line, the alignment would continue north to the UCLA campus station at the same location as in the base alignment.



Figure 5-9. Westside Alignment Options

Source: Sepulveda Mobility Partners, 2019

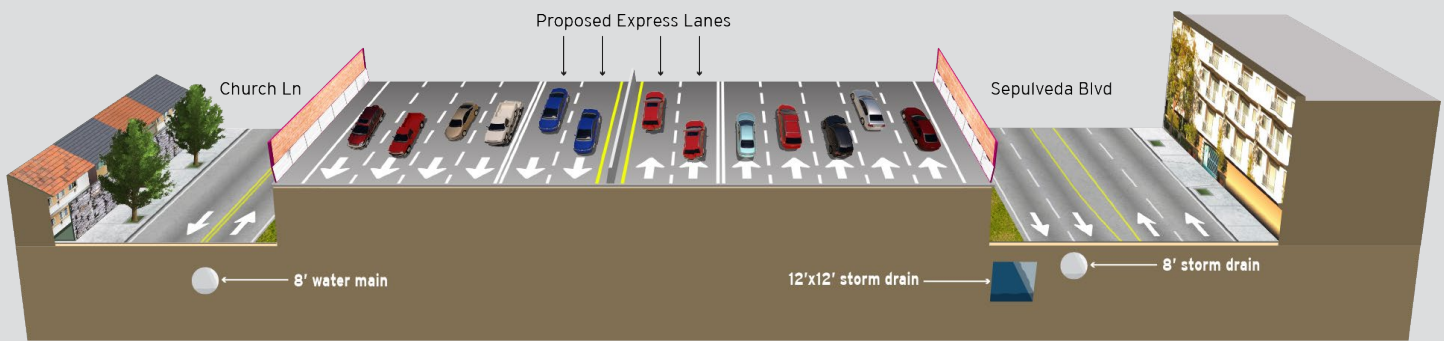
5.2.6.2 Bundy-Veteran Alignment Option

The Bundy-Veteran alignment option would have a southern terminus at the Expo/Bundy Station on the Metro Expo Line. The alignment would curve east of Bundy Drive just north of the station and continue northeast toward Santa Monica Boulevard, under residences, businesses, and roadways. An underground station would be located within the West Los Angeles Civic Center area south of Santa Monica Boulevard near Purdue Avenue.

North of the proposed Santa Monica Boulevard Station the alignment would continue to the northeast, still under residences, businesses, and roadways, where it would connect with the Metro Purple Line Westwood/UCLA Station at Veteran Avenue and Wilshire Boulevard. The proposed station would be underground, below and to the west of the Purple Line station, with a pedestrian connection via the station mezzanines. North of the Metro Purple Line, the alignment would continue northeast toward the UCLA campus. Once on campus, the tunnel would curve to the east and align north-south with Westwood Plaza and the UCLA campus at the same location as in the base alignment.

Could an alignment be located in the I-405 median?

Although one goal established for this Feasibility Study was to utilize existing transportation corridors to the extent possible, a number of major constraints would make an aerial alignment in the median of I-405 impractical. The *Initial Screening Report* (Metro, 2019a) addresses additional challenges with alignments in or adjacent to the I-405 right-of-way.



The I-405 ExpressLanes Project, which is also funded by Measure M, is studying the conversion of the existing HOV lanes to high-occupancy toll (HOT) lanes and the addition of a second HOT lane in each direction between I-10 and US 101. The combination of an aerial transit guideway and the addition of one lane in each direction would require widening of the freeway, which is constrained by retaining walls and parallel roads, and abutted by residential areas, commercial areas, and parklands in various locations.

Source: Sepulveda Mobility Partners



Columns in the median supporting the transit guideway would be spaced approximately every 100 feet. On curves, these columns would block drivers' view of stopped vehicles or other obstructions, violating Caltrans' safety and design standards. In addition, the columns would severely restrict the ability of disabled vehicles and emergency vehicles to use the shoulder in the median.

Photo credit: Sepulveda Mobility Partners



I-405 has no median between US 101 and Sherman Way. Adding columns to support a transit guideway in this area would require widening the freeway, which is constrained in this area by the Sepulveda Dam Basin on the west side and residential areas, commercial areas, and City of Los Angeles parks on the east side.

Photo credit: Google



In many parts of the freeway, there are storm drains in the median and a drainage pipe underneath the median to prevent flooding. The foundations of columns for a transit guideway would conflict with these facilities, which would therefore have to be relocated. The construction work area required to relocate them would extend into adjacent travel lanes, requiring either a reduction in freeway lanes during construction or widening of the freeway.

Source: Sepulveda Mobility Partners

5.3 Tunnel Configuration Options

All of the alternatives include substantial tunnel segments. Metro’s standard tunnel configuration consists of two tunnels, each approximately 20 feet in diameter, with ventilation generally provided at stations. This “twin-bore” configuration, illustrated in Figure 5-10, accommodates one set of tracks in each tunnel. This configuration would require mining of numerous cross-passages between the twin tunnels under the Santa Monica Mountains to allow passengers to evacuate from one tunnel to the other in the event of an emergency. As discussed in Section 5.4, it would also require up to two vertical shafts in the mountains to provide for ventilation of the long run under the mountains without any stations.

A tunnel configuration option consisting of twin-bore 27-foot-diameter tunnels, illustrated in Figure 5-11, would allow for a longitudinal ventilation duct to be incorporated into each tunnel, eliminating the need for ventilation shafts, but still requiring mined cross-passages under the mountains. Alternatively, a larger, single-bore 40-foot-diameter tunnel, illustrated in Figure 5-12, would accommodate both sets of tracks and ventilation in a single tunnel, eliminating the need for mined cross-passages and for ventilation shafts.

Because twin-bore tunnels generally require one tunnel diameter separation between the two tunnels, the right-of-way width for twin 20-foot tunnels is approximately 60 feet, and for twin 27-foot tunnels it is approximately 81 feet. The base alignment and the Bundy-Veteran alignment option could be designed using any of the three configuration options: 20-foot twin-bore, 27-foot twin-bore, or 40-foot single-bore. The Sepulveda-Gayley alignment option could likely only be designed as single-bore because of the narrow distance between major building foundations at the intersection of Gayley Avenue and Wilshire Boulevard.

Tunnels of any of the configurations shown in Figures 5-10, 5-11, or 5-12 would generally be constructed using tunnel boring machines (TBM) operating below the ground surface, leaving the ground above the tunnel undisturbed (except at the TBM launch and retrieval locations). Underground stations would not be constructed by the TBM; they would generally be constructed by excavating from the ground surface, referred to as the “cut-and-cover” method. For either of the twin-bore configurations, crossovers to allow trains to switch tracks would also generally be constructed using the cut-and-cover method. For the single-bore configuration, crossovers can be constructed within the tunnel created by the TBM since both tracks are in the single tunnel, reducing the amount of cut-and-cover construction and disruption at the surface required.

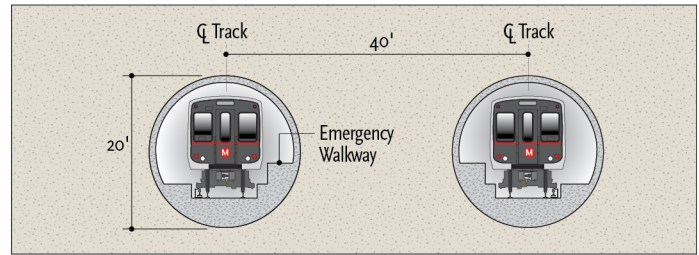


Figure 5-10. Twin-Bore Tunnel Configuration (20' Diameter)

Source: Sepulveda Mobility Partners, 2019

Note: Tunnel cross-section shown for HRT. Cross-section for MRT would be similar.

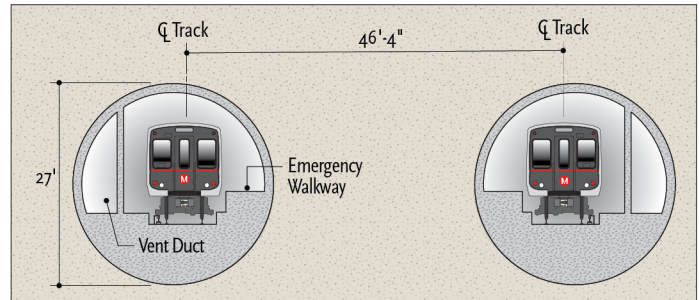


Figure 5-11. Twin-Bore Tunnel Configuration (27' Diameter)

Source: Sepulveda Mobility Partners, 2019

Note: Tunnel cross-section shown for HRT. Cross-section for MRT would be similar.

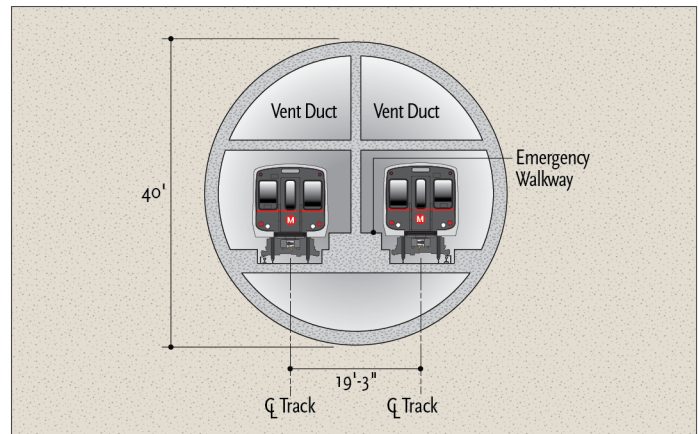


Figure 5-12. Single-Bore Tunnel Configuration (40' Diameter)

Source: Sepulveda Mobility Partners, 2019

Note: Tunnel cross-section shown for HRT. Cross-section for MRT would be similar.

5.4 Supporting Facilities and Systems

All alternatives would require traction power substations, communications and signaling systems, and an MSF sized to accommodate its fleet. In addition, if designed in a 20-foot twin-bore configuration, HRT 1, HRT 2, and HRT 3 would require up to two vertical shafts in the mountains to provide for ventilation in the case of an emergency. The shorter tunnel segment of MRT 1 would not require ventilation shafts.

5.4.1 Systems

Traction power substations are adjacent to the track and power the “third rail” that propels the train. They are generally spaced at intervals of one to two miles, as determined by an analysis of the power needs of the rail system. Along aerial segments and tunnel segments outside the mountains, they would be located at ground level or within stations. Within the mountains, caverns would need to be mined to house the substations.

Communications and signaling buildings house train control and communications for train operations in a central facility at each station. Each facility is located within the station site area, typically adjacent to a station platform.

5.4.2 MSF

All alternatives would require a new MSF to support the required fleet of vehicles. The MSF would be a stand-alone facility capable of performing all levels of service and maintenance of the HRT or MRT vehicles. Typical maintenance functions that would take place at the facility include interior and exterior cleaning of the rail vehicles, scheduled service and inspection, heavy repair, interior and exterior painting of the rail vehicles, and wheel truing. The MSF would also include storage and maintenance of equipment for maintaining the guideway and right-of-way.

The MSF would also serve as a storage area for vehicles that are not in service. The facility would need to be large enough to support the number of vehicles required to operate the Project during peak periods.

During the development of the alternatives, the availability of suitable, industrially zoned land adjacent to the refined concepts was reviewed, and the three locations illustrated in Figure 5-13. were identified:

- > Sepulveda Boulevard at Nebraska Avenue: This 26-acre site is located between I-405 and Sepulveda Boulevard, south of Nebraska Avenue and north of Olympic Boulevard. It could serve all alternatives, although the Bundy-Veteran alignment option would require modification. An MSF on this site would likely have to be built below the existing grade of the site, since the tracks providing access to the site would need to cross under the MWD Sepulveda Feeder on Sepulveda Boulevard, and the site is not large enough to return to grade.
- > Van Nuys Boulevard at Arminta Street: This 25-acre site is located on the north side of Arminta Street, east of Van Nuys Boulevard. It could serve HRT 1 and HRT 2. The tail tracks past the end of these alignments would lead into the site. The tracks providing access to the site would transition from below grade to ground level between the Metrolink Van Nuys Station and the MSF site.

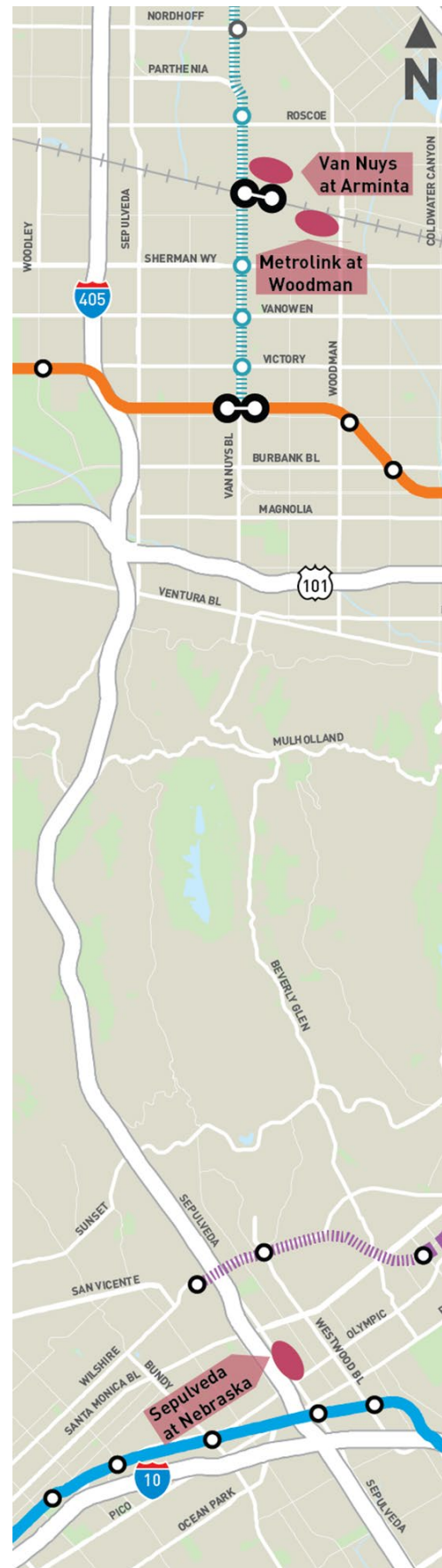


Figure 5-13. Potential Locations for a Maintenance and Storage Facility

Source: Sepulveda Mobility Partners, 2019

> Metrolink at Woodman Avenue: This 39-acre site is located south of the Metro and Union Pacific Railroad right-of-way, west of Hazeltine Avenue and east of Woodman Avenue. It could serve HRT 3 and MRT 1. The tail tracks past the end of these alignments would lead into the site. The tracks providing access to the site could be elevated or at ground level.

During environmental review, additional MSF sites will be investigated.

5.4.3 Ventilation Shafts

If designed in a 20-foot twin-bore configuration, HRT 1, HRT 2, and HRT 3 would require up to two vertical shafts in the mountains to provide for ventilation. A preliminary screening of possible ventilation shaft locations concluded that a shaft could potentially be located within the Los Angeles

Department of Water and Power (DWP) Stone Canyon Reservoir property, north of the reservoirs. A shaft located in this area could be compatible with the alignments of HRT 1, HRT 2, or HRT 3, with some refinement of the tunnel alignments. Alternatively, because the alignment of HRT 3 approaches I-405 as it enters the Valley, a ventilation shaft for that alternative could potentially be placed within Caltrans right-of-way adjacent to the freeway.

Should detailed analysis of train operations determine that a second ventilation shaft is required, it would be feasible to locate a second shaft near the south end of DWP's property. However, the only access to this part of the site for heavy equipment and materials is via Stone Canyon Road, which could result in traffic and other community impacts to the neighborhoods along the access route.

6 Comparative Performance Analysis of Valley-Westside Alternatives

Each alternative offers a different balance of benefits and potential impacts for the community to consider.

Expo/Bundy alignment option performance

Across all four alternatives, key differences in the mobility benefits of the Expo/Bundy alignment option compared to the base alignment to Expo/Sepulveda are as follows:

- > Two percent fewer daily boardings and new transit trips
- > Approximately one minute slower
- > Four percent less time savings

This chapter summarizes and compares the performance of the four final Valley-Westside alternatives in meeting the project objectives, including performance differences of the Bundy-Veteran alignment option. The analysis uses the detailed criteria defined in Chapter 3 and highlights key differences among alternatives. Detailed evaluation measures are included in Appendix C: Evaluation of Valley-Westside Alternatives. The methodology and results of the ridership forecasting for the final alternatives can be found in the *Travel Demand Model Methodology Report* (Metro, 2019g) and the *Travel Forecasting Results Report* (Metro, 2019h).

This chapter also evaluates the MSF options. For MSF options, only the goals to protect the environment and support community and economic development, provide a cost-effective solution, and minimize risk are applicable, as the selection of an MSF site would not affect the performance of the alternatives with regard to mobility or access to stations.

6.1 Improve Mobility

HRT 1 and HRT 3 each perform strongly on different measures of mobility improvement. Overall, HRT 3 would have the highest number of daily boardings, new transit trips, and hours of daily time savings, while HRT 1 links major origins and destinations most quickly and directly.

The HRT alternatives would have average operating speeds between 42.2 and 45.4 mph, while MRT 1 would be notably slower at 34.5 mph. However, the aerial configurations of HRT 3 and MRT 1 in the Valley would provide shorter transfer times between the Project and the Metro Orange Line and the East San Fernando Valley Light Rail Transit Corridor, improving the connections among those transit lines.

As with the initial and refined concepts, the disparity in ridership between MRT 1 and the HRT alternatives is a result of the slower speeds of MRT technology and its longer route through the Sepulveda Pass. While HRT 3 would have nearly 9,000 more boardings than the next highest ridership alternative (HRT 1), the difference in the number of new transit trips on the Metro system would not be as dramatic because some potential riders on the Project would otherwise use the East San Fernando Transit Corridor, as discussed further in the box on page 56.

Table 6-1 compares the results of the mobility evaluation by alternative. A summary of the travel forecasting results for the final alternatives can be found in Appendix B: Travel Forecast Results.

Table 6-1. Performance of Alternatives on Mobility Objectives

MEASURE		HRT 1	HRT 2	HRT 3	MRT 1
Objective: Increase transit ridership by directly serving origin-destination pairs with greatest potential for attracting new riders					
Daily boardings		128,246	126,078	137,177	121,740
New transit trips		54,108	53,691	57,608	49,815
Objective: Increase transit frequency and operating speeds					
Average operating speed (miles per hour)		45.4	42.2	43.6	34.5
Service frequencies		No differences in peak or off-peak service frequencies			
Travel time from Metrolink to Expo Line		16 minutes	17 minutes	19 minutes	26 minutes
Transit travel times between key origin-destination pairs (rounded to the nearest minute)	Sawtelle Bl/Olympic Bl – Van Nuys Civic Center	38	43	42	48
	Laurel Canyon Bl/Paxton St – UCLA Medical Center	62	62	64	70
	Balboa Bl/Ventura Bl – DTLA/Bunker Hill	77	73	74	79
	Van Nuys Bl/Sherman Way – Santa Monica Water Garden	45	46	48	55
	Century City – Reseda Bl/Sherman Way	55	58	53	59
Daily time savings (hours)		41,307	41,180	43,826	40,400
Objective: Minimize need for transfers and/or time spent transferring					
Number and duration ¹ of required transfers	Sawtelle Bl/Olympic Bl– Van Nuys Civic Center	0 (0 minutes)	1 (4.7 minutes)	1 (3.2 minutes)	1 (3.2 minutes)
	Laurel Canyon Bl/Paxton St – UCLA Medical Center	2 (7 minutes)			
	Balboa Bl/Ventura Bl – Bunker Hill	3 (7.2 minutes)	3 (7.2 minutes)	3 (8.0 minutes)	3 (8.0 minutes)
	Van Nuys Bl/Sherman Way – Santa Monica Water Garden	2 (6.5 minutes)			
	Century City – Reseda Bl/Sherman Way	3 (12.3 minutes)	2 (8.5 minutes)	3 (11.5 minutes)	3 (11.5 minutes)
Objective: Increase on-time performance and reliability					
		No design or operational differences for on-time performance or reliability			
Objective: Provide sufficient capacity to accommodate anticipated demand					
		All alternatives provide sufficient capacity to accommodate anticipated demand at the peak load point			
Objective: Provide convenient connections between existing and planned transit					
Quality of station connections	Metrolink Ventura County Line	All alternatives require a one-level transfer			
	East San Fernando Valley Light Rail Transit Corridor	One-level transfer	One-level transfer	Two-level transfer	Two-level transfer
	Metro Orange Line	Two-level transfer	Two-level transfer	One-level transfer	One-level transfer
	Metro Purple Line	All alternatives require a one-level transfer			
	Metro Expo Line	All alternatives require a two-level transfer			

Source: Sepulveda Mobility Partners, 2019; Metro Travel Demand Model, 2017a; Connetics Transportation Group, 2018

¹Duration of transfer between two transit lines is calculated as the time it takes to move between platforms or bus stops plus half the headway of the second transit line.

Origin-destination pairs for transit travel times were chosen based on areas where travel demand was greatest in and through the Sepulveda corridor. For more on travel demand and travel markets, refer to Chapter 2 of this report and the *Travel Market Analysis Report* (Metro, 2018d).

What is the relationship between ridership on the Sepulveda Transit Corridor Project and the East San Fernando Valley Light Rail Transit Corridor?

As discussed in Chapter 4, the initial concepts for the Sepulveda Transit Corridor Project increased the forecast demand on the East San Fernando Valley Light Rail Transit Corridor beyond its capacity. The final alternatives all extend north to the Metrolink Ventura County Line, so the two projects would both provide service between that rail line and the Metro Orange Line. As shown in Figure 6-1, all of the final project alternatives would increase the daily ridership on the East San Fernando Valley Light Rail Transit Corridor beyond what it would be without the Project. The East San Fernando Valley Light Rail Transit Corridor primarily serves local trips within the Valley, while the Sepulveda Transit Corridor Project primarily serves trips between the Valley and the Westside.

As shown in Figure 6-1, HRT 3 and MRT 1 would increase ridership on the East San Fernando Valley Light Rail Transit Corridor substantially less than HRT 1 and HRT 2 would. This difference occurs because both HRT 3 and MRT 1 have an additional station at Sherman Way, so some riders who would use the East San Fernando Valley Light Rail Transit Corridor for shorter trips within the Valley are able to use the Sepulveda Transit Corridor Project instead.

The shift of local trips from the East San Fernando Valley Light Rail Transit Corridor to the Sepulveda Transit Corridor Project largely explains the greater daily ridership on HRT 3 compared to the other heavy rail alternatives, which have similar travel times. Figure 6-2 illustrates how people get to the Project's stations in the Valley (i.e., by walking, taking a bus, park-and-ride, or by transferring from another rail line) under each of the heavy rail alternatives. As shown in Figure 6-2, with the additional station in the Valley under HRT 3, total boardings in the Valley increases substantially, with most of the increase coming from people who walk or take the bus to the Project. In contrast, total boardings on the Westside (not illustrated) increase by only a relatively small amount, indicating that these additional trips have both their origins and their destinations within the Valley. (If their destinations were on the Westside, the boarding of the return trip would be on the Westside.)

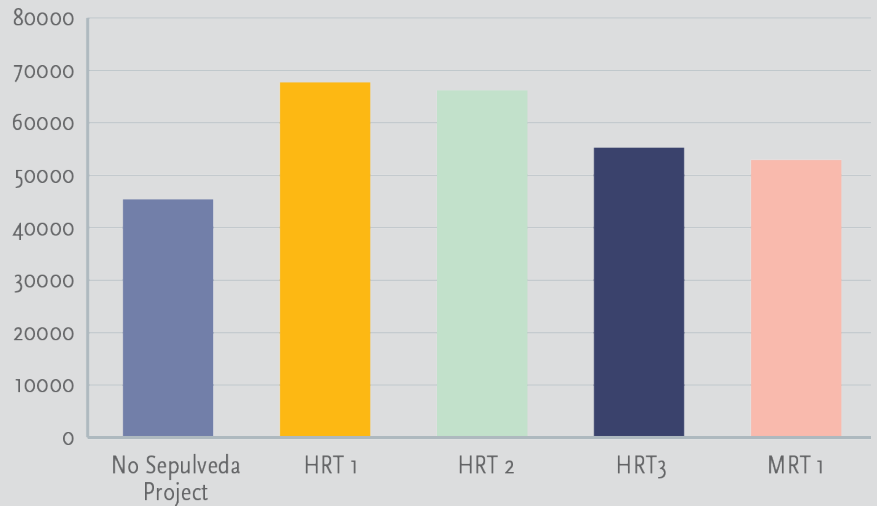


Figure 6-1. East San Fernando Valley Light Rail Transit Corridor Boardings (2042)

Source: Sepulveda Mobility Partners, 2019

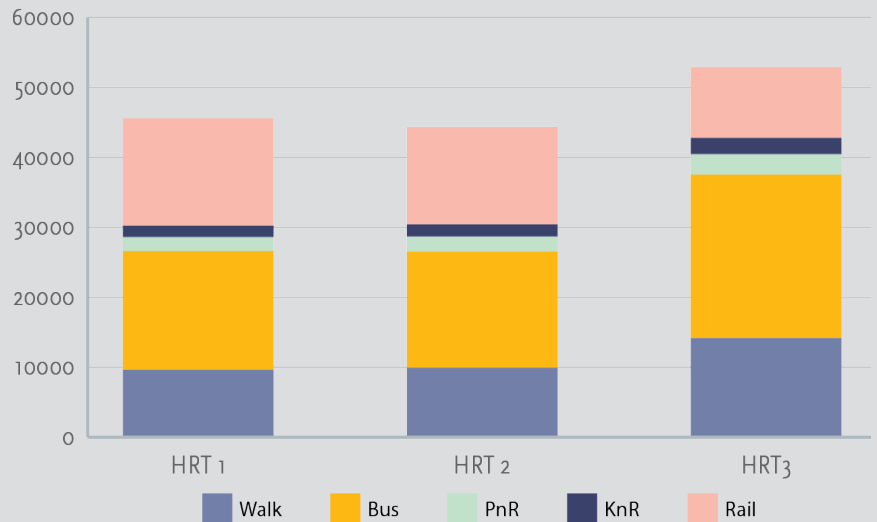


Figure 6-2. Sepulveda Transit Corridor Mode of Access, Valley Stations (2042)

Source: Sepulveda Mobility Partners, 2019

PnR = Park-and-Ride; KnR = Kiss-and-Ride

6.2 Improve Equity of Access

All of the final alternatives would have the same northern terminus at the Metrolink Van Nuys Station and the same stations on the Westside (including the option for a southern terminus at Expo/Bundy). The differences in station access are in the Valley, where HRT 1 follows Van Nuys Boulevard and HRT 2, HRT 3, and MRT 1 generally follow Sepulveda Boulevard. Therefore, the evaluation of equity of access measures focused on stations that differ across the alternatives. Table 6-2 presents a comparison of equity-of-access measures at the Van Nuys Boulevard (HRT 1) and Sepulveda Boulevard (HRT 2, HRT 3, MRT 1) stations.

As shown in Table 6-2, HRT 1 would serve higher population densities, while HRT 2, HRT 3, and MRT 1 would serve higher employment densities. With higher population densities along Van Nuys Boulevard, HRT 1 stations would be close to a larger number of minority residents, low-income residents,

and zero-car households. They would also have better bicycle access and have better pedestrian connections with fewer walking barriers. However, while more low-income residents live near Van Nuys Boulevard, HRT 3 along Sepulveda Boulevard serves the most low-income riders (87,600) because of its overall higher ridership.

The existing land uses and potential future type and density of development around transit can increase transit access by allowing more people to live and work near transit. Areas with land uses and development supportive of transit use are called transit-oriented communities (TOC). The characteristics of these communities are described in Chapter 3. Overall, HRT 1 is more supportive of TOC than HRT 2, HRT 3, and MRT 1 because of the land uses and development potential around the different Metro Orange Line stations that would be served by each alternative. Existing zoning around the Metro Orange Line Sepulveda Station does not support TOC to the

Table 6-2. Performance of Alternatives on Equity of Access Objectives

MEASURE		HRT 1	HRT 2 ¹	HRT 3 ¹	MRT 1 ¹
Objective: Improve accessibility for residential and employment centers					
2042 Population density (persons per square mile)	Metro Orange Line	17,176		7,129	
	Ventura Boulevard	12,809		11,480	
2042 Employment density (jobs per square mile)	Metro Orange Line	12,862		13,275	
	Ventura Boulevard	12,050		21,974	
Objective: Support transit-oriented communities policies					
Transit-supportive characteristics	Metro Orange Line	Highly supportive TOC policies and potential	Policies not supportive of TOC		
	Ventura Boulevard	Moderately supportive TOC policies and potential	Highly supportive TOC policies and potential		
Objective: Support first/last mile connections					
Quality of bicycle and pedestrian connectivity		0.9 mile of Class I bicycle lanes, 1 mile of Class II bicycle lanes		0.9 mile of Class I bicycle lanes, no Class II bicycle lanes	
Share of station access by non-motorized transportation	Metro Orange Line	15%		16%	
	Ventura Boulevard	39%		45%	
Objective: Investment in disadvantaged communities					
Low-income residents		3,977		792	
Minority residents		8,791		3,070	
Zero-car households		761		190	
Number of low-income riders		81,500	80,200	87,600	79,900

Source: Sepulveda Mobility Partners, 2019; Fehr & Peers, 2019; Torti Gallas + Partners, 2019

¹ For evaluation purposes, HRT 2, HRT 3, and MRT 1 are considered to have identical station locations.

Notes: All metrics are within one-half mile of the station site. Information in table represents major station differences among alternatives. Detailed analyses are presented in Appendix C.

TOC = transit-oriented communities

Expo/Bundy alignment option performance

Key equity of access differences of the Expo/Bundy alignment option compared to the base alignment to Expo/Sepulveda are the result of differences between the two station areas, as follows:

- > Lower population density
- > Greater employment density
- > Fewer existing and planned activity hubs within walking distance
- > Fewer barriers to access to the station from nearby neighborhoods
- > Better pedestrian connectivity with through streets
- > 54 percent fewer zero-car households within a half mile

Expo/Bundy alignment option performance

Key differences in potential for environmental, community, and economic development impacts for the Expo/Bundy alignment option compared to the base alignment to Expo/Sepulveda are as follows:

- > One percent less VMT and VHT reduction
- > Potential impact to two additional EJ census blocks
- > Potential impact to three additional Section 4(f) resources

same degree as the zoning around the Van Nuys Station. The alternatives all have similar potential to support TOC at their station locations on Ventura Boulevard as a result of a combination of existing dense commercial development, walkability, and potential for the integration of the station into development at both Van Nuys Boulevard and Sepulveda Boulevard.

6.3 Protect the Environment and Support Community and Economic Development

Since each alternative could be served by more than one MSF site, the ability to protect the environment and support community and economic development was evaluated independently for the alternatives and for the MSF sites. The evaluation of each is presented below.

6.3.1 Alternatives

Table 6-3 presents a summary of the results of the environmental and community evaluation by alternative. Differences across alternatives on some of these measures are driven primarily by ridership, while others are primarily the result of vertical configuration (e.g., aerial or tunnel), and yet others also depend on the design of the aerial guideway or the tunnel carrying the alignment.

Reduction in vehicles miles traveled (VMT) and vehicle hours traveled (VHT) for each alternative is directly correlated with the ridership it attracts. Reductions in VMT and VHT within both the region and the corridor are greatest for HRT 3, which has the highest ridership, and are least for MRT 1, which has the lowest ridership.

The potential for traffic, visual, noise, and EJ impacts are generally greater for alternatives with more extensive aerial or at-grade configurations because of the physical space they occupy in a community. Aerial structures are also more susceptible to seismic impacts than are tunnel or at-grade alignments. As a result, HRT 3 and MRT 1 have the most potential for impact in these categories. Overlap with the construction and operation of the East San Fernando Valley Light Rail Transit Corridor also increases the potential for traffic impacts during construction for HRT 1.

Many of the potential property impacts of the alternatives are associated with the locations of stations and crossovers, which have been assumed to be constructed using the cut-and-cover method, as described in Chapter 5. To varying extents, all the alternatives have some stations and crossovers that could not be located within roadway rights-of-way and for which property acquisition would be required.

Table 6-3. Performance of Alternatives on Environmental and Community Objectives

MEASURE	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Reduce VMT				
Regional VMT reduction	991,600	985,900	1,038,600	861,800
Corridor VMT reduction	66,400	66,100	70,700	63,000
Objective: Reduce air pollutant emissions				
Regional VHT reduction	69,500	68,700	72,000	60,100
Corridor VHT reduction	5,600	5,600	5,900	5,300
Objective: Minimize effects to communities				
Potential property impacts	Likely impact	Likely impact	Likely impact	Likely impact
Potential for traffic and noise impacts (construction)	Likely impact	Potential impact	Likely impact	Likely impact
Potential for transportation and traffic Impacts (operation)	Potential impact	Potential impact	Likely impact	Likely impact
Potential for visual impacts	Unlikely to impact	Unlikely to impact	Likely impact	Likely impact
Objective: Minimize impacts to transportation network				
Estimated traffic lanes, parking lanes, bike lanes, and sidewalks to be removed	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed	Approximately 4.1 miles of parking	Approximately 4.1 miles of parking
Objective: Minimize other environmental impacts				
Environmental Justice	Potential impact	Potential impact	Likely impact	Likely impact
Noise and Vibration	Potential impact	Potential impact	Likely impact	Likely impact
Seismic Resources	Unlikely to impact	Unlikely to impact	Potential impact	Potential impact
Other Resources	Impacts to archaeological and tribal cultural resources, hazards and hazardous materials, historic resources, Section 4(f), and water resources are anticipated to be relatively similar across alternatives			

Source: Sepulveda Mobility Partners, 2019; Terry A. Hayes Associates, 2019

Notes: Twin-bore tunnel configuration assumed for all alternatives to present largest potential project footprint and impacts. Alternative configurations could reduce potential impacts. Information in table represents major differences among alternatives. Detailed data presented in Appendix C.

VHT = vehicle hours traveled; VMT = vehicle miles traveled

The potential property impacts of all alternatives could be reduced through refinement of the alignments, changes to guideway or tunnel design, or the use of alternative construction methods. The analysis of potential property impacts is based on the assumption of a twin-bore tunnel configuration, which, as described in Chapter 5, has a larger physical footprint than a single-bore configuration and is therefore more likely to require property acquisitions at station areas and crossovers. With a single-bore configuration, crossovers can be constructed inside the bored tunnel rather than excavated from the ground above, which would reduce the number of property impacts for all alternatives. In certain geological conditions, and for additional cost, mining stations and crossovers from underground without disturbing the

surface is also possible and could reduce property impacts associated with underground project elements.

6.3.2 MSF Options

The MSF sites were also evaluated to assess potential impacts to the environment, communities, and the transportation network. Table 6-4 compares these potential impacts for all MSF options.

Because the Metrolink at Woodman and Van Nuys at Arminta sites are primarily occupied by large-scale industrial and commercial uses, fewer businesses would be impacted than at the Sepulveda at Nebraska site, which is occupied by a large number of smaller commercial and industrial

Table 6-4. Performance of MSF Options on Environmental and Community Objectives

MEASURE	SEPULVEDA AT NEBRASKA	METROLINK AT WOODMAN	VAN NUYS AT ARMINTA
Objective: Minimize effects to communities			
Potential for property impacts		Likely impact	
Potential for traffic and noise impacts (construction)		Likely impact	
Potential for transportation and traffic Impacts (operation)	Potential impact	Likely impact	Potential impact
Potential for visual impacts	Potential impact	Likely impact	Potential impact
Objective: Minimize impacts to transportation network			
Estimated traffic lanes, parking lanes, bike lanes, and sidewalks to be removed	Pontius Avenue to be vacated between Nebraska Avenue and Olympic Boulevard. Missouri Avenue, La Grange Avenue, and Mississippi Avenue to be vacated between Sepulveda Boulevard and Cotner Avenue. All properties accessed from these roadway segments would be acquired.	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed	No traffic, parking, bicycle, or pedestrian facility anticipated to be permanently removed
Objective: Minimize other environmental impacts			
Environmental Justice	Unlikely to impact, no EJ census tracts	Potential impact, adjacent to EJ census tracts	Potential impact, adjacent to EJ census tracts
Historic Resources	Potential impact	Unlikely to impact	Potential impact
Water Resources	Potential impact	Unlikely to impact	Unlikely to impact
Other Resources	Impacts to archaeological and tribal cultural resources, hazards and hazardous materials, noise and vibration, Section 4(f) resources, and seismic resources are anticipated to be relatively similar across MSF options		

Source: Sepulveda Mobility Partners, 2019; Terry Hayes Associates, 2019

Note: EJ = environmental justice

buildings. Additionally, the Sepulveda at Nebraska site would require several public roadway segments to be vacated and incorporated into the MSF site. The traffic impact of vacating these roadway segments would be minimal, as the properties these roadway segments currently serve would be part of the MSF.

The Sepulveda at Nebraska site also has potential impacts associated with potentially historic structures (buildings over 50 years old with architectural characteristics of the time and culture in which they were built) and water resources as a result of the need to excavate the site to build the MSF. The Van Nuys at Arminta site is in an EJ census tract (with no residences) and adjacent to EJ communities and has a potentially historic structure on the site. The Metrolink at Woodman site has the fewest potential impacts and is located in an EJ census tract that does not contain residences.

6.4 Provide a Cost-Effective Solution

Cost estimates were prepared for each alternative using a methodology consistent with Federal Transit Administration (FTA) guidelines for estimating capital costs. The FTA guidelines employ Standard Cost Categories (SCC) that encompass the major elements of a transit project, such as guideway, stations, support facilities, sitework, systems, right-of-way, vehicles, and professional services. Cost estimates also include a contingency allocated to individual categories as well as an unallocated contingency. Finance charges are not included in the cost estimates.

For some SCC items, costs were estimated using quantities calculated based on the plans in the conceptual drawings. However, because of the early level of design, costs for most categories were estimated using parametric cost elements

(e.g., cost per route mile) based on bids from the Purple Line Extension or other Metro projects. Because no MRT systems with the capacity required for the Project have been constructed in the United States, unit prices for MRT 1 were based on costs for HRT, modified to reflect the unique characteristics of MRT. The cost estimating methodology and detailed cost estimates are provided in the *Capital Cost Methodology and Estimates Report* (Metro, 2019e), the *O&M Cost Methodology Report* (Metro, 2019k), and the *Operating and Maintenance Cost Estimates Report* (Metro, 2019d).

Because a point estimate may suggest more precision than is warranted at this early stage of project development, a range of capital cost estimates was developed for each alternative. Since unit prices were developed from the average of reasonable bids (not low bids), and these bids included contractor contingencies, it is anticipated that the point estimates developed would be near the high end of the reasonable range of estimates. Therefore, it was assumed that the low end of the cost range may be as much as 15 percent below the point estimate and that the high end may be as high as 5 percent above the point estimate.

Since each alternative could be served by more than one MSF site, cost and cost-effectiveness were evaluated independently for the alternatives and for the MSF sites. The evaluation of each is presented below.

6.4.1 Alternatives

Since underground construction is more expensive than aboveground construction, the main factors influencing the cost of the alternatives are the overall length of the alignment and the amount of the alignment that is underground. The estimated capital cost of the alternatives ranges from \$9.4 to \$11.6 billion for MRT 1 up to \$11.0 to \$13.6 billion for HRT 2.

Annual operating and maintenance (O&M) costs would be lower for MRT 1 than for the HRT alternatives, in part because the industry standard of driverless operations of monorails has been assumed in estimating costs. Because of the lower capital and O&M costs, MRT 1 performs significantly better than the HRT alternatives in terms of cost per hour of time savings, even though it has lower ridership. However, because MRT 1 has lower ridership, the cost per project trip for HRT 1, HRT 3, and MRT 1 are relatively similar. The long stretch through the mountains with no stations has a negative impact on the cost-effectiveness of all alternatives.

Table 6-5 presents a comparison of costs and cost effectiveness by alternative. Table 6-6 presents a breakdown of the cost of each alternative by SCC.

Expo/Bundy alignment option performance

Key cost differences for the Expo/Bundy alignment option compared to the base alignment to Expo/Sepulveda are as follows:

- > Higher capital cost as a result of longer tunnel segment
- > Higher cost per transit trip and hour of time savings

Table 6-5. Performance of Alternatives on Providing a Cost-Effective Solution

MEASURE	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Minimize cost to achieve benefits				
Capital cost	\$10.9 to \$13.4 billion	\$11.0 to \$13.6 billion	\$10.0 to \$12.4 billion	\$9.4 to \$11.6 billion
Annual O&M cost	\$112 to \$119 million	\$112 to \$129 million	\$123 to \$137 million	\$84 to \$92 million
Annualized capital and O&M cost per project trip	\$9.85 to \$11.69	\$10.13 to \$12.28	\$9.27 to \$11.11	\$9.26 to \$11.15
Cost per hour of time savings	\$30.58 to \$36.30	\$31.03 to \$37.61	\$29.02 to \$34.77	\$27.90 to \$33.58
Objective: Match cost to available funding				
	The estimated costs of the Project are greater than the funding identified in the <i>Measure M Expenditure Plan</i> . All alternatives have similar potential to receive Capital Improvement Grant funding and to attract private investment.			

Source: Sepulveda Mobility Partners, 2019

Notes: Costs shown in 2019 dollars. Costs are for 20-foot diameter twin-bore tunnel configuration. Cost per project trip considers only 2042 ridership forecasts.

O&M = operating and maintenance

Table 6-6. Cost of Alternatives by Standard Cost Category (in thousands of dollars)

CATEGORY	HRT 1	HRT 2	HRT 3	MRT 1
Guideway and Track	\$3,476,719	\$3,539,663	\$3,225,527	\$2,252,550
Stations	\$2,917,582	\$2,935,437	\$1,929,734	\$1,904,734
Support Facilities	\$253,750	\$253,750	\$253,750	\$253,750
Sitework and Special Conditions	\$556,630	\$568,732	\$674,543	\$850,736
Systems	\$661,334	\$683,014	\$741,425	\$845,345
Subtotal Construction Cost	\$7,866,015	\$7,980,596	\$6,824,979	\$6,107,116
Right-of-Way	\$1,057,740	\$1,057,740	\$1,418,938	\$1,374,558
Vehicles	\$343,970	\$343,970	\$367,235	\$599,885
Professional Services	\$2,375,232	\$2,409,497	\$2,132,992	\$1,926,625
Unallocated Contingency	\$1,164,296	\$1,179,180	\$1,074,414	\$1,000,818
Total Cost (Point estimate)	\$12,807,253	\$12,970,984	\$11,818,559	\$11,009,002
Total Cost (Low end of range)	\$10,886,165	\$11,025,336	\$10,045,775	\$9,357,651
Total Cost (High end of range)	\$13,447,616	\$13,619,533	\$12,409,487	\$11,559,452

Source: Sepulveda Mobility Partners, 2019

Note: Costs shown in 2019 dollars. Costs are for 20-foot diameter twin-bore tunnel configuration. Cost for each category includes allocated contingency.

The evaluation methodology described in Chapter 3 includes an objective of matching cost to available funding as part of this goal. Because the preliminary cost of the Sepulveda Transit Corridor Project is greater than the funding identified in the *Measure M Expenditure Plan*, additional funding would be sought from other sources. Two key potential sources of additional funding are the FTA's Capital Investment Grants (CIG) program and private business entities, although other state and local funding sources may also become available. The CIG program will consider funding transit projects that

achieve an annualized cost per project trip of \$10 or less. All Project alternatives have an annualized cost per project trip close to \$10 based only on 2042 ridership forecasts, which differs from the FTA methodology for the CIG program. Because design is still in the early stages, all alternatives are therefore considered relatively equally competitive for CIG funding. Additionally, because all alternatives could potentially be operated and maintained independently of other Metro transit facilities, all alternatives are considered equally likely to attract private investment.

6.4.2 MSF Options

Table 6-7 presents a comparison of costs for the MSF options. Because the MSF would be approximately the same size and require the same facilities regardless of the site selected, the capital cost of the MSFs options vary primarily based on the cost of the property that would need to be acquired and the cost of preparation of the site prior to construction. The O&M costs associated with an MSF are consistent across alternatives and are included in the O&M costs for each alternative.

The Sepulveda at Nebraska site would be significantly more costly than either the Metrolink at Woodman site or the Van Nuys at Arminta site. As described in Chapter 5, an MSF at the Sepulveda at Nebraska site would have to be constructed below the level of the existing ground because the track would have to cross under the MWD Sepulveda Feeder to access the site. Therefore, the entire site would have to be excavated. In addition, real estate is more costly in the vicinity of the Sepulveda at Nebraska site than at the other two sites.

6.5 Minimize Risk

All large infrastructure projects face risks along the process from project development through design and construction to the commencement of operations. Risk identification is the process of determining issues that may affect the ability of each alternative to achieve project objectives and documenting their characteristics. MSF options also vary in their level of risk

as an MSF is a necessary component of an operating transit line. The alternatives and MSF options have been evaluated for the ability to minimize risk. Project risks, both shared and unique to individual alternatives, are identified in detail in the *Risk Analysis Technical Memorandum* (Metro, 2019f).

6.5.1 Alternatives

Table 6-8 presents a comparison of the risks for each alternative related to unresolved engineering challenges and dependence on other agencies for decision-making. While all alternatives share many of the same risks, the overall risk associated with HRT 3 and MRT 1 is higher than that of HRT 1 and HRT 2, primarily because of the need to relocate parts of the MWD Sepulveda Feeder Line in proximity to each of these alternatives. Additionally, the lack of experience constructing and operating MRT with the capacity required for the Project in the United States creates additional uncertainty for MRT 1.

6.5.2 MSF Options

Risks related to unresolved engineering challenges and the dependence on other agencies for decision-making associated with MSF options are summarized in Table 6-9 and described in more detail in the *Risk Analysis Technical Memorandum* (Metro, 2019f). While the MSF options at Metrolink at Woodman and Van Nuys at Arminta sites do not have additional risks associated with them, the Sepulveda at Nebraska site does. These additional risks are related to excavating the site, crossing the Sepulveda Feeder Line, and vacating public roadways.

Table 6-7. Performance of MSF Options on Providing a Cost-Effective Solution

MEASURE	SEPULVEDA AT NEBRASKA	METROLINK AT WOODMAN	VAN NUYS AT ARMINTA
Objective: Minimize cost to achieve benefits			
Capital cost, not including real estate	\$1.1 billion	\$253.8 million	\$253.8 million
Real estate cost	\$890.9 million	\$114.4 million	\$195.0 million
Total capital cost	\$1.9 billion	\$347.4 million	\$448.8 million

Source: Sepulveda Mobility Partners, 2019

Notes: Costs shown in 2019 dollars.

Table 6-8. Performance of Alternatives on Minimizing Risks

MEASURE	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Minimize potential for cost increases and delays				
Qualitative assessment of unresolved major engineering challenges	<p>Tunneling in the vicinity of bridge foundations at US 101, Metro Orange Line, and LOSSAN Rail Corridor may require ground improvements</p> <p>Construction may conflict with operations of the East San Fernando Valley Light Rail Transit Corridor</p>	<p>Tunneling in the vicinity of bridge foundations at US 101, Metro Orange Line, and LOSSAN Rail Corridor may require ground improvements</p> <p>Construction may conflict with operations of the East San Fernando Valley Light Rail Transit Corridor</p>	<p>Liquefaction potential could require deeper foundations for aerial structures on Sepulveda Boulevard</p> <p>Relocating the 96-inch Sepulveda Feeder Line would increase project cost</p>	<p>Liquefaction potential could require deeper foundations for aerial structures on Sepulveda Boulevard</p> <p>Relocating the 96-inch Sepulveda Feeder Line would increase project cost</p> <p>Meeting fire/life safety standards could be challenging in the Sepulveda Pass, including in the event of wildfire</p> <p>Limited data on construction cost of monorail structures adds uncertainty to cost estimates</p> <p>MRT vehicles and systems are proprietary to the vendor and may limit Metro's ability to change vendors in the future</p> <p>MRT design may not allow crossovers at the frequency that Metro has on HRT systems</p>
Dependence on decisions made by other projects or other agencies	<p>Tunnel may have to go under parklands in the Santa Monica Mountains</p> <p>Relocation of storm drain on Van Nuys Boulevard requires Los Angeles County Flood Control approval</p>	<p>Tunnel may have to go under parklands in the Santa Monica Mountains</p> <p>Relocation of storm drain on Van Nuys Boulevard requires Los Angeles County Flood Control approval</p>	<p>Tunnel may have to go under parklands in the Santa Monica Mountains</p> <p>Aerial guideway along Sepulveda Boulevard will require City approval</p> <p>Relocation of the 96-inch Sepulveda Feeder Line will require approval of MWD</p>	<p>Aerial guideway along Sepulveda Boulevard will require City approval</p> <p>Aerial guideway may impact parklands or wildlife habitat in the Santa Monica Mountains</p> <p>Relocation of the 96-inch Sepulveda Feeder Line will require approval of MWD</p>

Source: Sepulveda Mobility Partners, 2019

Note: MWD = Metropolitan Water District

Table 6-9. Performance of MSF Options on Minimizing Risks

MEASURE	SEPULVEDA AT NEBRASKA	METROLINK AT WOODMAN	VAN NUYS AT ARMINTA
Objective: Minimize potential for cost increases and delays			
Qualitative assessment of unresolved major engineering challenges	MSF site would have to be located below existing grade Crossing the 96-inch Sepulveda Feeder Line may require reconstruction or other improvements to the line in the vicinity of the crossing	No additional risks related to unresolved major engineering challenges associated with this MSF option	No additional risks related to unresolved major engineering challenges associated with this MSF option
Dependence on decisions made by other projects or other agencies	Crossing the 96-inch Sepulveda Feeder Line will require approval of MWD Vacating public roadways will require approval of City of Los Angeles	No additional risks related to agency approvals associated with this MSF option	No additional risks related to agency approvals associated with this MSF option

Source: Sepulveda Mobility Partners, 2019

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7 Identification and Screening of Westside-LAX Concepts

The transit concepts for the Westside-LAX segment offer multiple mode and alignment options for extending the alternatives to LAX.

This chapter describes the process of developing and evaluating transit concepts for the Westside-LAX segment of the Project. Westside-LAX concepts were developed as extensions of the Valley-Westside concepts to serve the major activity centers and travel markets in the southern part of the Study Area. After the concepts were developed, they were evaluated using the evaluation criteria described in Chapter 3. A detailed discussion of the evaluation measures and results is provided in the *Initial Screening Report* (Metro, 2019a).

7.1 Development of Westside-LAX Concepts

The Westside-LAX concepts were developed as extensions of the refined Valley-Westside concepts, or, in one case, as an extension of the Metro Purple Line. Therefore, each Westside-LAX concept must be compatible with the mode and the terminus of a Valley-Westside concept or the Metro Purple Line. As a consequence, only HRT and MRT concepts connecting to the Expo/Bundy Station, Expo/Sepulveda Station, or Westwood/VA Station were considered.

The Airport Metro Connector (AMC) 96th Street Transit Station was identified as the logical southern terminus of the Westside-LAX concepts. This station will be served by the Automated People Mover (APM) currently under construction by Los Angeles World Airports, which is the City of Los Angeles department that operates LAX. The AMC 96th Street Transit Station is also planned to be served by two Metro LRT lines, the Metro Green Line and the Crenshaw/LAX Line, so it will be a hub for transit activity in the LAX area.

The Westside-LAX concepts generally follow the major north-south corridors within the southern part of the Study Area: Centinela Avenue, Sepulveda Boulevard, I-405, and Overland Avenue. Concepts following Centinela Avenue, Sepulveda Boulevard, and I-405 were presented at community meetings held in June 2018; a concept following Overland Avenue was added in response to public comment.

An aerial configuration was only considered along I-405 since the refined Valley-Westside segment concepts all end in a tunnel configuration and all of the arterial corridors to the south have extensive segments in which the right-of-way is not sufficient to accommodate the addition of an aerial guideway without removal of travel lanes and/or substantial property impacts.

7.2 Westside-LAX Concepts

The alignments of the six Westside-LAX concepts are shown in Figure 7-1. All concepts have a southern terminus at the planned Airport Metro Connector 96th Street Transit Station. Concepts along I-405 or Sepulveda Boulevard follow shorter paths to LAX and have three intermediate stations, while concepts that deviate to the west to Centinela Avenue or to the east to Overland Avenue to serve additional activity centers follow longer paths and have four intermediate stations. The Purple Line extension has an additional, transfer station at the Expo/Bundy Station.

As extensions of the HRT and MRT Valley-Westside concepts or the Metro Purple Line, the Westside-LAX concepts would also operate at 4-minute peak headways and 10-minute off-peak headways. As with the Valley-Westside concepts, it is expected that some Metro and municipal bus services would be modified to eliminate duplicative service and to support regional access to the Project.

7.2.1 HRT Overland Concept

The HRT Overland concept would be an entirely underground HRT extension. The HRT Overland alignment would add 8.0 miles of guideway and four stations to the Project. As shown in Figure 7-1, the HRT Overland concept would connect to the Valley-Westside segment at the Expo/Sepulveda Station, transition to Overland Avenue, and then return to Sepulveda Boulevard before turning east to connect to the AMC 96th Street Transit Station. Intermediate stations would be located at Venice and Jefferson Boulevards on Overland Avenue, as well as at the Culver City Transit Center and near the intersection of Sepulveda Boulevard and Manchester Avenue.

7.2.2 HRT Sepulveda Concept

The HRT Sepulveda concept would be an entirely underground HRT extension. The HRT Sepulveda alignment would add 7.7 miles of guideway and three stations to the Project. As shown in Figure 7-1, the HRT Sepulveda concept would connect to the Valley-Westside segment at the Expo/Sepulveda Station and continue under Sepulveda Boulevard before turning east to connect to the AMC 96th Street Transit Station. Intermediate stations would be located at Venice Boulevard, the Culver City Transit Center, and near the intersection of Sepulveda Boulevard and Manchester Avenue.

7.2.3 HRT I-405 Concept

The HRT I-405 concept would be a partially underground and partially aerial HRT extension. The HRT I-405 alignment would add 7.3 miles of guideway and three stations to the Project. As shown in Figure 7-1, the HRT I-405 concept would connect to the Valley-Westside segment at the Expo/Sepulveda Station and then transition to an aerial alignment alongside I-405.



Figure 7-1. Westside-LAX Concepts

Source: Sepulveda Mobility Partners, 2019

Why do all the Westside-LAX concepts terminate at the Airport Metro Connector 96th Street Transit Station?

- > The AMC 96th Street Transit Station will be the primary transit hub for LAX, serving the APM, the Metro Green Line, and the Crenshaw/LAX Line.
- > Connecting to a different APM station would require passengers using both the Sepulveda Transit Corridor and another Metro line to make an additional transfer.

It would transition back to an underground configuration south of SR 90 and then turn east to connect to the AMC 96th Street Transit Station. It would include an aerial station adjacent to I-405 at Venice Boulevard and underground stations on Sepulveda Boulevard by Howard Hughes Center and near the intersection of Sepulveda Boulevard and Manchester Avenue.

7.2.4 HRT Centinela Concept

The HRT Centinela concept would be an entirely underground HRT extension. As shown in Figure 7-1, the HRT Centinela concept would connect to the Valley-Westside segment at the Expo/Sepulveda Station, with an option for a northern terminus at the Expo/Bundy if that option were to be selected for the Valley-Westside segment. The HRT Centinela alignment would add 7.8 miles of guideway and three stations to the Sepulveda Transit Corridor Project. From either the Expo/Sepulveda Station or the Expo/Bundy Station, it would transition to Centinela Avenue, and then return briefly to Sepulveda Boulevard before turning east to connect to the AMC 96th Street Transit Station. Intermediate stations would be located on Centinela Avenue at Venice Boulevard, Culver Boulevard, Jefferson Boulevard (Playa Vista), and near the intersection of Sepulveda Boulevard and Manchester Avenue.

7.2.5 Purple Line Extension Concept

As shown in Figure 7-1, one HRT concept would extend the Purple Line 10.2 miles west and south from the Westwood/VA Station, turning south along Bundy Avenue to the Expo/Bundy Station. South of the Expo/Bundy Station, it would follow the same alignment and serve the same stations as the Expo/Bundy option of the HRT Centinela concept. The Purple Line Extension concept would terminate at the AMC 96th Street Transit Station and would only be feasible if the Valley-Westside segment terminates at the existing Expo/Sepulveda station. Because the Purple Line Extension concept includes two tunnels between the Metro Purple and Expo Lines, one for the Valley-Westside segment and another for the extension to LAX, it requires the greatest amount of new tunnel construction of all the alternatives.

7.2.6 MRT I-405 Concept

Because a primary motivation of the MRT concept is to reduce potential costs by remaining aerial for as much of the alignment as possible, only one MRT extension concept was developed. As shown in Figure 7-1, the MRT I-405 concept would follow the same alignment and serve the same stations as the HRT I-405 concept, terminating at the future AMC 96th Street Transit Station.

7.2.7 MSF

Additional rail vehicles would be needed to operate any of the Westside-LAX concepts: 44 for the HRT concepts other than the Purple Line Extension, 58 for the Purple Line Extension, and 67 for MRT I-405. None of the MSF sites identified for the Valley-Westside segment of the Project would be large enough to accommodate these additional vehicles. Because land uses change over time, a suitable site for storage and daily cleaning of the expanded fleet should be identified closer to the anticipated date of construction of the Westside-LAX segment.

7.3 Station Locations

Table 7-1 presents a comparison of the stations included in each of the Westside-LAX concepts. In addition to the intermediate station locations listed on Venice Boulevard, intermediate station locations on Washington Boulevard were considered. The locations on Venice Boulevard were included because of the greater transit demand on Venice Boulevard.

7.4 Evaluation of Westside-LAX Concepts

The Westside-LAX concepts were evaluated in the same manner as the refined Valley-Westside concepts using the evaluation criteria described in Chapter 3. This section

summarizes the evaluation of the Westside-LAX concepts, organized by project goals. Because of the early stage of design of the Westside-LAX concepts, objectives related to the goal of minimizing risk were not evaluated. The detailed evaluation of the concepts is provided in Appendix D: Evaluation of Westside-LAX Concepts.

7.4.1 Improve Mobility

The Westside-LAX concepts were evaluated based on ridership, operability, and the quality of transfers and connections to assess their potential to improve mobility in the corridor. Since the Westside-LAX segment is not scheduled to open until 2057, ridership forecasts were conducted for that year. Ridership results are presented for the entire Project, including both the Valley-Westside and Westside-LAX segments. A summary of the travel forecasting results for the Westside-LAX concepts can be found in Appendix B: Travel Forecast Results.

As shown in Table 7-2, excluding the Purple Line Extension (discussed in the box at the top of page 73), the HRT Sepulveda concept would result in the highest number of daily boardings. It would also attract the most new transit trips and provide the greatest daily time savings. The MRT I-405 concept would result in the fewest daily boardings, generally due to its slower operating speeds and longer travel times.

Table 7-1. Potential Station Locations Studied for Westside-LAX Concepts

LOCATION	HRT OVERLAND	HRT SEPULVEDA	HRT I-405	HRT CENTINELA	PURPLE LINE EXTENSION	MRT-405
Expo/Sepulveda	U	U	U	O		U
Expo/Bundy				O	U	
Overland/Venice	U					
Overland/Jefferson	U					
Sepulveda/Venice		U				
Culver City Transit Center	U	U				
I-405/Venice			A			A
Howard Hughes Center			U			U
Centinela/Venice				U	U	
Centinela/Culver				U	U	
Centinela/Jefferson				U	U	
Sepulveda/Manchester	U	U	U	U	U	U
AMC 96th Street	U	U	U	U	U	U

Source: Sepulveda Mobility Partners, 2018

A = Aerial station

O = Optional underground station dependent on alignment option chosen

U = Underground station

Table 7-2. Performance of Westside-LAX Concepts on Mobility Objectives

	HRT OVERLAND	HRT SEPULVEDA	HRT I-405	HRT CENTINELA ¹	MRT I-405	PURPLE LINE EXTENSION
Objective: Increase transit ridership by directly serving origin-destination pairs with greatest potential for attracting new riders						
Daily boardings ²	234,634	238,791	229,785	231,284	192,345	282,130
New transit trips ³	37,577	40,499	35,573	37,551	29,466	35,283
Daily time savings ³ (hours)	39,715	42,336	37,647	38,190	31,924	38,897
Objective: Increase transit frequency and operating speeds						
Travel time (Expo-LAX)	11.5 minutes	10.5 minutes	11 minutes	11.5 minutes	12.5 minutes	11.5 minutes ⁴
Average operating speed (mph)	42.0	44.5	42.2	40.8	36.2	40.7
Service frequency	No differences in peak or off-peak service frequencies					
Objective: Minimize need for transfers and/or time spent transferring						
Number of required transfers	No additional transfers needed from Valley-Westside to Westside-LAX segments					Transfer required to travel between the Valley and the Westside-LAX segment
Objective: Increase on-time performance and reliability						
	No design or operational differences for on-time performance or reliability					
Objective: Provide sufficient capacity to accommodate anticipated demand						
	All concepts have capacity to accommodate anticipated demand					
Objective: Provide convenient connections between existing and planned transit						
Quality of station connections	Connection from an underground to aerial station at the Expo Line					Forced transfer at Purple Line; connection from an underground to aerial station at the Expo Line

Source: Sepulveda Mobility Partners, 2019

¹Via Sepulveda Boulevard with an Expo/Sepulveda Station. Performance via Expo/Bundy is similar.

²For entire Project from Van Nuys Metrolink to LAX. Purple Line Extension double counts about 20,000 to 25,000 riders transferring from the Sepulveda Transit Corridor Project to Purple Line because they must board two trains.

³Compared to Valley-Westside segment only. Most trips on Westside-LAX concepts also travel on the Valley-Westside segment, so time savings presented are only possible in conjunction with that segment.

⁴Travel from Purple Line Westwood/VA Station to LAX would take 14 minutes.

7.4.2 Improve Equity of Access

Because access to the Project would occur at stations, station areas along the Westside-LAX concepts were evaluated to understand the Project's ability to serve the surrounding residential and employment centers, capitalize on transit-supportive land uses, provide connections to transit-dependent communities, and connect with existing and planned first/last-mile connections. Since the Westside-LAX concepts are along three primary corridors (Centinela Avenue, I-405/Sepulveda Boulevard, and Overland Avenue), the concepts were grouped by corridor and the evaluation was conducted for each of these corridors. Intermediate

stations along each corridor at Venice Boulevard (Overland/Venice, Sepulveda/Venice, and Centinela/Venice) and Jefferson Boulevard (Overland/Jefferson, Culver City Transit Center, and Playa Vista) were evaluated.

The HRT Overland concept would provide the greatest equity of access benefits. Its intermediate stations at Overland/Venice and Overland/Jefferson are forecast to have employment densities greater than comparable stations on the other corridors. In particular, the Overland/Venice Station is surrounded by transit-supportive land uses and a significant number of low-income, minority, and zero-car households.

Purple Line Extension Ridership Patterns

Figure 7-2 compares several ridership measures for the Purple Line Extension concept and the HRT concepts that are extensions of Valley-Westside alternatives from the Expo/Sepulveda Station. While the Purple Line Extension concept would have the greatest number of daily boardings on the entire Project and produce slightly higher ridership on the Westside-LAX segment, it would result in substantially lower ridership on the Valley-Westside segment. This pattern occurs because the concept consists of two disconnected segments—the Valley-Westside segment and the Purple Line Extension to LAX—so passengers using both segments of the Project would be forced to transfer at the Westwood/UCLA Station. This “forced transfer” has the following implications:

- > Since some passengers would be required to board two trains to complete their journey, they are counted twice in the total Project boardings, so the greater number of boardings does not actually represent a benefit to riders.
- > Passengers from the Valley, including those who start their journey on the East San Fernando Valley Light Rail Transit Corridor or the Metro Orange Line, are less likely to use the Project because they would have to make an additional transfer to reach the LAX area.

As shown in Table 7-2 and illustrated in Figure 7-2, as a result of these factors, the number of daily new transit trips attracted to the Metro system is lower for the Purple Line Extension than the other HRT concepts.

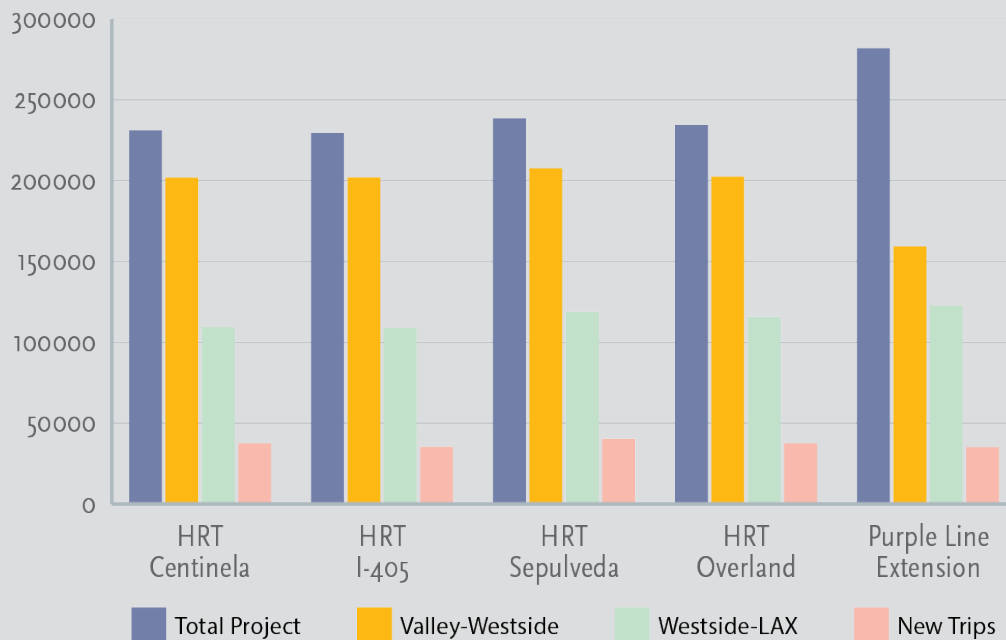


Figure 7-2. Project Trips and New Trips Under HRT Concepts (2057)

Note: Total Project trips are less than the sum of Valley-Westside trips and Westside-LAX trips because some trips use both segments of the Project.

The HRT Centinela and Purple Line Extension concepts would provide the least benefits on this measure, in part because the Centinela corridor would provide the weakest opportunities for first/last mile connections due to its poor cycling infrastructure and pedestrian connectivity.

7.4.3 Protect the Environment and Support Community and Economic Development

As with the Valley-Westside alternatives, the Westside-LAX concepts that are entirely underground perform better than those with aerial sections (HRT I-405 and MRT I-405) on measures of protecting the environment and supporting community and economic development since they have lower potential for visual, construction, transportation, noise, vibration, and historic impacts. Impacts to the surface, including visual, noise, vibration, and traffic, would be limited to construction staging areas and station sites.

Among the all-tunnel alternatives, the HRT Sepulveda and HRT Centinela concepts perform best at protecting the environment because they would not pass through oil fields or Methane and Methane Buffer Zones. The Purple Line Extension would pass through the Sawtelle Oil Fields and the Sawtelle Methane and Methane Buffer Zone, and the HRT Overland concept would pass through the Inglewood Oil Fields and the Inglewood Methane and Methane Buffer Zones, which would increase the risk for methane seepage and other related methane hazards. The Purple Line Extension concept also has increased potential for historic impacts near the West Los Angeles Veterans Affairs Medical Center and seismic impacts along the portion of its alignment through the Santa Monica Fault Zone.

Reductions in VMT and VHT were not calculated for the Westside-LAX concepts because they are extensions of different Valley-Westside concepts and therefore have different “No Build” baselines against which reductions would be measured. However, reductions in VMT and VHT are generally related to project boardings, with greater numbers of boardings associated with greater reductions.

7.4.4 Provide a Cost-Effective Solution

Construction cost estimates for each concept were developed using a methodology similar to that described in Chapter 6 for the Valley-Westside alternatives. Preliminary right-of-way cost estimates were based on uniform unit prices for residential and commercial property acquisitions, underground easements, and station plazas. The cost estimates for the all of the Westside-LAX concepts include an allowance for a secondary MSF for storage and daily cleaning of rail vehicles.

As with the Valley-Westside alternatives, the main factors influencing the cost of the Westside-LAX concepts are the overall length of the alignment and the amount of the alignment that is underground. In addition, the preliminary right-of-way cost estimates suggest that HRT I-405 and MRT I-405, which have aerial sections, could have substantial costs associated with property acquisition. As shown in Table 7-3, the estimated capital cost of the concepts ranges from a low of \$6.0 to \$7.4 billion for HRT Sepulveda up to \$8.3 to \$10.3 billion for the Purple Line Extension. Table 7-4 presents a breakdown of the cost of each alternative by SCC. Detailed cost estimates are provided in *Cost Estimates for Westside-LAX Concepts* (Metro, 2019). Annual O&M costs would be about 35

Table 7-3. Performance of Westside-LAX Concepts on Providing a Cost-Effective Solution

	HRT OVERLAND	HRT SEPULVEDA	HRT I-405	HRT CENTINELA ¹	MRT I-405	PURPLE LINE EXTENSION
Objective: Minimize cost to achieve benefits						
Capital cost	\$6.8 to \$8.4 billion	\$6.0 to \$7.4 billion	\$6.5 to \$8.0 billion	\$6.7 to \$8.3 billion	\$6.5 to \$8.0 billion	\$8.3 to \$10.3 billion
Annual O&M cost	\$64 to \$68 million	\$59 to \$63 million	\$59 to \$63 million	\$62 to \$66 million	\$40 to \$42 million	\$82 million
Cost per hour of time savings ²	\$19.35 to \$23.03	\$16.39 to \$19.49	\$19.32 to \$23.02	\$19.74 to \$23.50	\$21.17 to \$25.46	\$24.51 to \$28.72
Objective: Match cost to available funding						
	The estimated costs of all alternatives exceed the funding allocated for the project in the <i>Measure M Expenditure Plan</i> . All alternatives have similar potential to receive Capital Improvement Grant funding and to attract private investment.					

Source: Sepulveda Mobility Partners, 2019

¹Via Sepulveda Boulevard with an Expo/Sepulveda Station. Cost via Expo/Bundy is similar.

²Most trips on Westside-LAX concepts also travel on the Valley-Westside segment, so time savings presented are only possible in conjunction with that segment.

Notes: Costs shown in 2019 dollars. Costs are for 20-foot diameter twin-bore tunnel configuration. A range of O&M costs reflecting contracted and Metro-operated services is provided for all concepts except the Purple Line Extension, which would only be operated by Metro.

Table 7-4. Cost of Westside-LAX Concepts by Standard Cost Category (in thousands of dollars)

CATEGORY	HRT OVERLAND	HRT SEPULVEDA	HRT I-405	HRT CENTINELA ¹	MRT I-405	PURPLE LINE EXTENSION
Guideway and Track	\$2,028,779	\$1,938,815	\$1,426,671	\$1,984,062	\$1,307,846	\$2,573,902
Stations	\$2,036,053	\$1,652,712	\$1,299,155	\$2,036,053	\$1,299,074	\$2,467,864
Support Facilities	\$181,250	\$181,250	\$181,250	\$181,250	\$181,250	\$181,250
Sitework and Special Conditions	\$530,044	\$445,870	\$381,845	\$527,009	\$381,845	\$636,062
Systems	\$411,027	\$383,496	\$379,407	\$391,530	\$401,221	\$516,735
Subtotal Construction Cost	\$5,187,153	\$4,602,143	\$3,668,328	\$5,119,904	\$3,571,236	\$6,375,813
Right-of-Way	\$268,702	\$229,011	\$1,936,103	\$268,327	\$1,966,003	\$330,426
Vehicles	\$173,360	\$173,360	\$173,360	\$173,360	\$262,543	\$227,645
Professional Services	\$1,613,179	\$1,429,777	\$1,153,457	\$1,592,557	\$1,122,551	\$1,979,158
Unallocated Contingency	\$724,239	\$643,429	\$693,125	\$715,415	\$692,233	\$891,304
Total Cost (Point estimate)	\$7,966,633	\$7,077,720	\$7,624,373	\$7,869,563	\$7,614,566	\$9,804,346
Total Cost (Low end of range)	\$6,771,638	\$6,016,062	\$6,480,717	\$6,689,129	\$6,472,381	\$8,333,694
Total Cost (High end of range)	\$8,364,965	\$7,431,606	\$8,005,592	\$8,263,041	\$7,995,294	\$10,294,563

Source: Sepulveda Mobility Partners, 2019

¹Via Sepulveda Boulevard with an Expo/Sepulveda Station. Cost via Expo/Bundy is similar.

Note: Costs shown in 2019 dollars. Costs are for 20-foot diameter twin-bore tunnel configuration. Cost for each category includes allocated contingency.

percent lower for MRT I-405 than for the HRT alternatives, in part because the industry standard of driverless operations of monorails has been assumed in estimating costs.

Because the *Measure M Expenditure Plan* does not fully fund the Sepulveda Transit Corridor Project, additional funding for the Project would need to be sought from other sources.

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8 Public Outreach and Agency Coordination

Metro sought input from the community and public agencies in an inclusive and transparent way, offering multiple forums for bilingual English and Spanish community engagement.

Metro understands the socioeconomic, ethnic, and linguistic diversity throughout the very large Study Area and outlined a variety of outreach methods to try and reach as many different stakeholders as possible. Metro designed a wide range of opportunities for feedback in an inclusive and transparent way and held multiple forums for bilingual English and Spanish community engagement. The outreach team recognizes that many people will not be able to participate in public meetings or feel comfortable doing so. The team therefore also engaged stakeholders at events/festivals, stakeholder briefings/meetings, transit/bus stations in the Valley and on the Westside, churches with multiple bilingual services, and youth sporting events, reaching approximately 5,000 stakeholders in person. More details on the outreach process, including meeting notifications, meeting materials, collateral materials, community events, social media engagement, print and broadcast media coverage, and feedback received are provided in Appendix A.

Metro also conducted significant outreach with many public agencies that have jurisdiction throughout the Study Area. As stewards of these resources, these agencies are critical stakeholders in the development of the Project. Coordination with these agencies allowed concerns to be identified and addressed early in the process. These agency meetings also facilitated the sharing of data on environmental resources that could affect the feasibility of the alternatives.

This chapter describes the goals of the public outreach effort, the process that was followed to engage the community and public agencies, the key issues and concerns raised by community members and agency representatives, and how Metro incorporated the feedback into the development of the alternatives.

8.1 Public Engagement Goals

Metro engaged in a robust public outreach process for this Feasibility Study, guided by Metro's Equity Platform. Because the Feasibility Study represents an early phase of the Project, the outreach program was designed to focus on the first two elements of the Metro Equity Platform:

- > **Define & Measure:** Metro sought to pursue an inclusive conversation that engages all stakeholders, establish meaningful goals and metrics to evaluate outcomes, and conduct research and market analysis to evaluate the Project effectively.
- > **Listen & Learn:** Throughout the Feasibility Study, Metro established multiple forums to engage the community meaningfully and actively in defining, measuring, and acting on equitable outcomes. Metro recognizes that a community-driven process creates a Project that addresses

community needs. Metro is committed to listening to people from all walks of life.

Throughout the Feasibility Study, Metro has sought to develop feasible alternatives and promote performance-based investment decisions that sustain opportunities and avoid outcomes that aggravate disparities in opportunity. As the Project advances, Metro is committed to continuing to seek and incorporate community input and to focus on the remaining two elements of the Equity Platform:

- > **Focus & Deliver:** Metro is committed to forging partnerships to address secondary or indirect project impacts related to land use, gentrification, and displacement, and will continue to evaluate these issues as the Project advances.
- > **Train and Grow:** Metro will continue to evaluate these critical equity issues as the Project moves forward into the environmental review phase and will place a priority on communicating and working with affected communities with respect for equity issues.

8.2 Public Engagement Process

The public engagement process included compilation of a stakeholder database, development of project meeting materials and collateral materials, proactive outreach, public meetings, participation in community events, and coordination meetings with public agencies.

8.2.1 Stakeholder Database

In an effort to engage as many stakeholders throughout the Study Area as possible, Metro identified and compiled stakeholder contact information into a database at the beginning of the process. Through targeted emails, social media, and proactive measures to encourage stakeholder groups to notify their memberships, affinity groups, neighbors, friends, and family, Metro created a comprehensive database that included individuals and groups ranging from elected officials, neighborhood councils, and homeowners' groups to key employers, business organizations, and media. In total, the initial stakeholder list contained approximately 1,400 entries of people and groups in the Study Area.

Metro sought to reach stakeholders who travel through the Study Area by launching a bilingual online survey prior to the public meetings to gather information from the public about their travels through the Study Area. This effort added more than 6,000 email addresses of those who not only live in the Study Area, but also those who work in the Study Area or commute through it. In conjunction with a survey conducted later in the study, these surveys were taken by approximately 10,000 stakeholders in English and Spanish and increased the database more than five-fold.



Recognizing that many people may not be able to participate in public meetings, Metro provided a range of opportunities for the community to offer feedback, such as this booth at the Sherman Oaks Street Fair in October 2018.

Throughout the process, Metro worked to increase the stakeholder database via requests to the project hotline, on the website, written requests, and from sign-in sheets after each series of public meetings. By the third round of public meetings, the full database had increased to approximately 8,410 individual email addresses. Reflecting the success of Metro's effort to identify stakeholders interested in the Project, the e-blasts that were sent for the public meetings had very high open rates, ranging from 24 percent to 54 percent, with an average open rate of 35 percent.

8.2.2 Project Materials and Resources

To inform and update stakeholders about the Project's progress, the outreach team developed collateral materials for distribution through various channels and means of communication. A project website <http://www.metro.net/projects/sepulvedacorridor> serves as a central location where the public can go to obtain all project-related information. The website includes the presentations and boards from the public meetings in English and Spanish. It also includes the Project Fact Sheet and Frequently Asked Questions. The website also contains a "Contact Us"

section where people can provide their input to the study, ask questions, and add themselves to the study database to be notified of future meetings and study progress. In addition to the other forms of communication made available to stakeholders, a project telephone information line (213.922.7375) was set up for the public and available to English- and Spanish-speaking callers.

A two-minute video about the Project in English and Spanish was developed to coincide with and reflect the content of the first public meetings. This video provides background on the study, its Purpose and Need, and explains the study process. This video is posted on Metro's website at <http://www.metro.net/projects/sepulvedacorridor> and was shown at the beginning of each of the 10 public meetings (including the meeting held in Spanish) to introduce the Project to the meeting attendees. It was also used in Facebook ads to promote awareness of, and interest in, the Project.

The project team also conducted two online bilingual surveys, which were designed to gather public feedback and collect email addresses to continue to expand the project database. The first survey, which garnered more than 6,000 responses and took place from April through November 2018, focused on learning about those who travel in the Study Area, including questions about when, how often, and why they traveled; which routes they took; what modes they used; their typical trip length; and what they would most like to change about their trip. The second survey, which received approximately 4,000 responses and took place from April through September 2019, focused generally on the concepts that had been presented at the second round of public meetings in January/February 2019.

8.2.3 Public Meetings

Metro hosted three rounds of public meetings (for a total of 10 public meetings drawing over 1,000 attendees) as part of the public outreach efforts for the study. For each round of public meetings, an extensive notification and outreach effort was undertaken to inform the public about the Project, the meetings, and opportunities to provide input. In total, more than 163,478 bilingual take-ones and flyers were distributed throughout and beyond the Study Area.

Meetings were held to coincide with the introduction, refinement, and evaluation of the transit concepts. At every public meeting, all materials were available in English and Spanish, and interpreters were available to translate during the open house, presentation, and question and answer (Q&A) period, as well as to assist with submission of comments. In addition, at the last public meeting held in August 2019, Metro hosted a fully bilingual meeting in Van Nuys. Table 8-1 lists the dates, times, and locations of the public meetings.

Table 8-1. Public Meeting Dates and Locations

AREA	LOCATION	DATE AND TIME
First Round of Public Meetings		
Westwood	Westwood United Methodist Church	Thursday, June 7, 2018 6:00-8:00pm
Van Nuys	Marvin Braude San Fernando Valley Constituent Service Center	Saturday, June 9, 2018 10:00am-12:00pm
Westchester	The Proud Bird Restaurant	Tuesday, June 12, 2018 6:00-8:00pm
Second Round of Public Meetings		
Westwood	Westwood Presbyterian Church	Wednesday, January 30, 2019 6:00-8:00pm
Van Nuys	Marvin Braude San Fernando Valley Constituent Service Center	Saturday, February 2, 2019 10:00am-12:00pm
Westchester	The Proud Bird Restaurant	Tuesday, February 5, 2019 6:00-8:00pm
Third Round of Public Meetings		
Westchester	The Proud Bird Restaurant	Wednesday, July 24, 2019 6:00-8:00pm
Culver City	Veterans Memorial Building	Saturday, July 27, 2019 10:00am-12:00pm
Westwood	St. Paul the Apostle Church	Monday, July 30, 2019 6:00-8:00pm
Van Nuys	Marvin Braude San Fernando Valley Constituent Service Center	Saturday, August 3, 2019 10:00am-1:00pm

Metro also presented updates on the Project to the San Fernando Valley, Westside/Central, and South Bay Service Councils in conjunction with each round of public meetings.

8.2.3.1 Proactive Pre-Meeting Outreach

To promote each round of public meetings, Metro distributed thousands of take-ones with information about the meetings in English and Spanish to Metro Divisions 5, 7, 8, 10, 13, 15, and 18—the divisions where bus routes that operate in the Westside/Central, South Bay, and San Fernando Valley areas are located. In addition, take-ones were placed at Metro Customer Centers and were distributed to the following transit operators: Santa Monica Big Blue Bus, Culver City Transit, UCLA's BruinBus, Santa Clarita Transit, and Metrolink. The Antelope Valley Transit Authority also shared information about the meetings on the electronic displays on their buses.

For each round, extended outreach efforts included requesting support from elected offices, cities, public facilities, and other key stakeholders to promote public meetings through their respective electronic communication tools, including websites, e-newsletters, social media sites, and membership e-blasts using a social media toolkit. Public officials, including Supervisor Kuehl, Mayor Garcetti, Councilmember Bonin, and Councilmember Koretz, shared information on the upcoming meetings on their social media.

Electronic versions of each meeting notice, with a link to a Spanish translation, were distributed via e-blast to all contacts included in the project database. All meetings were publicized on social media, via advertising on Facebook in both English and Spanish. Bilingual Facebook advertising had a total reach

of more than 766,825 and generated high rates of reactions/shares. After the meetings, e-blasts were also sent to attendees thanking them for their participation and to distribute the information that was shared at the public meetings, including a link to the project video.

For the third round of public meetings, flyers with bilingual information were distributed door-to-door in Van Nuys zip codes 91402, 91405, and 91411 to encourage attendance at the meeting held in Spanish. This area was selected and targeted based on a careful analysis of Spanish speakers with limited English proficiency (LEP) in the Study Area.

8.2.3.2 Media Activities

Metro extensively engaged traditional print and broadcast media outlets to promote the study and the public engagement process. Prior to each series of public meetings, press releases were sent to regional and local print media, broadcast media, and online media, including blogs. In addition to three paid advertisements in the *Daily News*, *Daily Breeze*, and *Hoy* that reached 175,000 people, 60 news stories ran about the Project during the study. Metro also posted articles to its own blogs (The Source and El Pasajero) to publicize the meetings.

Around key study milestones, there was generally a pronounced uptick in news stories. Because of the nature of online media and blogs, these stories generated significant online discussion from the public. Monitoring this “virtual” discussion allowed Metro to see how the public was reacting to study developments in real time.

8.2.3.3 Spring 2018 – Early Meetings

Prior to the first round of public meetings, the project team conducted early briefings with Metro staff and key stakeholders in the Study Area to introduce the Project, gather feedback, and ensure general project awareness. From March to May 2018, Metro met with Metro Board Deputies, the San Fernando Valley Council of Governments Transportation Committee, UCLA planning and transportation staff, the Sherman Oaks Neighborhood Council Sepulveda Transit Corridor Project Subcommittee, and the Sherman Oaks Homeowners Association.

In April 2018, Metro also invited elected officials and staff who represent the Study Area to attend two identical elected staff roundtables—one in Culver City and one in Van Nuys. The purpose of these meetings was to provide an overview of the Project to participants, understand constituent issues, and solicit participant feedback and involvement in stakeholder and community engagement. Twenty-two representatives from local, state, and federal elected officials and jurisdictions attended. Representatives from the elected offices in attendance were encouraged to share information about the upcoming public meetings with their constituents.

8.2.3.4 June 2018 – Round 1 Public Meetings

In June 2018, public meetings were held in Westwood, Van Nuys, and Westchester. To reach members of the public unable to attend, the Westchester meeting was broadcast live on, and recorded and uploaded to, the Metro UStream page. The video was posted to Metro's YouTube page. As of September 2, 2019, the video had been viewed 407 times

At the meetings, Metro staff presented an overview of the Project and the process for studying and evaluating the transit concepts. The presentation included an overview of the Study Area and travel patterns, a draft Purpose and Need statement, maps and descriptions of the initial Valley-Westside transit concepts, and a high-level description of the evaluation criteria that would be used to evaluate the concepts. The initial concepts presented included three HRT concepts (including an extension of the Purple Line from its planned terminus at the Westwood/VA Station), two LRT concepts, and one MRT concept. The public was invited to ask questions and to submit written comments, either at the meeting or via a variety of contact information that was provided.

8.2.3.5 January/February 2019 – Round 2 Public Meetings

Briefings for elected officials, their staff, and city agencies were held prior to the January/February 2019 community meetings. These meetings included a Metro Board staff briefing on January 10, 2019, and two elected official meetings, which included representatives from 18 local, state, and federal elected officials and jurisdictions.

The second round of public meetings was held in January and February of 2019 and included meetings in Westwood, Van Nuys, and Westchester. Metro staff updated participants on project progress, presented the draft Purpose and Need statement, and then shared refined concepts for the Valley-Westside segment, including an evaluation of their performance on the project goals. The refined concepts included three HRT concepts and one MRT concept. The LRT and Purple Line extension concepts were eliminated, and the proposed Project was extended north to the Van Nuys Metrolink station to relieve projected congestion on the East San Fernando Valley Light Rail Transit Corridor. Metro staff then presented initial concepts for the Westside-LAX segment. As at the first round of public meetings, participants were invited to ask questions and to submit written comments, either at the meeting or via a variety of contact information that was provided.

8.2.3.6 July/August 2019 – Round 3 Public Meetings

The third round of public meetings was held in July and August of 2019 and included meetings in Westwood, Van Nuys, Culver City, and Westchester. Similar to the first two rounds of public meetings, Metro held briefings for Metro Board staff and elected officials and their staff prior to the public meetings.

At the meetings, Metro staff presented an overview of the Project and the process for studying and evaluating the transit concepts. The presentation included the draft Purpose and Need statement, maps and descriptions of the refined Valley-Westside concepts and the Westside-LAX concepts, and evaluations of both sets of concepts on their performance on the project goals. As at the other rounds of public meetings, participants were invited to ask questions and to submit written comments, either at the meeting or via a variety of contact information that was provided.



Throughout the study, hundreds of community members attended public meetings to learn about the Project and provide input.

Source: Arellano Associates, 2019



Metro hosted a fully bilingual meeting in Van Nuys in August 2019.

At the final public meeting held in August 2019, Metro hosted a fully bilingual meeting in Van Nuys, where the surrounding LEP Spanish speaker rate is well above 30 percent of the population. The first half of the meeting was conducted in English, and the second half (including the presentation and Q&A) was in Spanish. Breakfast and a light lunch were also served to draw attendees.

8.2.4 Outreach at Community Events

While the community meetings drew large numbers of attendees throughout the Feasibility Study, Metro recognizes that barriers may prevent some people from attending community meetings. The long commutes experienced by drivers in the Study Area may make an evening or weekend meeting unappealing. Other factors that may impact attendance include transit dependence, work or caregiving responsibilities, fear or uneasiness about attending government meetings, lack of familiarity with transit aside



Many people who travel in the Sepulveda corridor live and work outside the Study Area, so Metro engaged the community at popular events such as the Santa Monica Summer SOULstice in June 2018.

Source: Arellano Associates, 2019

from bus service, and a lack of urgency for a project that is still in the preliminary planning phase as compared to those projects that will directly affect transit service in the near term.

Therefore, to reach the widest and most diverse audience possible, the outreach team prioritized going to places where community stakeholders already gather. This included making announcements and presentations at community meetings, such as neighborhood councils, homeowners associations, etc. In addition, the outreach team staffed information booths at approximately 20 free or low-cost community festivals that drew thousands of diverse attendees throughout the Study Area to inform them about the Project and the ways in which they could provide input.

From presentations to information booths, staff, including bilingual staff at many of the events, engaged the public at more than 50 community functions. Through these activities, the team directly reached nearly 5,000 community members who might not otherwise have been aware of the Project or attended public meetings.

8.2.5 Public Agency Meetings

Metro coordinated with many public agencies that have jurisdiction throughout the Study Area, holding both multi-agency briefings and individual meetings, to allow concerns to be identified and addressed early in the process and to share data on resources that may affect the feasibility of the proposed transit concepts. This effort was designed to present information on the project concepts, to discuss relevant issues related to each agency's jurisdiction, and proactively consult with these agencies prior to formal agency consultation, which is a prerequisite under the NEPA environmental review process. Table 8-2 summarizes the agency coordination meetings that have occurred to date throughout the development of the Feasibility Study. Meetings held through July 2019 are documented in the *Initial Screening Report* (Metro, 2019a).

The multi-agency briefings were conducted in conjunction with each round of public meetings to allow agency employees to obtain information about the Project during working hours. In general, the material presented at the briefings was the same as the material presented at the corresponding public meeting. Table 8-3 identifies the agencies that sent representatives to each briefing.

8.3 Key Issues and Concerns

Metro received more than 1,200 comments via comment/question cards at the meetings and via the project email and website. Although the comment volume was highest during and immediately after each round of public meetings, dozens

Table 8-2. Summary of Agency Coordination Meetings

AGENCY	DATE	LOCATION
Multi-Agency Briefing	6/13/18	Metro Headquarters
	2/11/19	Metro Headquarters
	8/5/19	Metro Headquarters
California State Department of Transportation	1/9/19	Caltrans District 7 Offices
	8/7/19	Metro Headquarters
Los Angeles Department of City Planning and County of Los Angeles Department of Regional Planning	8/8/19	Metro Headquarters
Los Angeles Department of Transportation	1/24/19	LADOT Offices
Los Angeles Department of Water and Power	8/6/19	LADWP Headquarters
	8/20/19	Stone Canyon Reservoir
Metropolitan Water District	1/3/19	MWD Headquarters
Santa Monica Mountains Conservancy	2/22/19	King Gillette Ranch
Southern California Regional Rail Authority (Metrolink)	4/16/19	Metrolink Headquarters
United States Army Corps of Engineers	2/12/19	USACE Headquarters
University of California-Los Angeles	7/17/18	UCLA Campus
	3/4/19	UCLA Campus
	3/20/19	UCLA Campus
	9/26/19	UCLA Campus

Source: Sepulveda Mobility Partners, 2019

Table 8-3. Multi-Agency Project Briefings Participants

AGENCY	PROJECT BRIEFING ATTENDED		
	6/13/2018	2/11/2019	8/5/2019
Antelope Valley Transit Authority		■	■
California Department of Fish and Wildlife		■	
California Department of Transportation	■	■	
California Transportation Commission			■
Concourse Federal Group			■
City of Culver City		■	
Environmental Protection Agency		■	
Federal Aviation Administration	■		
Los Angeles Department of Building and Safety			■
Los Angeles Department of City Planning		■	■
Los Angeles Department of Sanitation	■		
Los Angeles Department of Transportation		■	■
Los Angeles Department of Water and Power		■	■
Los Angeles World Airports	■		■
Metropolitan Water District			■
Santa Monica Big Blue Bus			■
San Fernando Valley Council of Governments			■
Torrance Transit			■
University of California-Los Angeles		■	■
United States General Services Administration			■
Westside Cities Council of Governments		■	

Source: Sepulveda Mobility Partners, 2019

of comments were received in advance of the first and second rounds of meetings and more than 175 were sent prior to the third round of meetings. Approximately 400 of the 1,200 comments were received in the form of comment/question cards at the public meetings, while around 800 comments were received through other means, including the project email and website.

Many of the comments submitted throughout the study were not about a specific preferred concept, but about general transit improvements and transportation needs, including demand for parking availability wherever future Metro construction occurs. Overall, there was support for the Project and an understanding of the need to provide an alternative to driving on I-405 for travel between the Valley, the Westside, and LAX. Comments focused on the difficulty associated with traveling by car or bus on the Westside roadways due to extreme and often all-day congestion. There was also an interest in ensuring that bicycle needs were integrated into future Metro rail and bus service. Other key themes among the public feedback included budget concerns (for the Project overall and specific concepts), regional and transit connectivity, capacity of each concept, project timing, integration with the Metro Purple Line, and the environmental review process. There was almost unanimous support to move forward with the study, excitement about fast travel times, and interest in seeing the Project completed as quickly as possible.

The following sections summarize the major themes of the public comments.

8.3.1.1 Alternative Concepts and Modes

Comments received in conjunction with the first round of public meetings expressed the most support for Concepts 1 and 2, which are both HRT. Based on the comments, Concepts 3 and 4, which are LRT concepts, appear to have the least support. However, throughout the study, there was tremendous interest in a convenient ride without needing to transfer from the San Fernando Valley to LAX. Commenters also expressed interest in connectivity to other destinations, including Santa Clarita, Santa Monica and the Santa Monica Airport, Culver City, and Playa Vista. Commenters also expressed interest in how the Project would connect to the East San Fernando Valley Light Rail Transit Corridor, and some asked about possible changes to that Project to allow better integration of the two projects.

During the second and third rounds of public meetings, among all the comments received expressing preference for any concept, the majority expressed a preference for heavy rail, with HRT 1 receiving the most support, followed by HRT 2 and then by HRT 3. Some stakeholders expressed interest and support

for the monorail option based on cost, potentially faster construction, and the possibility of a station at The Getty.

Approximately 175 comments were submitted by stakeholders in the Mar Vista area in March, April, and June 2019 following the second round of meetings expressing strong support for the Sepulveda alignment over the Bundy/Centinela alignment in the Westside-LAX segment due to concerns about impacts to their community.

Numerous comments from the Sherman Oaks area expressed opposition to any aboveground options through their community, with many supporting an all-underground alternative or a monorail in the median of I-405, which is a different alignment than proposed by MRT 1. Approximately 75 Sherman Oaks stakeholders submitted comments in summer 2019 that included support for an underground option, expressed opposition to the elevated alternative through their community, or supported a monorail option down the middle of I-405.

8.3.1.2 Stations

Commenters expressed strong support for a station at UCLA. Approximately 240 comments were received in summer 2019 expressing strong support for a station at UCLA due to the high number of people traveling to UCLA every day for school, work, and medical appointments. Commenters also expressed interest in both the Expo/Sepulveda and Expo/Bundy Stations on the Metro Expo Line as possible southern termini of the Valley-Westside segment. Some comments requested a station between the Metro Purple Line and Expo Line, many mentioning Santa Monica Boulevard specifically. Some requested a station or asked why there was no proposed station at The Getty.

For the Westside-LAX segment, commenters expressed a preference for a Centinela/Washington station option over Centinela/Venice, likely because Centinela/Washington is seen as currently less congested, and Culver City is developing along Washington Boulevard.

Other comments related to stations included recommendations to include more parking and to ensure transit-oriented development around stations, as well as frequent and convenient connectivity to other transit modes.

8.3.1.3 Evaluation Criteria

Because the concepts were still preliminary, there were not many specific concerns about construction and operations impacts. Residents in the Sherman Oaks area expressed concerns regarding noise and vibration during construction and operation of an aerial system, while some Bel Air residents expressed concerns regarding tunneling.

8.3.1.4 Study Scope

Some members of the public suggested to extend the geographic scope of the analysis and physical boundaries of the Project as far north as the Antelope Valley and as far south as Torrance to attract commuters coming from those areas.

8.3.2 Agency Comments

In addition to three multi-agency briefings, Metro and the project team participated in individual coordination meetings with public agencies between July 2018 and August 2019. The following summarizes the key issues requiring coordination that were raised by various agencies.

8.3.2.1 California State Department of Transportation District 7

Metro's initial meeting with Caltrans was to better understand the Department's requirements and concerns regarding construction in its right-of-way for the Valley-Westside segment. All of the Valley-Westside alternatives cross over or under US 101, and one alternative runs in or near Caltrans right-of-way along the west side of I-405 in the Sepulveda Pass. Caltrans confirmed that the *I-405 Corridor Operational Analysis* (Caltrans, 2018) prepared in 2018 represents the Department's latest planning for the corridor. Caltrans also stated that the Department is currently examining operational improvements and ExpressLanes in the I-405 corridor and is considering a Congested Corridors application under Senate Bill 1.

At the second meeting, Metro informed Caltrans that it was conducting an initial evaluation of potential locations for ventilation shafts, including one location within Caltrans right-of-way on the east side of I-405 south of the Sepulveda Boulevard undercrossing in the Valley. Metro and Caltrans agreed that further coordination may be best timed for after the I-405 ExpressLanes project has begun.

8.3.2.2 Los Angeles Department of City Planning and the County of Los Angeles Department of Regional Planning

At the request of the Los Angeles Department of City Planning (LADCP), Metro met with LADCP and the Los Angeles Department of Regional Planning regarding the possibility of locating a station portal within the West Los Angeles Civic Center area. The County and the City of Los Angeles have a mutual interest in redeveloping their properties and facilities in that area. LADCP explained the anticipated phasing of their redevelopment efforts and requested that the alignment of the Bundy-Veteran alignment option be refined to accommodate a station portal within the southwest part of the Civic Center area. Following the meeting, Metro modified the Westside Bundy-Veteran alignment option to place a possible Santa Monica Boulevard station on the south side of the West Los Angeles Civic Center site.

8.3.2.3 Los Angeles Department of Transportation

LADOT has jurisdiction over the street right-of-way within the City of Los Angeles, and some of the alternatives include construction of transit facilities within that right-of-way. Metro met with LADOT to understand the Department's expectation for the future cross section of Sepulveda Boulevard under *Mobility Plan 2035* (LADOT, 2015). LADOT noted that the plan classifies Sepulveda Boulevard as a Boulevard II north of the I-405 crossing in the Valley, and as an Avenue III south of that point through the Sepulveda Pass. Sepulveda Boulevard is also included in the Tier 2 Near Term Bike Network. As part of the Westside Mobility Plan adopted by the City Council, a bus rapid transit line along Sepulveda Boulevard is contemplated. LADOT also noted that Community Plan updates are under development for the Study Area, and the City is developing guidance on requirements for evaluation of proposed lane reductions.

8.3.2.4 Los Angeles Department of Water and Power

Metro met with the Los Angeles Department of Water and Power (LADWP) to investigate the possibility of constructing one or more ventilation shafts on LADWP property around the Stone Canyon Reservoir. This meeting was followed by a site visit to the reservoir property. Metro identified two general locations where ventilation shafts could be located near the Stone Canyon Reservoir, both south and north of the reservoir. LADWP noted that the area north of the reservoir may be less challenging as a ventilation shaft location. Access to the north side of the reservoir could be from Mulholland Drive, and there are no restrictions on heavy equipment for construction access to the north side. Sites both east and west of the reservoir appeared potentially feasible for a ventilation shaft location.

A site on the south side of the reservoir would be more challenging for construction of a ventilation shaft. The dam spillway cannot be impacted, and there is an existing tunnel portal on the south side of the dam. Heavy equipment cannot use the access route to the south side of the reservoir from Mulholland Drive because it passes over the dam. Therefore, construction access to south side of the dam would have to occur through winding local streets and residential neighborhoods. Following the meeting, Metro refined potential ventilation locations on the LADWP Stone Canyon Reservoir property.

8.3.2.5 Metropolitan Water District

The Metropolitan Water District (MWD) maintains and operates the Sepulveda Feeder, a significant 96-inch water transmission pipeline that runs generally under Sepulveda Boulevard throughout much of the Study Area, as well as the Santa Monica Feeder located under Santa Monica Boulevard and Ohio Avenue on the Westside, and the Culver City

Feeder in the southern part of the Study Area. MWD shared information about its planned relining project of the Sepulveda Feeder, which is anticipated to take place over 10 years. MWD noted that the agency has not considered relocation of the pipeline due to anticipated cost. MWD stated that the agency generally requires a vertical separation between its pipeline and any other underground pipeline or tunnel of approximately 150 percent of the diameter of the larger facility to avoid potential settlement of the pipeline. MWD and Metro also agreed that, even after MWD's relining project is complete, it would not be advisable to locate a transit station in proximity to the pipeline. Following the meeting, Metro refined the alignments of tunnel segments to avoid the Sepulveda Feeder where possible.

8.3.2.6 Santa Monica Mountains Conservancy (SMMC)

Three of the Valley-Westside alternatives would tunnel underneath the Santa Monica Mountains, and a fourth would have an aerial component next to I-405 through the Sepulveda Pass. The Santa Monica Mountains Conservancy (SMMC) has jurisdiction over parklands on both sides of I-405. SMMC noted that four wildlife crossings are located within the Study Area at Sepulveda Boulevard, Bel Air Crest Road, Skirball Center Drive, and Mulholland Drive, and that a wildlife corridor is located between Skirball Center Drive and Mulholland Drive on the west side of I-405. To avoid impacts on these wildlife crossings or the wildlife corridor, SMMC requested that Metro consider the construction of additional wildlife crossings and enhancements as potential mitigation measures. In addition to the wildlife crossings and corridor, Mission Canyon Park on the west side of I-405 will include a trailhead off Sepulveda Boulevard.

8.3.2.7 Southern California Regional Rail Authority (Metrolink)

All of the Valley-Westside alternatives include a northern terminus at the Metrolink station in Van Nuys, and two include alignment segments within Metrolink right-of-way. As a regional rail authority, Metrolink also has an interest in rail connectivity throughout the counties it serves. Metrolink agreed that it appeared to be feasible to locate an aerial guideway for the Project in the agency's right-of-way.

Metrolink shared its plans to provide additional service under the Southern California Optimized Rail Expansion Program, with the goal of providing frequent, bidirectional service on all

of its corridors. Metrolink representatives suggested ways in which the Project could be integrated with Metrolink service, either through passenger connections or possibly even shared services if mutually compatible vehicles such as Electric Multiple Unit trains were used.

8.3.2.8 United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction over the Los Angeles River, which the Project will cross either aerially or underground. The USACE agreed to share data on facilities under its jurisdiction and noted that while a 404 permit would not be required for a tunnel crossing of the Los Angeles River, further consultation will be required to determine if a 408 permit is required. Depending on the alternative that is ultimately selected, it is possible that a single or multi-phase permit may be required from the USACE.

8.3.2.9 University of California-Los Angeles

All of the Valley-Westside alternatives include a station on the UCLA campus. Metro met with representatives of UCLA to discuss potential station locations on campus and issues related to construction on campus. At the initial meeting, which occurred during the development of the initial Valley-Westside concepts, UCLA's representatives shared information about sites and equipment that may be sensitive to noise, vibration, and electromagnetic fields. They noted that Kaufman Hall and the Student Activities Center are two of the oldest buildings on campus. They also noted that direct access to parking structures P4 and P7 from Sunset Boulevard would need to be maintained.

At the second meeting, UCLA indicated that the University would prefer a station located within a central area of campus south of Bruin Plaza, as opposed to a location closer to Sunset Boulevard, and would be willing to accept greater potential construction impacts if it resulted in a more ideal station location. UCLA representatives suggested that a portion of the existing pick-up/drop-off loop near the Luskin Conference Center could be repurposed for a station portal.

At the third and fourth meetings, Metro continued to revise the station location consistent with comments raised by UCLA representatives. Metro noted that the station location and layout could continue to be revised as the Project advances.

9 Next Steps

Additional community input will be essential as design and analysis of the Project continues.

This Feasibility Study has determined that a reliable, high-capacity fixed-guideway transit system connecting the San Fernando Valley to the Westside and the LAX area could be constructed along several different alignments. Such a transit system, operated as either HRT or MRT, would serve the major travel markets in the Sepulveda corridor and would provide travel times competitive with the automobile. This study has also identified potential environmental and community impacts that could result from the construction and operation of this transit line, and it has developed a range of cost estimates for construction and operations.

Throughout this study, communities along the corridor, travelers within the corridor, and public agencies with jurisdiction over resources in the corridor have provided input on the alternatives under consideration. There has been broad consensus on the need for a reliable, high-capacity north-south transit line to connect the existing and planned east-west lines in the Valley, the Westside, and the LAX area. Because this Feasibility Study has developed alternatives only to the level of general alignments and general station locations, public and agency input has necessarily been focused at the same level.

The Metro Board of Directors will select alternatives to be included in the environmental process based on this study and upcoming proposals resulting from Metro's predevelopment agreement process. These alternatives will be presented to the public and public agencies for feedback through the NEPA and CEQA scoping process; all reasonable alternatives will be considered during environmental review.

Any fixed-guideway system in the corridor, whether one of the alternatives developed during this study or one developed independently, will confront many of the same challenges. Based on the design and analysis conducted during this study, the following are some of the key steps that should be taken to address these challenges:

> **Seek additional community input on station locations and designs.** This study identified general station locations for each alternative and identified feasible locations for major station elements, such as passenger platforms, entrance plazas, and emergency exits. The evaluation process determined that many of the potential environmental and community impacts of the alternatives, especially residential and business displacements, are associated with station areas. As the Project advances, station locations should be refined and station area plans developed to serve the community and to minimize impacts based on public input and coordination with agencies such as the LADCP and UCLA. Station layouts and station area plans should be developed that consider first/last-mile connections by all

modes, both motorized and non-motorized, consistent with Metro's *First Last Mile Strategic Plan & Planning Guidelines* (Metro, 2014), Metro's *FLM Planning and Implementation Policy* (Metro, 2016b), and Metro's *Transit Oriented Communities Policy* (Metro, 2018a). Intermodal facilities, including bus loading and layover areas, should be evaluated at appropriate locations in the Valley, the Westside, and the LAX area, taking into consideration service changes proposed by Metro's NextGen Bus Study. Parking and kiss-and-ride facilities should be carefully considered in light of changing travel patterns resulting from evolving technologies such as transportation network companies.

- > **Consider interactions with and connections to other Metro Lines.** The final alternatives developed in this study for the Valley-Westside segment have all been extended north to the Metrolink Van Nuys Station to address potential overcrowding on the East San Fernando Valley Light Rail Transit Corridor. While less dramatic, the Project will also increase ridership or change ridership patterns on the Metro Orange, Purple, Expo, and Green Lines. These potential systemwide impacts should be evaluated carefully. Design improvements to existing lines and the design of transfer stations to provide an optimal customer experience will be key design issues as the Project advances because so many of the proposed stations are transfer stations, especially in the Valley-Westside segment of the Project. Station designs should incorporate the principles of Metro's *Transfers Design Guide* (Metro, 2018b).
- > **Advance engineering studies of key design issues.** A detailed discussion of engineering challenges can be found in the *Engineering Analysis Report* (Metro, 2019c). Two challenges stand out in importance: the MWD Sepulveda Feeder and geotechnical investigations. The MWD Sepulveda Feeder water main would conflict with any alignment on Sepulveda Boulevard, whether aerial or underground. Further coordination with MWD and detailed assessment of the trade-offs of relocating or avoiding the Sepulveda Feeder will be essential for evaluation of alternatives located on or adjacent to Sepulveda Boulevard. Geotechnical investigations are required to refine the alignment through the Santa Monica Mountains and to evaluate potential challenges associated with crossing the Santa Monica Fault, including assessing the feasibility of a station at Santa Monica Boulevard.
- > **Identify ways to reduce impacts, including further evaluation of tunnel configurations.** A single-bore tunnel configuration offers the possibility of reducing the impacts associated with Metro's traditional twin-bore configuration, but challenges remain with regard to operations, including fire/life safety procedures, and cost. Further design effort is required to assess the trade-offs among cost, the potential to reduce impacts, and operational flexibility.

- > **Identify cost reductions and consider project phasing.** The preliminary estimated cost of each alternative is greater than the funding identified by Measure M. As the Project advances, opportunities for cost reductions should be identified. Phasing of the Project, including the identification of interim operating segments, should also be considered.

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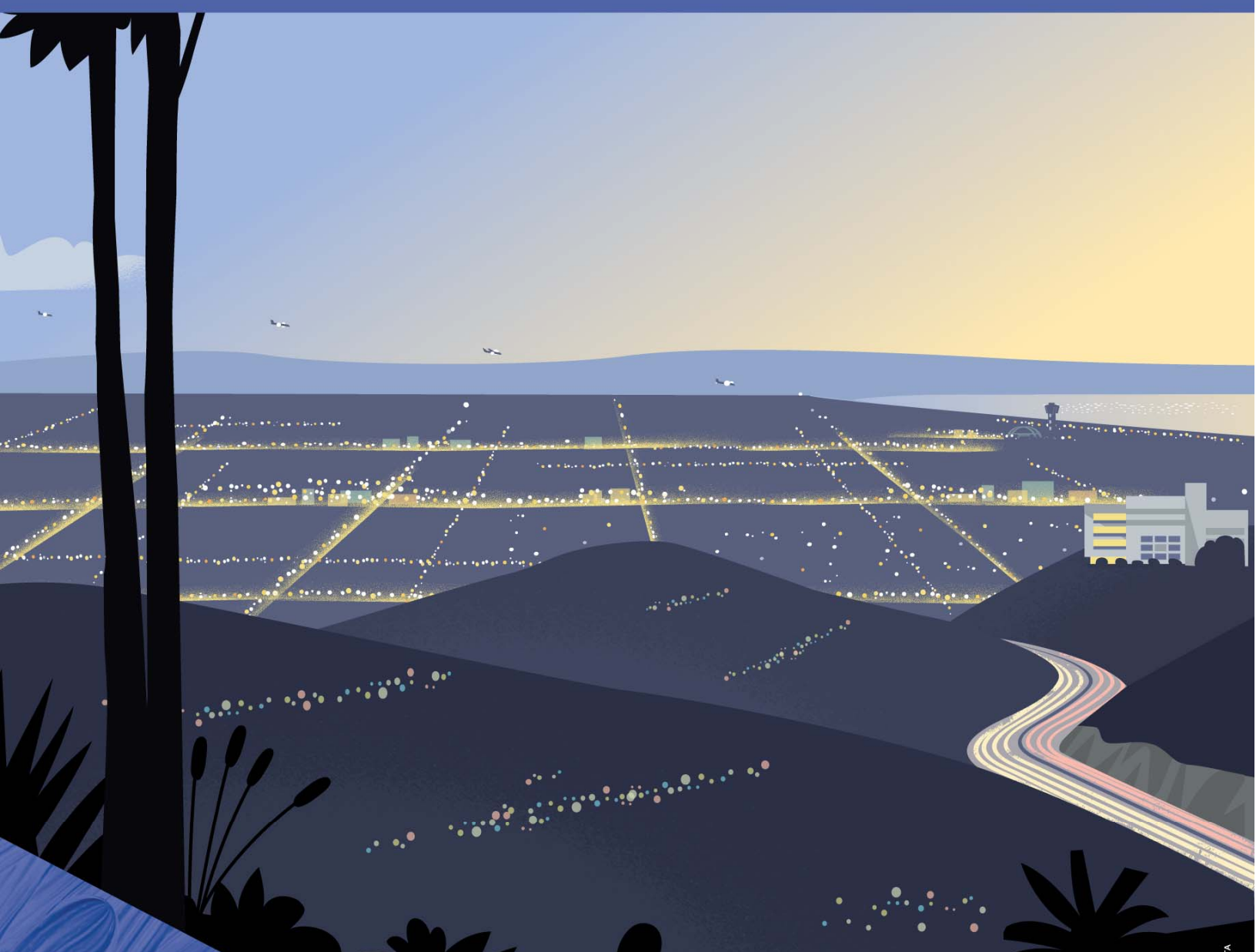
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SEPULVEDA TRANSIT CORRIDOR PROJECT

Appendix A Public Input



Metro

SEPULVEDA TRANSIT CORRIDOR PROJECT

Contract No. PS40442000

Appendix A Public Input

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October 2019

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Abbreviations / Acronyms

FAQ	Frequently Asked Questions
HRT	heavy rail transit
LAX	Los Angeles International Airport
LEP	limited English proficiency
LRT	light rail transit
Metro	Los Angeles County Metropolitan Transportation Authority
MRT	monorail/rubber tire
Q&A	Question and Answer
UCLA	University of California, Los Angeles

APPENDIX A PUBLIC INPUT

This Appendix describes the process by which input from the public and other stakeholders has been incorporated into the development and evaluation of the transit concepts for the Project. Outreach activities and public comments submitted by September 2, 2019, are summarized in this appendix. All outreach activities and comments received after that date will be documented in a supplemental outreach report that will be shared with the Metro Board of Directors and posted on the project website.

Throughout the Feasibility Study, the outreach and public engagement strategy for this Project has been guided by Metro's Equity Platform, which includes the following key elements: Define & Measure, Listen & Learn, Focus & Deliver, and Train & Grow.

Given that this Project is still in an early phase, the outreach program has focused on the first two elements:

- Define & Measure:
 - ▶ Pursue an inclusive conversation
 - ▶ Establish meaningful goals and metrics to evaluate outcomes
 - ▶ Conduct research and market analysis
- Listen & Learn:
 - ▶ Establish multiple forums to engage the community meaningfully and actively in defining, measuring, and acting on equitable outcomes
 - ▶ Recognize that community-driven conversation provides a foundation for a different future
 - ▶ Listen to people from all walks of life

Metro understands the socioeconomic, ethnic, and linguistic diversity throughout the very large Study Area and outlined a variety of outreach methods to reach as many different stakeholders as possible.

Throughout this Feasibility Study, there have been multiple forums for bilingual English and Spanish community engagement, including a wide range of opportunities for feedback that are designed to be transparent and inclusive.

Section A.1 explains how community and public stakeholders throughout the Study Area (other than public agencies) were identified and compiled into a database at the beginning of the process and how the public engagement program increased the number of stakeholders in the database.

Section A.2 summarizes the outreach that was undertaken throughout the study and the feedback received to date. More than 1,200 comments have been received, approximately one-third via comment/question cards at public meetings and two-thirds submitted via the project email address and website. Although the comment volume was highest during and immediately after each round of public meetings, dozens of comments were received before the first and second rounds of meetings, and more than 175 were sent prior to the third round of meetings.

The three rounds of public meetings included 10 public meetings that drew more than 1,000 attendees. An extensive notification and outreach effort was undertaken to inform the public about the progress of the Project and opportunities to provide input. This effort included distribution of more than 163,478

bilingual take-ones and flyers throughout and beyond the Study Area. All materials for every public meeting were made available in Spanish at the meetings and online. Spanish interpreters were also present at all public meetings.

Metro recognizes that many people will not be able to participate in public meetings or feel comfortable doing so. The outreach team therefore also engaged stakeholders at events and festivals, stakeholder briefings and meetings, transit and bus stations in the Valley and on the Westside, churches with multiple bilingual services, and youth sporting events, reaching approximately 5,000 stakeholders in-person.

Section A.3 describes materials and resources about the Project and the status of the Feasibility Study that have been produced in both English and Spanish and how they have been made available to the public, including the project website that hosted a fact sheet that was updated several times throughout the study, a Frequently Asked Questions (FAQ) that was posted online and updated, as well as a project video. This video, which was produced in English and Spanish, was shown at all of the public meetings and promoted heavily online. In addition, a telephone hotline was made available to those who wished to call and speak with an outreach team member about the Project.

Finally, Section A.4 explains the outreach to print, broadcast, and social media related to the Project, including press releases and media briefings for each round, as well as social media advertising. In addition to three paid advertisements in the *Daily News*, *Daily Breeze*, and *Hoy* that reached 175,000 people, 60 news stories ran about the Project during the study. Bilingual Facebook advertising had a total reach of more than 766,825 and generated high rates of reactions/shares.

A.1 Stakeholder Identification and Database Development

Comprehensive stakeholder identification efforts were initiated to coincide with the beginning of the Project's outreach process. The size of the Study Area, the number of people who travel through it from outside the Study Area, and changing communications methods suggested the need for innovative methods to publicize the Project and public meetings. Efforts began with the development of a comprehensive database for targeted emails. In addition, the team capitalized on the propensity of users of social media to share content, so recipients were asked to forward the information to their memberships, affinity groups, neighbors, friends, and family to encourage widespread participation in the study. From this effort, a database was developed that included the following categories:

- Elected officials at the local, state, and federal levels
- Neighborhood Councils and other elected groups
- Homeowners associations and neighborhood organizations
- Chambers of Commerce, business improvement districts, and individual business leaders
- Community-based and civic organizations
- Key destinations and employers
- Transportation advocates and interest groups
- Print, broadcast, and electronic media, including community-based publications and blogs

- Other interested groups and persons
- Individuals who attended public meetings or otherwise asked to be added to the database

In total, the initial stakeholder list contained approximately 1,400 entries of people and groups in the Study Area.

Additionally, to reach the many stakeholders who travel through the Study Area but may not live in it, Metro launched a bilingual online survey prior to the public meetings to gather information from the public about their travels through the Study Area. This effort added more than 6,000 email addresses of those who not only live in the Study Area, but also those who work in the Study Area or commute through it. In conjunction with a survey conducted later in the study, these surveys were completed by approximately 10,000 stakeholders in English and Spanish and increased the database more than five-fold.

The database was updated on an ongoing basis via requests to the project hotline, on the website, written requests, and from sign-in sheets after each public or stakeholder meeting. After the third round of meetings, the full database increased to approximately 8,410 individual email addresses.

The e-blast that were sent for the public meetings had very high open rates, ranging from 24 percent to 54 percent, with an average open rate of 35 percent.

A.2 Public Meetings

Metro hosted three rounds of public meetings (for a total of ten public meetings) as part of the public outreach efforts for the evaluation of the initial and refined Valley-Westside and Westside-LAX transit concepts. Meetings were held to coincide with the introduction and refinement of the concepts. Public comment informed the further refinement of the concepts as the process went on. At every public meeting, all materials were available in English and Spanish, and interpreters were available to translate during the open house, presentation, and Q&A, as well as to assist with submission of comments. In addition, at the last public meeting held in August 2019, Metro hosted a fully bilingual meeting in Van Nuys.

Comments submitted by September 2, 2019, are summarized in this report. All comments received after that date will be documented in a supplemental outreach report that will be shared with the Metro Board of Directors and posted on the project website.

A.2.1 Early Meetings

Prior to the first round of public meetings, the project team conducted briefings with Metro staff and key stakeholders in the project area to introduce the Project and gather feedback. These briefings ensured that the key representatives for the corridor communities were aware of the Project and informed of the public meeting process in advance of the meeting announcements being released. This effort, in turn, helped establish relationships with key stakeholder representatives that further expanded public notification efforts, as these contacts could reach stakeholders that the team may otherwise not have reached. These early briefings included the following:

- Meeting with Metro Board Deputies – March 5, 2018
- Announcement at San Fernando Valley Council of Governments Transportation Committee – April 19, 2018
- Briefing with UCLA planning and transportation staff – April 26, 2018

- Sherman Oaks Neighborhood Council Sepulveda Transit Corridor Project Subcommittee – May 9, 2018
- Sherman Oaks Homeowners Association – May 16, 2018

A.2.2 Public Meetings – Round 1

The public meetings held in June 2018 began with a presentation by Metro staff that included the following topics:

- A description of the Project and its proposed phasing
- An overview of the Study Area and travel patterns
- A draft Purpose and Need statement
- Maps and descriptions of the initial Valley-Westside transit concepts
- A summary of recent and planned improvements in the Sepulveda corridor
- A high-level description of the evaluation criteria that will be used to evaluate the concepts
- A brief review of the study process, leading to future environmental review
- Contact information, including several options to send comments

The initial concepts presented included three heavy rail transit (HRT) concepts (including an extension of the Purple Line from its planned terminus at the Westwood/VA Station), two light rail transit (LRT) concepts, and one monorail/rubber tire (MRT) concept. During the meetings, the public was invited to ask questions and to submit written comments. A summary of the comments received is presented in Section A.2.2.2.

The public meetings were held as follows:

- Meeting 1: Westwood
Westwood United Methodist Church
10497 Wilshire Boulevard
Los Angeles, CA 90024
Thursday, June 7, 2018; 6:00-8:00pm
50 people signed in at this meeting, and 24 comment or question cards were received.
- Meeting 2: Van Nuys
Marvin Braude San Fernando Valley Constituent Service Center
6262 Van Nuys Boulevard
Los Angeles, CA 91401
Saturday, June 9, 2018; 10:00am-12:00pm
91 people signed in at this meeting, and 52 comment or question cards were received.

- Meeting 3: LAX Area
The Proud Bird
Proud Bird Restaurant
11022 Aviation Boulevard
Los Angeles, CA 90045
Tuesday, June 12, 2018; 6:00-8:00pm
49 people signed in at this meeting, and 37 comment or question cards were received.

In addition, the meeting on June 12 was broadcast live on, and recorded and uploaded to, the Metro UStream page. The video recording was created to reach members of the public who were not able to attend a meeting in-person and to increase the level of participation. The video recording was posted to Metro's YouTube page. As of September 2, 2019, the video had been viewed 407 times.

A.2.2.1 Pre-Meeting Activities

As part of project outreach, Metro invited the elected officials and staff within the Study Area to attend two identical elected staff roundtables. The purpose of these meetings was to provide an overview of the Project to participants, understand constituent issues, and solicit participant feedback and involvement in stakeholders and community engagement.

Elected Official Briefings

Two briefings were hosted for local elected officials and their staff as follows:

- Monday, April 9, 2018; 10:30am to 12:00pm, Culver City Hall, Dan Patacchia Room, 9770 Culver Boulevard, Culver City, CA 90232

Representatives from the following jurisdictions attended this briefing:

- ▶ Federal: Office of Senator Dianne Feinstein
- ▶ Federal: Office of Representative Ted Lieu, District 33
- ▶ State: Office of Assemblymember Richard Bloom, District 50
- ▶ City of Culver City: City Manager, Councilmembers, Transportation Department
- ▶ City of Los Angeles: Office of Councilmember Paul Krekorian, District 2
- ▶ City of Los Angeles: Office of Councilmember Mike Bonin, District 11
- ▶ City of Los Angeles: Office of Councilmember Paul Koretz, District 5
- ▶ City of Los Angeles: Office of Councilmember Monica Rodriguez, District 7
- ▶ City of Long Beach: Office of Mayor Robert Garcia

- Thursday, April 12, 2018; 10:30am to 12:00pm, Van Nuys State Office Building, 6150 Van Nuys Blvd, Van Nuys, CA 91401

Representatives from the following offices attended this briefing:

- ▶ Federal: Office of Representative Tony Cardenas, District 29
- ▶ Federal: Office of Representative Brad Sherman, District 30
- ▶ State: Office of Senator Bob Hertzberg, District 18
- ▶ State: Office of Senator Henry Stern, District 27
- ▶ State: Office of Assemblymember Dante Acosta, District 38
- ▶ State: Office of Assemblymember Adrin Nazarian, District 46
- ▶ County of Los Angeles: Office of Supervisor Sheila Kuehl, District 3

- ▶ City of Santa Monica: Transportation Manager
- ▶ City of Los Angeles: Office of Councilmember Paul Krekorian, District 2
- ▶ City of Los Angeles: Office of Councilmember Bob Blumenfield, District 3
- ▶ City of Los Angeles: Office of Councilmember David Ryu, District 4
- ▶ City of Los Angeles: Office of Councilmember Nury Martinez, District 6
- ▶ City of Los Angeles: Office of Councilmember Monica Rodriguez, District 7

Representatives from the elected offices in attendance were encouraged to share information about the upcoming public meetings with their constituents.

Community Notices

Delivery of Take-Ones

A total of 27,375 informational flyers (take-ones) with information about the meetings in English and Spanish were distributed to Metro Divisions 1, 2, 5, 7, 8, 10, 15, and 18—the divisions where bus routes that operate in the Westside/Central, South Bay, and San Fernando Valley areas are based. In addition, 100 take-ones were placed at the Metro Customer Center in Baldwin Hills, and 1,500 take-ones each were distributed to the municipal operators in Santa Monica and Culver City.

Extended Outreach

Extended outreach efforts included requesting support from elected offices, cities, and other key stakeholders to promote public meetings through their respective electronic communication tools, including websites, e-newsletters, social media sites, and membership e-blasts.

Email

An electronic version of the meeting notice, with a link to a Spanish translation, was distributed via e-blast on May 3, 2018, and reminders were sent on May 21 and May 31 in advance of the first meeting on June 7. In addition, an e-blast was sent following the meetings to 7,063 contacts to thank attendees for their participation and to distribute the information shared at the public meetings. This included a link to the webcast video in both English and Spanish. The open rate for this round ranged from 29 percent to 54 percent, with an average open rate of 41 percent.

Display Advertising

Display advertisements were featured in three print publications, listed in Table A-1, to advertise the public meetings to communities within the project area. The meetings were also advertised on Facebook in English and Spanish, as shown in Table A-2.

Table A-1. Print Advertising – First Round of Public Meetings

Publication	Communities Reached	Date	Circulation
Daily Breeze	South Bay	5/31/18	24,998
Hoy	Los Angeles region	6/1/18	128,986
Daily News	San Fernando Valley	6/4/18	21,028
Total Circulation			175,012

Source: Arellano Associates, 2018

Table A-2. Facebook Advertising – First Round of Public Meetings

Title	Impressions	Engagement	Posting Date Range
Project Video Ad	333,866	Video Views: 65,701 Ad Reach: 189,408 Frequency: 1.76 Reactions: 1,300 Comments: 223 Shares: 474	5/22/18-6/11/18
West LA Meeting Event Ad	62,970	Event Responses: 300 Ad Reach: 24,552 Frequency: 2.56 Reactions: 356 Comments: 54	5/24/18-6/7/18
Van Nuys Meeting Event Ad	65,658	Event Responses: 481 Ad Reach: 26,616 Frequency: 2.47 Reactions: 518 Comments: 91	5/26/18-6/9/18
LAX Meeting Event Ad	51,147	Event Responses: 215 Ad Reach: 20,696 Frequency: 2.47 Reactions: 306 Comments: 53	5/29/18-6/12/18
Total Impressions (approximate):	513,641	Ad Reach: 261,272	

Source: Arellano Associates, 2018

Ad Reach = total unique people who saw the ad

Frequency= how many times each person saw the ad

Media

Metro distributed a media release ahead of the meetings, resulting in numerous articles published prior, during, and after the meeting series. Several public officials also shared information on the upcoming meetings on their social media. Table A-3 lists media articles about the study before, during, and after the first round of public meetings.

Table A-3. Published Articles – First Round of Public Meetings

Date	Publication	Article
04/20/18	KPCC	“Mad at the 405? Metro wants to hear about it”
06/04/18	NOHO Arts District	“Metro Wants to Hear from YOU about the Sepulveda Pass (The 405)”
06/05/18	Los Angeles Daily News	“Metro begins feasibility study, presentations on a train through the Sepulveda Pass connecting West LA with the San Fernando Valley”
06/06/18	NBC Los Angeles	“Train Line Construction Recalls Yet Another 'Carmageddon'”
06/07/18	The Source	“Rail concepts released for Sepulveda Transit Corridor project”
06/07/18	KTLA	“Metro Officials Discuss Possible Solutions to Ease Traffic on Sepulveda Pass”
06/07/18	KPCC	“The infamous Sepulveda Pass could get a rail line”
06/07/18	LA Sentinel	“Metro to Hold Community Meetings for Sepulveda Transit Corridor Project in June”
06/07/18	KTLA	“Proposed Metro Line on Sepulveda Pass Between Sherman Oaks and Westwood to be Discussed”
06/08/18	Los Angeles Daily News	“LA Metro releases concepts for a rail line through, over, or under the Sepulveda Pass. Take your pick”
06/10/18	Breitbart	“LA Metro Plans Sepulveda Pass Train for 2028 Summer Olympics”
06/11/18	RT&S	“LACMTA evaluating six rail options for Sepulveda Transit Corridor”
06/12/18	Progressive Railroading	“LA Metro unveils rail concept for Sepulveda Pass project”
06/12/18	City Watch	“There’s Serious Talk of a Sepulveda Pass Rail Line again. How Serious is the Question?”
06/12/18	Curbed LA	“Metro narrows down options for Sepulveda Pass transit line”
06/12/18	KPCC	“METRO CONSIDERS SEPULVEDA PASS RAIL LINE”
06/12/18	The Architect’s Newspaper	“L.A. Metro unveils plans to link San Fernando Valley with Westwood and eventually LAX”
06/13/18	Canyon News	“Sepulveda Pass Proposed Metro Line”
06/19/18	The Architect’s Newspaper	“L.A. is one step closer to bringing light rail to the San Fernando Valley”
06/26/18	Urbanize.LA	“Metro Doesn't Need to Tunnel Through the Sepulveda Pass”

Source: Arellano Associates, 2018

Table A-4 lists elected officials’ social media mentions about the study.

Table A-4. Elected Officials’ Social Media Mentions – First Round of Public Meetings

Date	Organization	Distribution Method
6/11/18	Councilmember Mike Bonin	Facebook post
6/19/18	Mayor Eric Garcetti	Facebook post
6/29/18	Councilmember Mike Bonin	E-blast

Source: Arellano Associates, 2018

A.2.2.2 Summary of Public Comment at Community Update Meeting 1

Summary of Comments

The three public meetings resulted in a total of 215 participants and 113 comments. During the meeting comments were documented via comment cards, question cards, and visual comment cards. In addition, interpreters were available to translate for Spanish-speaking participants during the open house, presentation, and Q&A, as well as to facilitate their comment submittal.

The most popular concepts based on stakeholder input were Concept 1 and Concept 2, both HRT. The concept commented upon the most was Concept 5, the MRT concept. While there was little opposition among comments to the different concepts, the concepts that received the least support were the LRT concepts—Concept 3 and Concept 4.

Many of the submitted comments were not about a specific preferred concept, but about general transit improvements and transportation needs, including demand for parking availability wherever future Metro construction occurs. There was also an interest in ensuring that bicycle needs were integrated into future Metro rail and bus service.

Prior to the public meetings, 45 comments were received via postal mail, email, and through the Project’s webpage. There was almost unanimous support to move forward with the study.

Other key themes among the public feedback included budget concerns (for the Project overall and specific concepts), regional and transit connectivity, capacity of each concept, project timing, integration with the Metro Purple Line, and the environmental review process.

Comments Related to Purpose and Need

Overall there was support for the Project and the need to provide an alternative to driving I-405 to travel between the Valley, the Westside, and LAX. Comments focused on the difficulty associated with traveling by car or bus on Westside roadways due to extreme and often all-day congestion.

Comments Related to Concepts

More than 40 comments were received related to concepts and routes. Because the study was still in its early stages, with only initial concepts for the Valley-Westside segment, there was a wide range of comments about the possible routes the Project could take.

Comments Related to Modes

The most popular concepts based on stakeholder input were the HRT concepts—Concept 1 and Concept 2. Of the approximately 25 commenters who expressed a preference for a mode, 12 preferred HRT. Eight preferred LRT, and many of those cited the possibility of a direct connection from Sylmar to the Westside (the possibility of a “one-seat ride”) as their reason. Five supported Concept 5, the MRT concept.

Because The Boring Company publicized plans to construct high-speed travel tunnels in the Study Area, five stakeholders raised questions about how and if the Project would integrate with what was being proposed by The Boring Company.

Comments Related to Stations

Eight stakeholders specifically mentioned a station at UCLA in their comments; seven of these supported a station at UCLA, while one was concerned it would be too complicated. Six expressed a preference for an Expo/Bundy Station at the Metro Expo Line, and there was less support for an Expo/Sepulveda station. Four commenters specifically mentioned the possibility of a station at The Getty.

Other comments related to stations included recommendations to include more parking and to ensure transit-oriented development around stations, as well as frequent and convenient connectivity to other transit modes.

Comments Related to Evaluation Criteria

Because the concepts were still preliminary, there were not many specific concerns about construction and operations impacts at this phase.

Comments Related to Scope of the Analysis

There were some suggestions to extend the geographic scope of the analysis and physical boundaries of the Project as far north as the Antelope Valley and as far south as Torrance in order to capture commuters coming from those areas.

A.2.3 Public Meetings – Round 2

The public meetings held in January/February 2019 served as an opportunity for Metro to update stakeholders on the Project since the last round of public meetings in June 2018 and present refined concepts for the Valley-Westside segment and initial concepts for the Westside-LAX segment. The public meetings began with a presentation by Metro staff that included the following topics:

- A description of the Project and its proposed phasing
- A description of the Study Area
- A summary of recent and planned improvements in the Sepulveda corridor
- A draft Purpose and Need statement
- Maps and descriptions of the refined Valley-Westside transit concepts
- A summary of the evaluation of the refined Valley-Westside transit concepts
- Maps and descriptions of the initial Westside-LAX transit concepts

- A brief review of the study process, leading to future environmental review
- Contact information, including several options to send comments

The refined Valley-Westside concepts included three HRT concepts and one MRT concept. The LRT and Purple Line concepts were eliminated, and the proposed Project was extended north to the Van Nuys Metrolink station to relieve projected congestion on the East San Fernando Valley Light Rail Transit Corridor. During the meetings, the public was invited to ask questions and to submit written comments. A summary of the comments received is presented in Section A.2.3.2.

The second round of public meetings were held as follows:

- Meeting 1: Westwood
Westwood Presbyterian Church
10822 Wilshire Boulevard
Los Angeles, CA 90024
Wednesday, January 30, 2019; 6:00-8:00pm
114 people signed in at this meeting, and 45 comment or question cards were received.
- Meeting 2: Van Nuys
Marvin Braude San Fernando Valley Constituent Service Center
6262 Van Nuys Boulevard
Los Angeles, CA 91401
Saturday, February 2, 2019; 10:00am-12:00pm
126 people signed in at this meeting, and 57 comment or question cards were received.
- Meeting 3: LAX Area
The Proud Bird
Proud Bird Restaurant
11022 Aviation Boulevard
Los Angeles, CA 90045
Tuesday, February 5, 2019; 6:00-8:00pm
68 people signed in at this meeting, and 24 comment or question cards were received.

A.2.3.1 Pre-Meeting Activities

Briefings for elected officials, their staff, and city agencies were held prior to the January/February 2019 community meetings, including a Metro Board staff briefing on January 10, 2019, and two elected official briefings.

Elected Official Briefings

- Monday, January 14, 2019; 1:30–3:00pm, Brentwood Branch Library, 11820 San Vicente Boulevard, Los Angeles, CA 90049

Representatives from the following offices attended the January 14 briefing:

- ▶ Federal: Office of Senator Dianne Feinstein
- ▶ Federal: Office of Representative Ted Lieu, District 33
- ▶ State: Office of State Senator Holly Mitchell, District 30
- ▶ State: Office of State Senator Ben Allen, District 26

- ▶ State: Office of Assemblymember Sydney Kamlager-Dove, District 54
 - ▶ County of Los Angeles: Office of Supervisor Sheila Kuehl, District 3
 - ▶ City of Culver City: Transportation Department
 - ▶ City of Los Angeles: Office of Councilmember Paul Koretz, District 5
 - ▶ City of Los Angeles: Office of Councilmember Nury Martinez, District 6
- Thursday, January 17, 2019; 11:00am–12:30pm, Marvin Braude Service Center, 6262 Van Nuys Boulevard, Los Angeles, CA 91401

Representatives from the following offices attended this briefing:

- ▶ Federal: Office of Representative Tony Cardenas, District 29
- ▶ State: Office of Senator Henry Stern, District 27
- ▶ State: Office of Assemblymember Richard Bloom, District 50
- ▶ State: Office of Assemblymember Luz Rivas, District 39
- ▶ City of Culver City: Transportation Manager
- ▶ City of San Fernando: City Manager
- ▶ City of Los Angeles: Office of Councilmember Bob Blumenfield, District 3
- ▶ City of Los Angeles: Office of Councilmember David Ryu, District 4
- ▶ City of Los Angeles: Office of Councilmember Monica Rodriguez, District 7

Community Notices

Delivery of Take-Ones

A total of 33,275 take-ones with information about the meetings in English and Spanish were distributed to Metro Divisions 5, 7, 8, 10, 13, 15, and 18—the divisions where bus routes that operate in the Westside/Central, South Bay, and San Fernando Valley areas are located. In addition, 1,075 take-ones were placed at Metro Customer Centers, and 16,200 take-ones were distributed to the following transit operators: Santa Monica Big Blue Bus (2,000), Culver City Transit (2,700), UCLA’s BruinBus (1,000), Santa Clarita Transit (1,500), and Metrolink (9,000). Antelope Valley Transit Authority also shared information about the meetings on the electronic displays on their buses.

Extended Outreach

Extended outreach efforts included requesting support from elected offices, cities, public facilities, and other key stakeholders to promote public meetings through their respective electronic communication tools, including websites, e-newsletters, social media sites, and membership e-blasts using a social media toolkit. Table A-5 lists the extended coverage provided by local organizations.

Table A-5. Extended Coverage by Local Organizations – Second Round of Public Meetings

Date	Organization	Distribution Method
1/8/19	Westwood South of Santa Monica newsletter	E-blast
1/19/19	Supervisor Sheila Kuehl	E-blast
1/24/19	Bel Air Beverly Crest Neighborhood Council	Website post
1/26/19	Councilmember Paul Koretz	E-blast
1/29/19	Councilmember Mike Bonin	Facebook post
1/30/19	Councilmember Paul Koretz	Facebook post
1/30/19	West Los Angeles/Sawtelle Neighborhood Council	Website and Facebook posts
1/30/19	Westside Neighborhood Council	Calendar post
1/30/19	Del Rey Neighborhood Council	Website post
1/31/19	Mayor Eric Garcetti	Facebook post
1/31/19	Councilmember Mike Bonin	E-blast
1/31/19	Lake Balboa Neighborhood Council	Facebook post (shared Mayor Garcetti's post)
2/1/19	Encino Neighborhood Council	Website post
2/1/19	Sherman Oaks Neighborhood Council	Newsletter
2/4/19	Councilmember Mike Bonin	Facebook post
2/4/19	Van Nuys Neighborhood Council	Website post

Source: Arellano Associates, 2019

Email

An electronic version of the meeting notice, with a link to a Spanish translation, was distributed via e-blast to 6,378 contacts included in the project database. The initial save-the-date notice was sent on January 7, 2019, and reminders were sent on January 23, 29, 31, and February 4. In addition, an e-blast was sent following the meetings to 6,426 contacts thanking attendees for their participation and to distribute the information shared at the public meetings. This included a link to the project video. The open rate for this round ranged from 27 percent to 45 percent, with an average open rate of 35 percent.

Social Media

The second round of community update meetings was publicized via advertising on Facebook in both English and Spanish. Table A-6 summarizes the advertisements on Facebook, including Spanish-language advertisements on Facebook.

Table A-6. Facebook Advertising – Second Round of Public Meetings

Type of Advertisement	Impressions	Engagement	Posting Date Range
English Video	59,654	Video Views: 22,012 Ad Reach: 16,176 Frequency: 3.69 Reactions: 8 Comments: 2 Shares: 12	1/11/19-1/29/19
Spanish Video	100,400	Video Views: 16,297 Ad Reach: 50,783 Frequency: 1.98 Reactions: 562 Comments: 39 Shares: 264	1/14/19-1/29/19
Spanish Ad Linking to El Pasajero	180,886	Link Clicks: 3,149 Ad Reach: 77,614 Frequency: 2.23 Reactions: 93 Comments: 18 Shares: 6	1/29/19-2/5/19
West LA Meeting Event	48,257	Event Responses: 341 Ad Reach: 20,668 Frequency: 2.33 Reactions: 331 Comments: 33	1/16/19-1/30/19
Van Nuys Meeting Event	59,056	Event Responses: 540 Ad Reach: 25,040 Frequency: 2.35 Reactions: 520 Comments: 86	1/19/19-2/1/19
LAX Meeting Event	43,340	Event Responses: 280 Ad Reach: 19,848 Frequency: 2.18 Reactions: 238 Comments: 33	1/22/19-2/5/19
Total	491,593	Ad Reach: 210,129	

Source: Arellano Associates, 2019

Ad Reach= total unique people who saw the ad

Frequency= how many times each person saw the ad

Media

Metro distributed a media release before the January/February 2019 meetings. Numerous articles about the Project were published prior, during, and after the meeting series. Public officials, including Supervisor Kuehl, Mayor Garcetti, Councilmember Bonin, and Councilmember Koretz, shared information on the upcoming meetings on their social media. Table A-7 lists media articles about the study before, during, and after the second round of public meetings.

Table A-7. Published Articles – Second Round of Public Meetings

Date	Publication	Article
1/29/19	Curbed Los Angeles	“Rail line could ferry riders through Sepulveda Pass in 15 minutes, Metro says”
1/29/19	LAist	“LA Metro Has A Plan To Get You From The Valley To The Westside in 15 Minutes”
1/29/19	Los Angeles Times	“Valley to Westside in 20 minutes? Metro says it’s possible on a Sepulveda Pass line”
1/29/19	The Source	“Here are the four new refined concepts for Sepulveda Transit Corridor”
1/29/19	Urbanize Los Angeles	“Metro Refines its Options for a Sepulveda Pass Rail Line”
1/30/19	KTLA5	“Metro Says Possible Sepulveda Pass Line Could Whisk Commuters Between Valley, Westside in 15 Minutes”
1/31/19	ABC7	“Concepts for Sepulveda Pass project shown in continued effort to ease congestion on 405 Freeway”
1/31/19	City Watch LA	“Good News! The ‘Holy Grail’ of LA’s Transit System is Being Built!”
1/31/19	Daily Bruin	“Plans for Sepulveda Pass rail station near UCLA are en route for completion by 2035”
1/31/19	Los Angeles Daily News	“Van Nuys to the Westside by rail? Metro is sharpening its vision for the Sepulveda Transit Corridor”
1/31/19	Progressive Railroading	“LA Metro to choose between heavy rail, Monorail for Sepulveda corridor”
2/1/19	ENR.com	“Metro Releases Four Refined Concepts for Sepulveda Transit Corridor Project”
2/4/19	Angels Moving Forward (Blog)	“What I Learned at the Sepulveda Transit Corridor Project Community Meeting”
2/7/19	City Watch LA	“LA Politicians May Be Corrupt and Incompetent, but Metro...Is Doing Its Job!”
2/9/19	Los Angeles Daily News	“Sherman Oaks homeowners to Metro: Sepulveda Corridor transit in the Valley must stay underground”
2/11/19	CityWatchLA	“Take a Virtual Metro Ride Through the Sepulveda Pass”
2/12/19	Patch.com	“Sherman Oaks Homeowners Oppose Above-Ground Transit Plans”

Date	Publication	Article
2/13/19	Canyon News	"SOHA Insist Metro Stays Underground"
2/13/19	Los Angeles Daily News	"Monorails aren't just for Disneyland anymore!"
2/18/19	Orange County Register	"From Disneyland to China, the monorail is riding a new high. But would it work in LA?"

Source: Arellano Associates, 2019

A.2.3.2 Summary of Public Comment at Community Update Meeting 2

More than 300 people attended the January/February 2019 community update meetings. Question and comment cards were completed by 126 people and submitted at the meetings or returned to Metro after the meetings. In addition, interpreters were available to translate for Spanish-speaking participants during the open house, presentation, and Q&A, as well as to facilitate their comment submittal.

Comments Related to Purpose and Need

Across all three public meetings, and in comments submitted via other means around the time of the meetings, there was support for the Project overall, excitement about fast travel times, and interest in seeing the Project completed as quickly as possible. In addition, there were comments about bicycle connectivity and Project costs and timing, as well as broader comments about Metro system improvements (including better transit connections, safety, and homelessness issues).

Comments Related to Alternatives

Interest remained in a convenient ride (such as a ride without needing to transfer) from the San Fernando Valley to LAX. Stakeholders also expressed interest in connectivity to other destinations in the Westside-LAX segment, including Santa Monica and the Santa Monica Airport, Culver City, and Playa Vista.

Comments Related to Modes

Of the 60 stakeholders who expressed a preference for a specific concept, 50 preferred HRT. Half (25) of those did not have a preference among the HRT concepts. One-quarter (15) of the stakeholders specifically supported HRT 1; five specifically supported HRT 3; two supported HRT 1 or HRT 2; two supported HRT 2 or HRT 3; and one specifically supported HRT 2. Four stakeholders expressed continued support for LRT, primarily because it could provide a direct connection between the East San Fernando Valley Light Rail Transit Corridor and Expo Lines without the need to transfer. Six stakeholders expressed support for the monorail option because of potentially lower costs, potentially faster construction speed, and the possibility of a station at The Getty.

Comments Related to Stations

There was support for a station at UCLA and interest in both the Expo/Sepulveda and Expo/Bundy Stations on the Metro Expo Line. Twelve comments requested a station between the Metro Purple Line and Expo Line, many mentioning Santa Monica Boulevard specifically. A similar number requested a stop or asked why there was no proposed stop at The Getty. There was also preference for a Centinela/Washington station option over a Centinela/Venice station in the Westside-LAX segment, likely because Centinela/Washington is seen as currently less congested and Culver City is developing along Washington. Additionally, there was interest in parking at stations, both in the Valley and on the Westside.

Comments Related to Alignments

Overall, stakeholders supported the connection between the Valley and the Westside. However, there was also interest in connectivity to Santa Clarita and the East San Fernando Valley Light Rail Transit Corridor. This included questions about possible changes to the East San Fernando Valley Light Rail Transit Corridor to better integrate with the Sepulveda Transit Corridor. There were also concerns about aboveground options from Sherman Oaks and other areas.

Comments Related to Evaluation Criteria

Residents in the Sherman Oaks area expressed concerns regarding noise and vibration during construction and operation of an aerial system, while some Bel Air residents expressed concerns regarding tunneling.

A.2.4 Public Meetings – Round 3

The public meetings held in July/August 2019 served as an opportunity for Metro to update stakeholders on the Project since the last round of public meetings in January 2019 and present refined concepts for the Valley-Westside and the evaluation of the Westside-LAX concepts. The public meetings began with a presentation by Metro staff that included the following topics:

- A description of the Project and its proposed phasing
- A description of the Study Area
- A summary of recent and planned improvements in the Sepulveda corridor
- A Purpose and Need statement
- Maps and descriptions of the refined Valley-Westside transit concepts
- Maps and descriptions of the Westside-LAX transit concepts
- A summary of the evaluation of the refined Valley-Westside transit concepts
- A summary of the evaluation of the Westside-LAX transit concepts
- A description of key constraints throughout the project area
- Conceptual renderings for both HRT and MRT
- A description of the maintenance and storage facility requirements with potential locations
- A brief review of the study process, leading to future environmental review
- Contact information, including several options to send comments

The refined Valley-Westside concepts included three HRT concepts and one MRT concept. The Westside-LAX concepts included three HRT concepts, one HRT or MRT concept, and a Purple Line Extension. During the meetings, the public was invited to ask questions and to submit written comments. A summary of the comments received in this round of meetings is presented in Section A.2.4.2. Comments submitted by August 20, 2019, are summarized in this report. All comments received after that date will be documented in a supplemental outreach report and submitted to the Metro Board of Directors.

The third round of public meetings were held as follows:

- Meeting 1: LAX Area
The Proud Bird
Proud Bird Restaurant
11022 Aviation Boulevard
Los Angeles, CA 90045
Wednesday, July 24, 2019; 6:00-8:00pm
75 people signed in at this meeting, and 29 comment or question cards were received.
- Meeting 2: Culver City
Culver City Veterans Memorial Auditorium
4117 Overland Avenue
Culver City, CA 90230
Saturday, July 27, 2019; 10:00am-12:00pm
85 people signed in at this meeting, and 44 comment or question cards were received.
- Meeting 3: Westwood
St. Paul the Apostle Catholic Church
10750 Ohio Avenue
Los Angeles, CA 90024
Tuesday, July 30, 2019; 6:00-8:00pm
105 people signed in at this meeting, and 54 comment or question cards were received.
- Meeting 4: Van Nuys
Marvin Braude San Fernando Valley Constituent Service Center
6262 Van Nuys Boulevard
Los Angeles, CA 91401
Saturday, August 3, 2019; 10:00am-1:00pm
270 people signed in at this meeting, and 111 comment or question cards were received.

As noted previously, at the last public meeting held in August 2019, Metro hosted a fully bilingual meeting in Van Nuys where the surrounding limited English proficiency (LEP) Spanish speaker rates are well above 30 percent of the population. The first half of the meeting was conducted in English and the second half (including the presentation and Q&A) was in Spanish. A breakfast and light lunch were also served to draw attendees. Bilingual flyers were distributed door-to-door in a targeted area around the meeting based on the LEP data.

A.2.4.1 Pre-Meeting Activities

Briefings for elected officials, their staff, and city agencies were held prior to the July/August 2019 community meetings, including a Metro Board staff briefing on July 11, 2019, and an elected official briefing.

Elected Official Briefing

- Monday, July 22, 2019; 11:00am – 12:00pm, Metro Headquarters, Mulholland Conference Room, One Gateway Plaza, 15th Floor, Los Angeles, CA 90012

Representatives from the following offices attended the July 22 briefing:

- ▶ Federal: Office of Senator Dianne Feinstein
- ▶ Federal: Office of Representative Ted Lieu, District 33
- ▶ Federal: Office of Representative Brad Sherman, District 30
- ▶ State: Office of Assemblymember Jesse Gabriel, District 45
- ▶ County of Los Angeles: Office of Supervisor Janice Hahn, District 4
- ▶ City of Los Angeles: Office of Councilmember Paul Krekorian, District 2
- ▶ City of Los Angeles: Office of Councilmember Bob Blumenfield, District 3
- ▶ City of Los Angeles: Office of Councilmember Paul Koretz, District 5
- ▶ City of Los Angeles: Office of Councilmember Nury Martinez, District 6
- ▶ City of Culver City: City Manager

Community Notices

Delivery of Flyers and Take-Ones

A total of 37,453 flyers with bilingual information about the meetings were distributed door-to-door via Walking Man in Van Nuys zip codes 91402, 91405, and 91411 between Sepulveda and Woodman and Roscoe and Burbank to encourage attendance at the Spanish meeting specifically. This area was selected and targeted based on a careful analysis of LEP Spanish speakers in the Study Area.

A total of 34,275 take-ones with information about the meetings in English and Spanish were distributed to Metro Divisions 1, 2, 5, 7, 8, 10, 15, and 18—the divisions where bus routes that operate in the Westside/Central, South Bay, and San Fernando Valley areas are based.

In addition, 1,075 bilingual take-ones were placed at Metro Customer Centers and 9,200 take-ones were distributed to the following transit operators: Santa Monica Big Blue Bus (2,000), Culver City Transit (2,700), BruinBus (1,000), Antelope Valley Transit Authority (1,500), Metrolink Ventura Line (2,000). Santa Clarita Transit also shared information about the meetings on their electronic displays on their buses.

Staff also handed out take-ones at:

- St. Bridget of Sweden and Our Lady of Peace churches, which had multiple Spanish services on Sunday, July 14
- Expo/Sepulveda and Expo/Bundy Metro Expo Line stations on July 16 and 18
- Westwood Farmers Market on July 18
- Van Nuys and Sepulveda Metro Orange Line stations on July 23

Extended Outreach

Extended outreach efforts included requesting support from elected offices, cities, public facilities, and other key stakeholders to promote public meetings through their respective electronic communication tools, including websites, e-newsletters, social media sites, and membership e-blasts using a social media toolkit. Table A-8 lists the extended coverage provided by local organizations.

Table A-8. Extended Coverage by Local Organizations – Third Round of Public Meetings

Date	Organization	Distribution Method
5/29/19	Van Nuys Neighborhood Council	Website post
6/14/19	Sherman Oaks Community Bulletin	Facebook post
6/17/19	Sherman Oaks Community Bulletin	Facebook post
7/19/19	North Westwood Neighborhood Council	Facebook post
7/26/19	Lake Balboa Neighborhood Council	Facebook post (shared Mayor Garcetti's post)
7/26/19	Mayor Eric Garcetti	Facebook post
7/26/19	Palms Neighborhood Council	Facebook and Twitter posts
7/26/19	City Councilmember David Ryu	Facebook post
7/28/19	Lake Balboa Neighborhood Council	Facebook post
7/31/19	City Councilmember Bob Blumenfield	Facebook post
8/1/19	Sherman Oaks Neighborhood Council	Newsletter
8/3/19	Encino Neighborhood Council	Website post
8/5/19	Sherman Oaks Neighborhood Council	Facebook post
8/8/19	City of Culver City	Facebook post
8/14/19	UCLA Transportation	Facebook post
8/19/19	Sherman Oaks Community Bulletin	Facebook post

Source: Arellano Associates, 2019

Email

An electronic version of the meeting notice, with a link to a Spanish translation, was distributed via e-blast to 7,258 contacts included in the project database. The initial save-the-date notice was sent on July 1, 2019, and reminders were sent on July 17, 23, 29, and August 2. In addition, an e-blast was sent following the meetings to 8,410 contacts thanking attendees for their participation and to distribute the information shared at the public meetings. The open rate for this round ranged from 24 percent to 41 percent, with an average open rate of 32 percent.

Social Media

The third round of community update meetings was publicized via advertising on Facebook in both English and Spanish. Table A-9 summarizes the advertisements on Facebook, including Spanish-language advertisements on Facebook.

Table A-9. Facebook Advertising – Third Round of Public Meetings

Type of Advertisement	Impressions	Engagement	Posting Date Range
English Video Ad	167,525	Video Views: 27,404 Ad Reach: 95,344 Frequency: 1.76 Reactions: 403 Comments: 79 Shares: 130	7/5/19-7/24/19
Spanish Video Ad	128,889	Video Views: 15,708 Ad Reach: 65,930 Frequency: 1.95 Reactions: 1,200 Comments: 82 Shares: 475	7/5/19-7/24/19
Spanish Ad Linking to El Pasajero	168,665	Link Clicks: 893 Ad Reach: 22,463 Frequency: 7.51 Reactions: 93 Comments: 18 Shares: 6	7/24/19-8/3/19
LAX Meeting Event Ad	58,816	Event Responses: 240 Ad Reach: 28,061 Frequency: 2.10 Comments: 0 Shares: 39	7/10/19-7/24/19
Culver City Meeting Event Ad	57,521	Event Responses: 278 Ad Reach: 26,132 Frequency: 2.20 Comments: 1 Shares: 50	7/12/19-7/26/19
Westwood Meeting Event Ad	47,233	Event Responses: 225 Ad Reach: 19,144 Frequency: 2.47 Comments: 0 Shares: 29	7/16/19-7/30/19
Van Nuys Meeting Event Ad (English)	69,321	Event Responses: 120 Ad Reach: 12,815 Frequency: 4.50 Comments: 9 Shares: 21	7/19/19-8/2/19

Type of Advertisement	Impressions	Engagement	Posting Date Range
Van Nuys Meeting Event Ad (Spanish)	77,709	Event Responses: 250 Ad Reach: 25,535 Frequency: 3.04 Comments: 0 Shares: 51	7/19/19-8/2/19
Total	775,679	Ad Reach: 295,424	

Source: Arellano Associates, 2019

Ad Reach= total unique people who saw the ad

Frequency= how many times each person saw the ad

Media

Metro distributed a media release before the July/August 2019 meetings and hosted a media briefing on July 23, 2019. Numerous articles about the Project were published prior, during, and after the meeting series. Table A-10 lists media articles about the Metro Sepulveda Transit Corridor Study.

Table A-10. Published Articles – Third Round of Public Meetings

Date	Publication	Article
7/13/19	NBC4	"Metro to Host Series of Public Meetings on Sepulveda Corridor Project"
7/16/19	Curbed Los Angeles	"Metro looking for private contractor to help plan rail through Sepulveda Pass"
7/16/19	Los Angeles Daily News	"Metro wants to tell you about Valley-Westside-LAX transit plans"
7/17/19	RT&S	"LA Metro may turn to private sector to accelerate vital rail line construction"
7/18/19	Los Angeles Daily News	"Here are 6 San Fernando Valley transportation projects that will transform the region"
7/22/19	Curbed LA	"Price tag swells to \$9B for rail line through Sepulveda Pass"
7/23/19	Streetsblog USA	"New Metro Sepulveda Transit Info: Draft Alignments, Estimated Costs and Ridership, Potential Freeway Stations"
7/23/19	Los Angeles Times	"Building a Metro transit line through the Sepulveda Pass could cost \$13 billion"
7/24/19	LAist	"LA Metro Has Updated Its Sepulveda Pass Rail Plan. Expect Some Sticker Shock"
7/24/19	Los Angeles Daily News	"Rail from Valley to Westside worries Sherman Oaks homeowners, but rising costs aren't what troubles them"
7/26/19	ConstructionDive	"Los Angeles-area transit project costs could reach \$14B"
7/29/19	Canyon News	"Sherman Oaks Homeowners Association Reject Parts Of Metro's Sepulveda Pass Plan"
7/29/19	Daily Bruin	"Sepulveda Pass rail station sees increased cost projections as project continues"

Date	Publication	Article
7/30/19	KCRW	Sepulveda Transit Corridor Westside Community Meeting – event post
7/30/19	Streetsblog LA	“Sherman Oaks Nimbys Bash Sepulveda Rail Plans, Push Unrealistic Freeway Monorail”
7/31/19	Streetsblog USA	“Lessons of Los Angeles’s Transit Tax: Money Isn’t Everything”
8/1/19	Los Angeles Daily News	“How should Metro connect the Valley to the Westside via public transit? Say your piece on Saturday”
8/6/19	KCRW	“LA’s solution to its 405 freeway problem”
8/13/19	Santa Monica Mirror	“Rail Line from the Valley to Westside?”

Source: Arellano Associates, 2019

A.2.4.2 Summary of Public Comment at Community Update Meeting 3

More than 500 people attended the July/August 2019 community update meetings. There were 210 questions and comments submitted at the meetings. In addition, nearly 400 comments were submitted during or after the meetings via the project email, online portal, and hotline through September 2, 2019. Interpreters were available to translate for Spanish-speaking participants during the open house, presentation, and Q&A, as well as to facilitate their comment submittal.

Comments Related to Purpose and Need

Across all three public meetings, and in comments submitted via other means, there continued to be strong support for the Project overall, excitement about fast travel times, and interest in seeing the Project completed quickly. In addition, there were broader comments about Metro system improvements, including better transit connections, parking at stations, safety, and homelessness issues. With the inclusion of cost estimates at this round of meetings, there were also comments and questions regarding the costs and how funding shortfalls could be addressed.

Comments Related to Alternatives

There were numerous comments from the Sherman Oaks area expressing opposition to any aboveground options through their community, with many supporting an all-underground alternative or a monorail down the middle of the 405 Freeway, even if it required removal of a lane of traffic or forgoing the ExpressLanes project. Interest also continued in a one-seat ride from the San Fernando Valley to LAX. Stakeholders also expressed interest in connectivity to Santa Clarita and the East San Fernando Valley Light Rail Transit Corridor. At the meetings near LAX, in Culver City, and in Westwood, attendees were mixed on the Westside to LAX alignments, with roughly equal support for HRT Sepulveda, HRT Overland, and HRT Centinela.

Comments Related to Modes

Of the 148 stakeholders who specifically expressed a preference for any concept, 123 preferred heavy rail. Seven of those did not have a preference among the heavy rail alternatives. Seventy-eight stakeholders specifically supported HRT 1; 24 supported HRT 2; and 14 supported HRT 3. Twenty-five stakeholders expressed support for the monorail option for reasons that included cost, potentially faster construction speed, and the possibility of a station at The Getty Center.

Comments Related to Stations

There was continued strong support for a station on the campus at UCLA from students and employees alike. About 10 comments requested a station between the Purple Line and the Expo Line, and several commenters were glad to see that a Santa Monica Boulevard station was in consideration. A similar number requested a station (or asked why there would not be a station) at The Getty. Additionally, there was strong interest in parking at stations, both in the Valley and on the Westside.

Comments Related to Evaluation Criteria

Residents in the Sherman Oaks area continued to express concerns regarding noise, traffic, and vibration during construction and operation of an elevated train. There were also concerns about property and community impacts from a monorail alternative. Other comments included concerns regarding the potential environmental impact from both the monorail and heavy rail alternatives related to wildlife habitat and tunneling.

A.2.5 Outreach at Community Events

While the community meetings drew large numbers of attendees throughout the Feasibility Study, Metro also recognizes that barriers may prevent some people from attending community meetings. The long commutes drivers experience in the Study Area may make an evening or weekend meeting unappealing. Other factors that may impact attendance include transit dependence, work or caregiving responsibilities, fear or uneasiness about attending government meetings, lack of familiarity with transit aside from bus service, and a lack of urgency for a project that is still in the preliminary planning phase as compared to those projects that will directly affect transit service in the near term.

Therefore, to reach the widest and most diverse audience possible, the outreach team prioritized going to places where community stakeholders already gather. This included making announcements and presentations at a number of community meetings, such as neighborhood councils, homeowners' associations, etc. In addition, the outreach team staffed information booths at approximately 20 free or low-cost community festivals that draw thousands of diverse attendees throughout the Study Area to inform them about the Sepulveda Transit Corridor Project and the ways in which they could provide input. When the online surveys were active, this included providing opportunities to take the surveys. At other times, the staff answered questions and shared details about upcoming meetings, the website, email address, and project hotline. Attendees were generally supportive of the need to provide a transit option through the Sepulveda Pass and there was interest in both monorail and heavy rail alternatives, with those supporting monorail interested in being able to see it (and the possibility that it could be less expensive), while those supporting heavy rail focused on its higher ridership and faster speeds.

Table A-11 lists these events and the type of outreach performed at them. Bilingual staff were on-hand at many of the events to engage with Spanish-speaking attendees. Through these activities, the team directly reached nearly 5,000 community members who might not otherwise have been aware of the Project or attended public meetings.

Table A-11. Outreach at Community Events

Date	Event	Location	Type of Outreach
4/19/2018	San Fernando Valley Council of Governments Transportation Committee Meeting Announcement	Van Nuys	Announcement
4/28/2018	Festival of Colors	Van Nuys	Information Booth
5/9/2018	Sherman Oaks Neighborhood Council's Traffic and Transportation Committee	Sherman Oaks	Information Booth
5/9/2018	Sherman Oaks Neighborhood Council Sepulveda Transit Corridor Project Sub-Committee Meeting	Sherman Oaks	Presentation
5/16/2018	Sherman Oaks Homeowners Association	Sherman Oaks	Presentation
5/20/2018	Pick Pico	Westwood/Rancho Park	Information Booth
5/19- 5/20/2018	Marina Fest & Discover Marina Del Rey	Marina Del Rey	Information Booth
5/24/2018	San Fernando Valley Council of Governments Special Board Meeting Announcement	Van Nuys	Announcement
5/31/2018	Metro Employee Transportation Coordinator Workshop	Downtown Los Angeles	Information Booth
6/10/2018	Balboa Strawberry Festival	Encino	Information Booth
6/24/2018	Summer SOULstice	Santa Monica	Information Booth
6/28/2018	Transit Coalition: Valley to Westside Transit Update	Downtown Los Angeles	Presentation
7/10/2018	Valley Industry Commerce Association Transportation Committee	North Hollywood	Presentation
7/11/2018	Westside/Central Service Council	Downtown Los Angeles	Presentation
7/13/2018	South Bay Service Council	Inglewood	Presentation
7/19/2018	San Fernando Valley Council of Governments Transportation Committee	Van Nuys	Presentation
8/1/2018	San Fernando Valley Service Council	Van Nuys	Presentation
8/9/2018	RAND Corporation Rideshare Fair	Santa Monica	Information Booth
8/9/2018	Valley Alliance of Neighborhood Councils	Sherman Oaks	Presentation
8/11/2018	City of Santa Clarita - Concerts in the Park	Santa Clarita	Information Booth
8/25-8/26/2018	Fiesta La Ballona	Culver City	Information Booth
9/28/2018	Van Nuys Art Festival	Van Nuys	Information Booth
9/29/2018	Reseda Rising Artwalk and Night Market	Reseda	Information Booth

Date	Event	Location	Type of Outreach
10/5/2018	Sherman Oaks Chamber of Commerce Transportation Panel	Sherman Oaks	Panel Discussion
10/6-10/7/2018	Manhattan Beach Hometown Fair	Manhattan Beach	Information Booth
10/15/2018	Sherman Oaks Chamber Street Fair	Van Nuys/Sherman Oaks	Information Booth
2/8/2019	South Bay Metro Service Council	Inglewood	Presentation
2/21/2019	San Fernando Valley Council of Governments Transportation Committee	Van Nuys	Presentation
2/28/2019	Metro NextGen Meeting	Van Nuys	Table
3/5/2019	Metro NextGen Meeting	West Los Angeles	Information Booth
3/6/2019	San Fernando Valley Metro Service Council	Van Nuys	Presentation
3/12/2019	Valley Industry Commerce Association Transportation Committee	North Hollywood	Presentation
3/13/2019	Westside/Central Metro Service Council	Downtown Los Angeles	Presentation
3/20/2019	Sherman Oaks Homeowners Association Meeting	Sherman Oaks	Information Booth
3/20/2019	Sherman Oaks Homeowners Association	Sherman Oaks	Staff at Meeting
4/6/2019	Festival of Colors	Van Nuys	Information Booth
4/19/2019	UCLA Earth Day Festival	Westwood	Information Booth
4/27/2019	LA Dept. of Sanitation Earth Day Event	Lake Balboa	Information Booth
5/19/2019	Pick Pico	Westwood	Information Booth
6/22/2019	Valley Pride Festival	Van Nuys	Information Booth
8/8/2019	Westside Cities Council of Governments	Los Angeles	Presentation
8/14/2019	Brentwood Community Council	Los Angeles	Presentation
8/15/2019	RAND Corporation Rideshare Fair	Santa Monica	Information Booth
8/15/2019	Sepulveda Transit Corridor Industry Forum	Los Angeles	Conference
8/27/2019	BizFed Committee on Transportation	Los Angeles	Presentation
9/3/2019	LA Chamber of Commerce	Los Angeles	Presentation
9/4/2019	Metro Technical Advisory Committee	Los Angeles	Presentation
9/10/2019	VICA Transportation Committee	North Hollywood	Presentation
9/16/2019	Valley VOTE	Sherman Oaks	Presentation
9/19/2019	SFV COG Transportation Committee	Van Nuys	Presentation
9/19/2019	Metro Streets and Freeways Subcommittee, Technical Advisory Committee	Los Angeles	Presentation

Date	Event	Location	Type of Outreach
10/10/2019	SFV COG Board meeting	Van Nuys	Presentation
TBD	Bel Air Association	Los Angeles	Presentation
TBD	Sepulveda Corridor Leadership Committee	Los Angeles	Presentation
TBD	Westwood Village BID	Westwood	Presentation

Source: Arellano Associates, 2019

In addition to participation at the community events listed above, as part of its efforts to raise awareness of the Project, the outreach team engaged with stakeholders in spring 2019 at Metro stations (Expo/Sepulveda, Expo/Bundy, Orange Line Van Nuys, and Orange Line Sepulveda); Metro bus stops in Van Nuys and Westwood; and attendees at youth baseball games in the North San Fernando Valley. These stakeholders were generally interested in the Project and appreciated the outreach, but did not engage with staff as in-depth since they were focused on their commutes/sports.

A.2.6 Other Comments/Feedback Received

As noted earlier, approximately 400 of the 1,200 comments were received in the form of comment/question cards at the public meetings, while around 800 comments were received through other means, including the project email address and website.

Of the 800 comments received outside of the public meetings, the main categories were as follows:

- Approximately 175 comments were submitted by stakeholders in the Mar Vista area in March, April, and June 2019 following the second round of meetings expressing strong support for the Sepulveda alignment over the Bundy/Centinela alignment in the Westside-LAX segment due to concerns about impacts to their community.
- Approximately 75 Sherman Oaks stakeholders submitted comments in summer 2019 that either included support for an underground option, expressed opposition to the elevated alternative through their community, and/or supported a monorail option down the middle of the 405 Freeway. Of these, around 40 used virtually identical language citing concerns about impacts to quality of life in their neighborhood.
- Approximately 240 comments were received from stakeholders in summer 2019 expressing strong support for a station at UCLA due to the high number of people traveling to UCLA every day for school, work, and medical appointments.

Aside from these large groups of comments, the remaining feedback generally aligned with the comments noted in Sections A.2.2.2, A.2.3.2, and A.2.4.2 related to the alternatives, modes and alignments. In addition, approximately 10 comments each specifically requested a station at Santa Monica Boulevard and at The Getty Center. A number of comments were simply supportive of the Project, general comments about the need for transit, questions about the timing/process and costs, and requests to be added to the project database.

A.3 Project Materials and Resources

A.3.1 Collateral Materials

To inform and update stakeholders about the Project's progress, the outreach team developed collateral materials for distribution through various channels and means of communication. All collateral materials are posted to the project website and updated on an as-needed basis.

The following collateral materials have been developed to date:

- An FAQ provides stakeholders with a project description and basic project facts.
- A Fact Sheet includes a summary of background, Purpose and Need for the Project, a project overview, and a schedule for the study period.
- A project map shows the Study Area.

A.3.2 Project Website

The project website <http://www.metro.net/projects/sepulvedacorridor> serves as a central location where the public can go to obtain all project-related information. The website includes the presentations and boards from the public meetings in English and Spanish. It also includes the project Fact Sheet and FAQ. The website also contains a "Contact Us" section where people can provide their input to the study, ask questions, and add themselves to the study database to be notified of future meetings and study progress.

A.3.3 Project Information Line

In addition to the other forms of communication made available to stakeholders, such as email and the website, a project telephone information line was set up for the public. This telephone line is available to English and Spanish-speaking callers and is checked frequently. Calls and requests are returned promptly upon receiving a message. A log of all incoming calls, subject of the calls, and responses to the callers is being maintained. The project line is (213) 922-7375.

A.3.4 Project Video

A two-minute video about the Project in English and Spanish was developed to coincide with and reflect the content of the first public meetings. This video provides background on the study, its Purpose and Need, as well as explains the process. This video is posted on Metro's website at <http://www.metro.net/projects/sepulvedacorridor> and was shown at the beginning of each of the 10 public meetings (including the meeting in Spanish) to introduce the Project to the meeting attendees. It was also used in Facebook ads to promote awareness of, and interest in, the Project.

A.3.5 Online Surveys

Over the course of the study, as noted earlier, the project team conducted two online bilingual surveys, which were designed to gather public feedback and collect email addresses to continue to expand the project database.

The first survey, which garnered more than 6,000 responses and took place from April through November 2018, focused on learning about those who travel in the Study Area, including questions about when, how often, and why they traveled; which routes they took; what modes they used; their

typical trip length; and what they would most like to change about their trip. Unsurprisingly, more than 70 percent of respondents cited travel times, and the majority of commuters traveled alone in their own vehicles.

The second survey, which received approximately 4,000 responses and took place from April through September 2019, focused generally on the concepts that had been presented at the second round of public meetings in January/February 2019. It indicated a high level of interest in the service given the project travel times (83 percent of respondents were very or somewhat likely to use the service if the trip took 15 to 26 minutes from Van Nuys Metrolink to Expo), strong interest in connectivity to transit (58 percent), and fast travel times (56 percent), and interest in concepts with short travel times and high projected ridership.

A.4 Media Relations

Prior to each series of public meetings, press releases were sent out to media outlets made up of regional and local print media, broadcast media, and online media, including blogs. Metro also posted articles to its own blogs (The Source and El Pasajero) and used Facebook advertising to publicize the meetings.

Around key study milestones, there was generally a pronounced uptick in news stories. Because of the nature of online media and blogs, these stories generated significant online discussion from the public. Monitoring this “virtual” discussion allowed Metro to see how the public was reacting to study developments in real time.

APPENDIX B TRAVEL FORECAST RESULTS

Table B-1. Initial Valley-Westside Concepts (2042)

	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5	Concept 6
Project trips	119,331	134,426	122,644	137,122	110,336	108,097
New transit trips	48,207	56,634	49,866	57,391	41,952	44,038
Total urban rail boardings	1,058,711	1,071,024	1,029,674	1,052,102	1,041,598	996,141
Time savings (hours)	37,200	42,033	36,106	43,548	34,391	32,668
VMT reduction	821,713	992,994	1,039,819	1,134,752	726,618	816,463
VHT reduction	58,658	69,607	73,822	80,161	51,173	54,980
Peak load on ESFV	6,528	4,787	7,797	7,908	4,234	4,613

Note: Urban rail boardings are "unlinked trips," so a single trip requiring a transfer between two lines is counted as two boardings.

Table B-2. Refined Valley-Westside Concepts (2042)

	HRT 1	HRT 2	HRT 3	MRT 1
Project trips	122,661	120,095	133,008	105,482
New transit trips	49,939	49,707	54,616	39,529
Total urban rail boardings	1,063,661	1,061,179	1,064,559	1,032,927
Time savings (hours)	37,048	36,983	40,339	32,166
VMT reduction	968,515	959,549	1,044,835	760,499
VHT reduction	67,911	66,701	72,204	52,540
Peak load on ESFV	3,857	3,941	3,211	2,852

Note: Urban rail boardings are "unlinked trips," so a single trip requiring a transfer between two lines is counted as two boardings.

Table B-3. Final Valley-Westside Alternatives (2042)

	HRT 1	HRT 2	HRT 3	MRT 1
Project trips	128,246	126,078	137,177	121,740
New transit trips	54,108	53,691	57,608	49,815
Total urban rail boardings	1,066,916	1,064,002	1,065,513	1,042,248
Time savings (hours)	41,307	41,180	43,826	40,399
VMT reduction	991,555	985,895	1,038,633	861,771
VHT reduction	69,520	68,683	71,969	60,054
Peak load on ESFV	4,046	4,039	3,392	3,009

Note: Urban rail boardings are "unlinked trips," so a single trip requiring a transfer between two lines is counted as two boardings.

Table B-4. Westside-LAX Concepts (2057)

	HRT Centinela	HRT I-405	HRT Sepulveda	HRT Overland	Purple Line Extension	MRT I-405
Project trips	231,284	229,785	238,791	234,634	282,130	192,345
Trips on Valley-Westside segment	202,091	202,210	207,808	202,785	159,374	166,526
Trips on Westside-LAX segment	109,562	109,137	118,953	115,898	122,756	93,316
New transit trips	37,551	35,573	40,499	37,577	35,283	29,466
Total urban rail boardings	1,385,530	1,382,511	1,395,596	1,385,332	1,404,035	1,331,640
Time savings (hours)	38,190	37,647	42,336	39,715	38,897	31,924
VMT reduction	803,604	795,260	904,559	811,818	633,456	611,204
VHT reduction	43,903	43,517	49,485	44,744	29,305	33,788

Notes: Total project trips are less than the sum of trips on Valley-Westside segment and trips on Westside-LAX segment because many trips use both segments.

Urban rail boardings are "unlinked trips," so a single trip requiring a transfer between two lines is counted as two boardings.

APPENDIX C VALLEY-WESTSIDE ALTERNATIVES DETAILED EVALUATION

Valley-Westside Alternatives – Improve Mobility Detailed Evaluation

Measure		HRT 1	HRT 2	HRT 3	MRT 1
Objective: Increase transit ridership by directly serving O/Ds with greatest potential for attracting new riders					
Number of daily boardings		128,246	126,078	137,177	121,740
Number of new transit trips		54,108	53,691	57,608	49,815
Objective: Increase transit frequency and operating speeds					
Average operating speeds		45.4 mph	42.2 mph	43.6 mph	34.5 mph
Service frequencies		4 minutes (peak) 10 minutes (off peak)	4 minutes (peak) 10 minutes (off peak)	4 minutes (peak) 10 minutes (off peak)	4 minutes (peak) 10 minutes (off peak)
Travel time from Metrolink to Expo Line		16.2 minutes	17 minutes	19 minutes	25.6 minutes
Transit travel times between key origin-destination pairs	Sawtelle Boulevard/Olympic Boulevard – Van Nuys Civic Center	37.6 minutes	43.3 minutes	42.0 minutes	47.8 minutes
	Laurel Canyon Boulevard/Paxton Street – UCLA Medical Center	61.6 minutes	62.3 minutes	64.3 minutes	70.4 minutes
	Balboa Boulevard/Ventura Boulevard – Bunker Hill	76.5 minutes	73.0 minutes	73.7 minutes	78.7 minutes
	Van Nuys Boulevard/Sherman Way – Santa Monica Water Garden	45.3 minutes	46.0 minutes	48.0 minutes	54.6 minutes
	Century City – Reseda Boulevard/Sherman Way	54.6 minutes	58.3 minutes	53.2 minutes	58.5 minutes
Daily time savings (hours)		41,307	41,180	43,826	40,400
Objective: Minimize need for transfers and/or time spent transferring					
Estimated duration of transfers and number of transfers between origin-destination pairs	Sawtelle Boulevard/Olympic Boulevard – Van Nuys Civic Center	0 minutes (no transfer)	4.7 minutes (1 transfer)	3.2 minutes (1 transfer)	3.2 minutes (1 transfer)
	Laurel Canyon Boulevard/Paxton Street – UCLA Medical Center	7.0 minutes (2 transfers)	7.0 minutes (2 transfers)	7.0 minutes (2 transfers)	7.0 minutes (2 transfers)
	Balboa Boulevard/Ventura Boulevard – Bunker Hill	7.2 minutes (3 transfers)	7.2 minutes (3 transfers)	8.0 minutes (3 transfers)	8.0 minutes (3 transfers)
	Van Nuys Boulevard/Sherman Way – Santa Monica Water Garden	6.5 minutes (2 transfers)	6.5 minutes (2 transfers)	6.5 minutes (2 transfers)	6.5 minutes (2 transfers)
	Century City – Reseda Boulevard/Sherman Way	12.3 minutes (3 transfers)	8.5 minutes (2 transfers)	11.5 minutes (3 transfers)	11.5 minutes (3 transfers)
Objective: Increase on-time performance and reliability					
Percent of alignment in exclusive ROW		100%	100%	100%	100%
Rail junction (junctions can decrease the reliability of a service)		No junction	No junction	No junction	No junction
Objective: Provide sufficient capacity to accommodate anticipated demand					
Load at maximum load point (capacity=12,000/hour)		7,204/hour	6,920/hour	6,985/hour	5,923/hour

Measure		HRT 1	HRT 2	HRT 3	MRT 1
Objective: Provide convenient connections between existing and planned transit					
Estimated duration of transfers between origin-destination pairs	Metrolink Ventura County Line	One-level transfer	One-level transfer	One-level transfer	One-level transfer
	East San Fernando Valley Light Rail Transit Corridor	One-level transfer	One-level transfer	Two-level transfer	Two-level transfer
	Metro Orange Line	Two-level transfer	Two-level transfer	One-level transfer	One-level transfer
	Metro Purple Line	One-level transfer	One-level transfer	One-level transfer	One-level transfer
	Metro Expo Line	Two-level transfer	Two-level transfer	Two-level transfer	Two-level transfer

Source: Metro Ridership Forecasting Model; Sepulveda Mobility Partners, 2018

Notes: East San Fernando Valley Light Rail Transit Corridor Project terminus station is located north of the Orange Line and the locally preferred alternative does not consider the grade-separated Van Nuys station as part of the Metro Orange Line Improvement Project.

HRT = heavy rail transit; mph = miles per hour; MRT = monorail/rubber tire; O/D = origin/destination; ROW = right-of-way; UCLA = University of California Los Angeles

Valley-Westside Alternatives Stations – Improve Equity-of-Access Detailed Evaluation

Measure	Metrolink Van Nuys Station	Metro Orange Line/Van Nuys Station	Metro Orange Line/Sepulveda Station	Van Nuys Boulevard/Ventura Boulevard	Sepulveda Boulevard/Ventura Boulevard	Expo/Bundy Station	Expo/Sepulveda Station	
Objective: Improve accessibility for residential and employment centers								
2042 future population density (within ½ mile of stations)	6,253 persons/sq. mile	17,176 persons/ sq. mile	7,129 persons/ sq. mile	12,809 persons/ sq. mile	11,480 persons/ sq. mile	5,584 persons/ sq. mile	9,803 persons/ sq. mile	
2042 future employment density (within ½ mile of stations)	16,880 jobs/sq. mile	12,862 jobs/sq. mile	13,275 jobs/sq. mile	12,050 jobs/sq. mile	21,974 jobs/sq. mile	27,050 jobs/sq. mile	16,709 jobs/sq. mile	
Number and size of planned high-density/mixed use (within ½ mile of stations)	None with ½ mile of station area	None within ½ mile of station area	None within ½ mile of station area	Encino-W. Sherman Oaks	Sherman Oaks Galleria and Encino-W. Sherman Oaks	Sawtelle, Santa Monica	Westside Pavilion and Sawtelle	
Objective: Support transit-oriented communities policies								
Transit-supportive characteristics	Notes	<ul style="list-style-type: none"> Site is surrounded by mostly industrial and commercial uses; opportunity to redevelop, but may be unlikely Existing mid-rise residential building immediately adjacent to proposed station area Strip commercial along Van Nuys Blvd is mostly single-story; opportunity for redevelopment and increasing density Large-format retail with surface parking are prime redevelopment areas Many parking lots or small buildings immediately surrounding proposed station could be redeveloped with station portal; direct connection to Metrolink and Amtrak station possible County social services building is an anchor for ridership Some medium-density residential exists within station area Most existing residential is low density 	<ul style="list-style-type: none"> Station is located at existing Orange Line station, connects to Orange Line and bike path Van Nuys Park-and-Ride presents future opportunity, but public facility zoning does not allow for development¹ Station area is immediately adjacent to existing industrial uses, but some may be redeveloped with residential or mixed use Industrial uses and auto-oriented commercial corridor are not conducive to TOC but are opportunities for future redevelopment Van Nuys Blvd south of Calvert St is mainly car dealerships and auto-oriented commercial uses Civic uses within station area are community anchors and provide destinations for transit riders, but limit future development potential General Plan designates area immediately surrounding station as 	<ul style="list-style-type: none"> Station is located at intersection with Orange Line busway and bike path Close to existing park-and-ride lot Adjacent Costco is a major draw, but is not consistent with walkable development I-405 is a physical barrier, separating station area from Sepulveda Basin Recreation Area to the west Station area is immediately adjacent to industrial uses Auto-oriented commercial corridor is not conducive to TOC but may present opportunity for redevelopment Industrial uses are not supportive of TOC and would require rezoning for redevelopment Few options for portal location without razing existing structures or developing on existing parking lots General Plan designates core of area as industrial uses 	<ul style="list-style-type: none"> Site is surrounded by mostly low-to-medium-density uses Most of the commercial uses along Ventura Blvd are one – and two-story buildings <ul style="list-style-type: none"> Greater opportunity for redevelopment and increasing density Large-format retail with surface parking are prime redevelopment areas Multiple gas stations and small buildings immediately surrounding proposed station are possible locations to be redeveloped into station portal General Plan land use supports high-density development on main corridors surrounding station Large amount of land remains low density and very low density, not suitable for redevelopment or increasing density Specific Plan makes minor changes to designation of community commercial 	<ul style="list-style-type: none"> Site has existing high density immediately surrounding the transit station Existing major commercial destination, both retail and office Large vacant parcel within station area provides an opportunity for new development Because the commercial area is mostly built-out, there is limited opportunity for new development Redevelopment is unlikely in the near future, as buildings are occupied and successful Highway underpass creates barrier for station area located west of I-405 Open plaza at corner of Ventura and Sepulveda is probably not big enough to construct station portal without demolition of one-story bank building and two levels of subterranean garage General Plan land use supports high-density development on main 	<ul style="list-style-type: none"> Station located at intersection with existing Metro Expo Line station Surrounding is mainly light industrial with offices and commercial space; much existing employment and commercial, but little residential uses near station Low-density retail and restaurants offer opportunity for redevelopment and increased density, but zoning does not support mixed-use development Two large public facilities are located within station area: Department of Power and Water and LA Sanitation Part of the station area is within City of Santa Monica I-10 limits pedestrian access to station from the south Expo Corridor Transit Neighborhood Plan makes significant changes to existing General Plan land use and zoning 	<ul style="list-style-type: none"> Located at existing Expo/Sepulveda station of the Metro Expo Line New mixed-use construction at station Infill development occurring on Pico Blvd City, county, and federal buildings adjacent to station; may provide destinations to riders, but unlikely to redevelop Industrial uses surround station area Portion of the station area is separated by I-405 and I-10. Limited walkability and access from these areas Significant amount of land in station core area is designated light industrial <ul style="list-style-type: none"> Does not allow residential uses Significant portion of land is designated low density Expo Corridor Transit Neighborhood Plan makes changes to existing General Plan land use and zoning Some industrial parcels rezoned to hybrid industrial with three

Measure	Metrolink Van Nuys Station	Metro Orange Line/Van Nuys Station	Metro Orange Line/Sepulveda Station	Van Nuys Boulevard/Ventura Boulevard	Sepulveda Boulevard/Ventura Boulevard	Expo/Bundy Station	Expo/Sepulveda Station
		<p>industrial and public facilities”¹</p> <ul style="list-style-type: none"> • Mix of light and limited industrial plus CM • Some commercial and residential uses are allowed within industrial land use designation <ul style="list-style-type: none"> ▶ CM allows limited C2 uses (including R4) and R3 uses ▶ Limited industrial allows CM uses, as described above • Commercial uses designated on Van Nuys Blvd • Medium-density residential uses to the north of station • Low-density designation to the south of station on parcels not located on major corridors • Applicable specific plans: <ul style="list-style-type: none"> ▶ Van Nuys CBD Community Design Overlay District and Streetscape Plan are supportive of pedestrian-friendly design and supportive of TOC² ▶ Area of Van Nuys CBD allows TFAR up to a 6 FAR maximum 	<ul style="list-style-type: none"> • Mix of heavy, light, and limited industrial plus CM • Some residential uses are allowed within industrial land use designation <ul style="list-style-type: none"> ▶ CM allows limited C2 uses (including R4) and R3 uses ▶ Limited industrial allows CM uses, as described above • Majority of land directly surrounding station does not support residential development • Low-density and very low-density designation off major corridors 	<p>and neighborhood and general commercial areas; does not significantly change land use from General Plan</p> <ul style="list-style-type: none"> • Applicable Specific Plans: <ul style="list-style-type: none"> ▶ Ventura/Cahuenga Boulevard Corridor Specific Plan ▶ Specific Plan designates pedestrian-oriented areas, pedestrian development district and restricted use areas; prohibits drive-thru and auto-related uses; supportive of TOC 	<p>corridors surrounding station</p> <ul style="list-style-type: none"> • Large amount of land remains low density, not suitable for redevelopment or increasing density • Applicable Specific Plans: <ul style="list-style-type: none"> ▶ Ventura/Cahuenga Boulevard Corridor Specific Plan ▶ Specific Plan makes minor changes to designation of regional commercial and community commercial areas. Changes are consistent with development of TOC ▶ Specific Plan designates Ventura Blvd as a pedestrian-oriented area; prohibits drive-thru and auto-related uses; supportive of TOC 	<ul style="list-style-type: none"> • Industrial parcels rezoned to hybrid industrial with three subcategories (new industry, jobs emphasis, and residential emphasis). 2.0 to 4.0 FAR (with bonus) • Significant portion of low-density land rezoned to medium-density residential and neighborhood commercial <ul style="list-style-type: none"> ▶ Allows multifamily development and ground-floor retail uses ▶ Some low density remains outside 1/4-mile radius but within 1/2 mile of station • Neighborhood commercial designated on Pico Blvd and part of Olympic Blvd and Bundy Street • Major public facilities — Department of Power and Water and LA Sanitation — located in station area¹ • West Los Angeles General Plan and Palms – Mar Vista – Del Rey General Plan have slight differences in corresponding zones for land use categories • Applicable Specific Plan: <ul style="list-style-type: none"> ▶ West Los Angeles Transportation Improvement and Mitigation Specific Plan • A portion of the 1/2-mile radius station area encompasses the City of Santa Monica 	<p>subcategories (new industry, jobs emphasis, and residential emphasis). 2.0 to 4.0 FAR (with bonus)</p> <ul style="list-style-type: none"> • Low medium along Expo Boulevard rezoned to medium-density residential • Public facilities zoning adjacent to station¹ • Largest contiguous land use designated medium density is separated from station by I-405 • West Los Angeles General Plan and Palms – Mar Vista – Del Rey General Plan have slight differences in corresponding zones for land use categories • Applicable Specific Plans: <ul style="list-style-type: none"> ▶ Sepulveda Corridor Specific Plan; prohibits building in the railroad ROW; allows TFAR within specific plan area — from the railroad ROW to the other parcels — up to 3 FAR by the process described in the specific plan ▶ West Los Angeles Transportation Improvement and Mitigation Specific Plan

Measure	Metrolink Van Nuys Station	Metro Orange Line/Van Nuys Station	Metro Orange Line/Sepulveda Station	Van Nuys Boulevard/Ventura Boulevard	Sepulveda Boulevard/Ventura Boulevard	Expo/Bundy Station	Expo/Sepulveda Station
						<ul style="list-style-type: none"> ▶ Santa Monica General Plan Land Use element identifies “Transit Village” along the Metro Expo Line ▶ Land inside 1/2-mile radius station area adjacent to Expo is mixed-use creative, combining entertainment-related commercial uses with a range of housing types 	
Existing land use and development patterns support transit	Medium	Medium	Low	Medium	High	Low	Low
Nearby vacant or under-utilized parcels for redevelopment (Low=Limited; High=Many or High Potential)	Medium	High	Medium	Medium	Medium	Low	Low
Major destinations/activity hubs within walking distance	Medium	High	Medium	Medium	High	Medium	High
Planned development for new major destinations/activity hubs within walking distance	Medium	Medium	Low	Low	Low	Medium	High
Major barriers to access the station from nearby neighborhoods (Low=Poor Access; High=Good Access)	Medium	High	Low	High	Medium	Medium	Low
Ability of station to contribute to walkable neighborhood	High	High	Medium	High	High	Medium	High
Impact of potential station access on quality of built environment (Low=Negative; High=Positive)	High	High	High	High	Medium	High	High
Planned or funded infrastructure projects near the station (Low=Conflict; High=Collaboration)	Medium	High	High	Medium	Medium	High	High

Measure	Metrolink Van Nuys Station	Metro Orange Line/Van Nuys Station	Metro Orange Line/Sepulveda Station	Van Nuys Boulevard/Ventura Boulevard	Sepulveda Boulevard/Ventura Boulevard	Expo/Bundy Station	Expo/Sepulveda Station
Potential for the proposed station to be integrated into existing, future, or adjacent development to support ridership	High	High	Medium	Medium	High	High	High
Existing land use and development patterns support transit	High	Medium	Low	Medium	High	Low	Low

Objective: Support first/last-mile connections

Number of connections to bicycle and quality pedestrian facilities (within ½ mile of stations)	Bike facilities: none; Pedestrian Connectivity Score: 74.84	Bike facilities: Class I (0.91)/ Class II (0.53); Pedestrian Connectivity Score: 110.13	Bike facilities: Class I (0.9); Pedestrian Connectivity Score: 66.55	Bike facilities: Class II (0.5); Pedestrian Connectivity Score: 114.87	Bike facilities: none; Pedestrian Connectivity Score: 110.50	Bike facilities: Class I (0.85)/ Class III (0.47); Pedestrian Connectivity Score: 164.45	Bike facilities: Class I (0.99)/ Class III (0.02); Pedestrian Connectivity Score: 135.18
Share of station access by non-motorized transportation	21%	15%	16%	39%	45%	32%	23%

Objective: Investment in disadvantaged communities

Number of low income and minority residences (within ½ mile of stations)	471 low income; 1,538 minority residents	3,257 low income; 7,138 minority residents	392 low income; 1,423 minority residents	720 low income; 1,635 minority residents	400 low income; 1,647 minority residents	300 low income; 1,453 minority residents	334 low income; 1,807 minority residents
Number of zero-car households (within ½ mile of stations)	107 zero-car households	591 zero-car households	67 zero-car households	170 zero-car households	123 zero-car households	51 zero-car households	111 zero-car households

Measure	HRT 1	HRT 2	HRT 3	MRT 1
Number of low income/transit-dependent riders	81,500	80,200	87,600	79,900

Source: Sepulveda Mobility Partners, 2018; Fehr& Peers, 2018; Torti Gallas + Partners, 2018

Notes: West Los Angeles Transportation Improvement and Mitigation Specific Plan; funds new transportation projects, seeks to mitigate effects of new low-density residential development, and encourages public transit, alternative modes, and transportation demand management measures; requires review of transportation impacts and assesses applicable fees and/or credits; supportive of developing TOC

Pedestrian Connectivity Score is determined by the density of through intersections (intersections of roadways that do not dead-end) per square mile

1 If a public agency sells property, it may rezone to most consistent land use within 500 feet

2 Does not contain any changes or recommendations on land use

CBD = Central Business District; CM = commercial manufacturing; FAR = floor area ratio; HRT = heavy rail transit; MRT = monorail/rubber tire; ROW = right-of-way; sq. = square; TFAR = Transfer of Floor Area Rights; TOC = transit-oriented communities

Valley-Westside Alternatives – Protect the Environment and Support Community and Economic Development Detailed Evaluation

Measure		HRT 1	HRT 2	HRT 3	MRT 1
Objective: Reduce vehicle miles traveled					
Regional vehicle miles traveled reduction		991,600	985,900	1,038,600	861,800
Corridor vehicle miles traveled reduction		66,400	66,100	70,700	63,000
Objective: Reduce air pollutant emissions					
Regional vehicle hours traveled reduction		69,500	68,700	72,000	60,100
Corridor vehicle hours traveled reduction		5,600	5,600	5,900	5,300
Objective: Minimize effects to communities					
Potential for property impacts		Likely impact	Likely impact	Likely impact	Likely impact
Potential for traffic and noise impacts (construction)		Likely impact	Potential impact	Likely impact	Likely impact
Potential for transportation and traffic impacts (operation)		Potential impact	Potential impact	Likely impact	Likely impact
Potential for visual impacts		Unlikely to impact	Unlikely to impact	Likely impact	Likely impact
Objective: Minimize impacts to transportation network					
Estimated traffic lane miles to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed
Estimated parking lanes to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	Approximately 4.1 miles	Approximately 4.1 miles
Estimated length of bicycle and pedestrian facilities to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed
Objective: Minimize other environmental impacts					
Other potential environmental impacts	Archaeological and tribal cultural resources	Potential impact	Potential impact	Potential impact	Potential impact
	Environmental justice	Potential impact	Potential impact	Likely impact	Likely impact
	Hazard and hazardous materials	Potential impact	Potential impact	Potential impact	Potential impact
	Historic resources	Potential impact	Potential impact	Potential impact	Potential impact
	Operational noise and vibration	Potential impact	Potential impact	Likely impact	Likely impact
	Section 4(f)	Potential impact	Potential impact	Potential impact	Potential impact
	Seismic resources	Unlikely to impact	Unlikely to impact	Potential impact	Potential impact
	Water resources	Potential impact	Potential impact	Potential impact	Potential impact

Source: Metro Ridership Forecast Model; Sepulveda Mobility Partners, 2018; Terry Hayes and Associates, 2018

Notes: HRT = heavy rail transit; MRT = monorail/rubber tire

Valley-Westside Alternatives – Provide a Cost-Effective Solution Detailed Evaluation

Measure	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Minimize cost to achieve benefits				
Capital cost	\$10.9 to \$13.4 billion	\$11.0 to \$13.6 billion	\$10.0 to \$12.4 billion	\$9.4 to \$11.6 billion
Annual O&M cost	\$112 to 119 million	\$112 to \$129 million	\$123 to \$137 million	\$84 to \$92 million
Annualized capital and O&M cost per new transit trip	\$9.85 to \$11.69	\$10.13 to \$12.28	\$9.27 to \$11.11	\$9.26 to \$11.15
Cost per hour user benefit	\$30.58 to \$36.30	\$31.03 to \$37.61	\$29.02 to \$34.77	\$27.90 to \$33.58

Notes: HRT = heavy rail transit; MRT = monorail/rubber tire; O&M = operating and maintenance

Valley-Westside Alternatives – Minimize Risk Detailed Evaluation

Measure	HRT 1	HRT 2	HRT 3	MRT 1
Objective: Minimize potential for cost increases and delays				
Qualitative assessment of unresolved major engineering challenges	Tunneling in the vicinity of bridge foundations at US 101, Metro Orange Line, and LOSSAN Corridor may require ground improvements Construction may conflict with operations of the East San Fernando Valley Light Rail Transit Corridor	Tunneling in the vicinity of bridge foundations at US 101, Metro Orange Line, and LOSSAN Corridor may require ground improvements Construction may conflict with operations of the East San Fernando Valley Light Rail Transit Corridor	Liquefaction potential could require deeper foundations for aerial guideway structures on Sepulveda Boulevard Relocating the 96-inch Sepulveda Feeder Line would increase project cost	Liquefaction potential could require deeper foundations for aerial guideway structures on Sepulveda Boulevard Relocating the 96-inch Sepulveda Feeder Line would increase project cost Meeting fire/life safety standards could be challenging in the Sepulveda Pass, including in the event of wildfire Limited data on construction cost of monorail structures adds uncertainty to cost estimates MRT vehicles and systems are proprietary to the vendor and may limit Metro’s ability to change vendors in the future MRT design may not allow crossovers at the frequency that Metro has on HRT systems
Dependence on decisions made by other projects or other agencies	Tunnel may have to go under parklands in the Santa Monica Mountains Relocation of storm drain on Van Nuys Boulevard requires Los Angeles County Flood Control approval	Tunnel may have to go under parklands in the Santa Monica Mountains Relocation of storm drain on Van Nuys Boulevard requires Los Angeles County Flood Control approval	Tunnel may have to go under parklands in the Santa Monica Mountains Aerial guideway along Sepulveda Boulevard will require City approval Relocation of the 96-inch Sepulveda Feeder Line will require approval of MWD	Aerial guideway along Sepulveda Boulevard will require City approval Aerial guideway may impact parklands or wildlife habitat in the Santa Monica Mountains Relocation of the 96-inch Sepulveda Feeder Line will require approval of MWD

Notes: HRT = heavy rail transit; MRT = monorail/rubber tire; MWD = Metropolitan Water District; O&M = operating and maintenance

APPENDIX D WESTSIDE-LAX CONCEPTS EVALUATION

Westside-LAX Concepts – Improve Mobility Evaluation

Measure	HRT Overland	HRT Sepulveda	HRT I-405	HRT Centinela (from Expo/Sepulveda)	HRT Purple Line Extension	MRT I-405
Objective: Increase transit ridership by directly serving O/Ds with greatest potential for attracting new riders						
Number of daily boardings	234,634	238,791	229,785	231,284	282,130	192,345
Number of transit trips using Westside-LAX segment	115,898	118,953	109,137	109,562	122,756	93,316
Objective: Increase transit frequency and operating speeds						
Average operating speeds	42.0 mph	44.5 mph	42.2 mph	40.8 mph	40.7 mph	36.2 mph
Service frequencies	4 minutes	4 minutes	4 minutes	4 minutes	4 minutes	4 minutes
Objective: Increase on-time performance and reliability						
Percent of alignment in exclusive ROW	100%	100%	100%	100%	100%	100%
Rail junction (junctions can decrease the reliability of a service)	No junction	No junction	No junction	No junction	No junction	No junction
Objective: Provide sufficient capacity to accommodate anticipated demand						
Load at maximum load point (capacity 12,000)	10,821 at peak load point	10,954 at peak load point	7,579 at peak load point	10,701 at peak load point	10,042 on Westside-LAX segment peak load point; 13,241 on Purple Line peak load point	7,841 at peak load point
Objective: Provide convenient connections between existing and planned transit						
Number and quality of connections to existing and planned Metro rail and busway lines	Moderate connection from an underground to aerial station at the Expo Line	Moderate connection from an underground to aerial station at the Expo Line	Moderate connection from an underground to aerial station at the Expo Line	Moderate connection from an underground to aerial station at the Expo Line	Forced transfer at Purple Line; moderate connection from an underground to aerial station at the Expo Line	Moderate connection from an underground to aerial station at the Expo Line

Source: Sepulveda Mobility Partners, 2019

Notes: The HRT Centinela Concept in the table presents the option via Sepulveda Boulevard with an Expo/Sepulveda Station. The option with an Expo/Bundy Station would have similar mobility analysis results but have a slightly higher travel time (11:29) and lower average speeds (40.2 mph). The HRT Purple Line Extension Concept would require a forced transfer from Valley-Westside, then Westside-LAX.

HRT capacity based on a 6-car train running at a 4-minute headway, with each car accommodating approximately 133 passengers. MRT capacity assumed to be equivalent to HRT capacity

HRT = heavy rail transit; mph = miles per hour; MRT = monorail/rubber tire; O/D = origin/destination; O&M = operating and maintenance; ROW = right-of-way

Westside-LAX Concept Stations – Improve Equity-of-Access Evaluation

Objectives	Centinela/Venice	Sepulveda/Venice	Overland/Venice	Culver City Transit Center	Centinela/Jefferson	Overland/Jefferson
Objective: Improve accessibility for residential and employment centers						
2057 population density (within ½ mile of stations)	25,119 persons/ sq. mile	21,375 persons/ sq. mile	36,650 persons/ sq. mile	3,847 persons/ sq. mile	11,000 persons/ sq. mile	10,255 persons/ sq. mile
2057 employment density (within ½ mile of stations)	5,911 jobs/sq. mile	7,737 jobs/sq. mile	24,680 jobs/sq. mile	13,648 jobs/sq. mile	12,320 jobs/sq. mile	15,996 jobs/sq. mile
Planned high-density/mixed use (within ½ mile of stations)	None with ½ mile of station area	None with ½ mile of station area	None with ½ mile of station area	Westfield Culver City	None with ½ mile of station area	None with ½ mile of station area
Objective: Support transit-oriented communities policies						
Notes	<ul style="list-style-type: none"> • Site is surrounded by most low-to-medium-density residential • Existing commercial corridor development is mainly one- and two-story development that contributes to the walkability of the neighborhood • Station area is at the intersection of Big Blue, Culver City, and Metro Line bus routes connecting riders to a broader network • Schools uses within station area are community anchors and provide destinations for transit riders, but limit future development potential • Parcels surrounding station are fully built-out with occupied commercial uses. Construction of station portal would require some demolition • LA City zoning notes: <ul style="list-style-type: none"> ▶ General Plan designates area immediately surrounding station as commercial and low-to-medium-density residential ▶ Community commercial and general commercial use zones allow R4 residential development up to 3 FAR and commercial development up to 1.5 FAR ▶ Medium-density use zone allows up to 3 FAR with a height limit of 45 ft 	<ul style="list-style-type: none"> • Site is surrounded by most low-to-medium-density residential with some of the existing low-density/zones creating possibility for redevelopment as the zoning code allows for higher density • Station is located at intersection of Metro Line bus route and Culver City bus route • Highway underpass creates barrier for access to the station area from west of I-405 • Auto-oriented commercial corridor is not conducive to TOC, but may present opportunity for redevelopment • One-story commercial lining of Venice Blvd creates possible redevelopment opportunities • Vacant site at the intersection creates an opportunity for redevelopment and the station portal • Sites along I-405 immediately south of Venice Blvd have high visibility from freeway • LA City zoning notes: <ul style="list-style-type: none"> ▶ General Plan designates area immediately surrounding station as commercial and low-to-medium-density residential 	<ul style="list-style-type: none"> • Site is surrounded by mostly medium-density residential with existing low-density zones creating possibility for redevelopment as the zoning code allows for higher density • The station’s proximity to Sony Pictures Studios provides a large employment base • One-story commercial lining of Venice Blvd provides possible redevelopment opportunities • The site is near Metro Line and Culver City bus routes • Portal location could be developed by razing existing gas station or developing on existing parking lots of low-density commercial • Walkability of the existing neighborhood is high as it has many restaurants, grocery stores, and neighborhood-serving retail that attracts residents • LA City zoning notes: <ul style="list-style-type: none"> ▶ General Plan land use is generally supportive of TOC ▶ General Plan designates area immediately surrounding station as commercial and medium-to-high-density residential 	<ul style="list-style-type: none"> • Site is surrounded by commercial use with both retail and offices and an existing transit hub. The transit hub connects many Culver City and Metro Line buses, which would increase the reach of the station • The Westfield Culver City Mall and strip commercial around the station, especially on Sepulveda Blvd, can prove as attraction points for the site • The commercial attractions around the station are auto-oriented and the walkability of the existing neighborhood is low • Large-format retail with surface parking are prime redevelopment areas • No open sites for station portal, but many parking lots or small bank buildings immediately surrounding proposed station could be redeveloped with station portal • I-405 and Marina Freeway underpass is a physical barrier, limiting walkability and access from these areas to the station • Most existing residential within the radius of the station is low density 	<ul style="list-style-type: none"> • Site is surrounded by commercial use with both retail and offices and an existing transit hub. The transit hub connects many Culver City and Metro Line buses, which would increase the reach of the station • The Westfield Culver City Mall and strip commercial around the station, especially on Sepulveda Blvd, can prove as attraction points for the site • The commercial attractions around the station are auto-oriented and the walkability of the existing neighborhood is low • Large-format retail with surface parking are prime redevelopment areas • No open sites for station portal, but many parking lots or small bank buildings immediately surrounding proposed station could be redeveloped with station portal • I-405 and Marina Freeway underpass is a physical barrier, limiting walkability and access from these areas to the station • Most existing residential within the radius of the station is low density 	<ul style="list-style-type: none"> • Site is surrounded by commercial use with both retail and offices and an existing transit hub. The transit hub connects many Culver City and Metro Line buses, which would increase the reach of the station • The Westfield Culver City Mall and strip commercial around the station, especially on Sepulveda Blvd, can prove as attraction points for the site • The commercial attractions around the station are auto-oriented and the walkability of the existing neighborhood is low • Large-format retail with surface parking are prime redevelopment areas • No open sites for station portal, but many parking lots or small bank buildings immediately surrounding proposed station could be redeveloped with station portal • I-405 and Marina Freeway underpass is a physical barrier, limiting walkability and access from these areas to the station • Most existing residential within the radius of the station is low density

Objectives	Centinela/Venice	Sepulveda/Venice	Overland/Venice	Culver City Transit Center	Centinela/Jefferson	Overland/Jefferson
	<ul style="list-style-type: none"> ▶ Very low-density residential allows up to 0.6 FAR and a height limit of 36 ft and is not supportive of TOC • Culver City zoning notes: <ul style="list-style-type: none"> ▶ General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft ▶ Low-density residential allows for 0.6 FAR with a height limit of 26 ft for flat roofs and 30 ft for sloped roofs and is not supportive of TOC • West Los Angeles Transportation Improvement and Mitigation Specific Plan: <ul style="list-style-type: none"> ▶ Funds new transportation projects, seeks to mitigate effects of new low-density residential development, and encourage public transit, alternative modes, and TDM measures ▶ Requires review of transportation impacts and assesses applicable fees and/or credit ▶ Supportive of developing TOCs • Coastal Transportation Corridor Specific Plan: <ul style="list-style-type: none"> ▶ Funds specific transportation improvements due to transportation impacts generated by the projected new commercial and industrial development within the corridor ▶ Regulates phased development of land uses to ensure that the transportation infrastructure can accommodate such uses 	<ul style="list-style-type: none"> ▶ General commercial use zones allow R4 residential development up to 3 FAR and commercial development up to 1.5 FAR ▶ Medium use zone allows up to 3 FAR with a height limit of 45 ft ▶ Very low-density residential allows up to 0.6 FAR and a height limit of 36 ft and is not supportive of TOCs • Culver City zoning notes: <ul style="list-style-type: none"> ▶ General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft ▶ Opportunity for redevelopment at the medium-density zone where existing buildings are currently at low density. These zones allow for 30-ft height limit and 1 unit/1,500 sq. ft of net lot area, up to a maximum of 9 units ▶ Low-density two-family residential allows for 2 units per parcel with a height limit of 2 stories and 30 ft ▶ West Los Angeles Transportation Improvement and Mitigation Specific Plan: Funds new transportation projects, seeks to mitigate effects of new low-density residential development, and encourage public transit, alternative modes, and TDM measures 	<ul style="list-style-type: none"> ▶ Community commercial and general commercial use zones allow R4 residential development up to 3 FAR and commercial development up to 1.5 FAR ▶ Medium and high-density use zone allows up to 3 FAR, with medium-density development limited to 45 ft • Culver City zoning notes: <ul style="list-style-type: none"> ▶ General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft ▶ General Plan land use is generally supportive of TOCs ▶ Opportunity for redevelopment at the medium-density zone where existing buildings are currently at low density. These zones allow for 30-ft height limit and 1 unit/1,500 square feet of net lot area, up to a maximum of 9 units ▶ Low-density residential allows for 0.6 FAR with a height limit of 26 ft for flat roofs and 30 ft for sloped roofs and is not supportive of TOCs • West Los Angeles Transportation Improvement and Mitigation Specific Plan: <ul style="list-style-type: none"> ▶ Funds new transportation projects, seeks to mitigate effects of new low-density residential development, and encourages public transit, alternative modes, and TDM measures 	<ul style="list-style-type: none"> • General Plan land use is generally supportive of TOCs • Regional commercial center zones do not allow residential development and have a height limit of 56 ft • General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft • Very low density residential located to northern edge of station area allows for 0.6 FAR with a height limit of 26 ft for flat roofs and 30 ft for sloped roofs and is not supportive of TOCs • Industrial parcels do not allow residential development and have a height limit of 43 ft 	<ul style="list-style-type: none"> • General Plan land use is generally supportive of TOCs • Regional commercial center zones do not allow residential development and have a height limit of 56 ft • General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft • Very low-density residential located to northern edge of station area allows for 0.6 FAR with a height limit of 26 ft for flat roofs and 30 ft for sloped roofs and is not supportive of TOCs • Industrial parcels do not allow residential development and have a height limit of 43 ft 	<ul style="list-style-type: none"> • General Plan land use is generally supportive of TOCs • Regional commercial center zones do not allow residential development and have a height limit of 56 ft • General corridor commercial zones allow for mixed use and live/work development in line with its standards, with a height limit of 56 ft • Very low-density residential located to northern edge of station area allows for 0.6 FAR with a height limit of 26 ft for flat roofs and 30 ft for sloped roofs and is not supportive of TOCs • Industrial parcels do not allow residential development and have a height limit of 43 ft

Objectives		Centinela/Venice	Sepulveda/Venice	Overland/Venice	Culver City Transit Center	Centinela/Jefferson	Overland/Jefferson
		<ul style="list-style-type: none"> ▶ Promotes the reduction of peak-hour trips by promoting the increase of work-related ridesharing and bicycling to keep critical intersections from overload and level-of-service to decrease ▶ Reduces commute trips by encouraging the development of affordable housing at or near job-site ▶ Ensures new developments include TDM programs that will serve these auto-dependency reduction goals • Los Angeles Livable Boulevards Streetscape Plan: <ul style="list-style-type: none"> ▶ Aims to create pedestrian-friendly environments and enhance neighborhood identity ▶ A project located on a street segment identified in the Livable Boulevards Streetscape Plan may be required to provide streetscape plan improvements in the public right-of-way 	<ul style="list-style-type: none"> ▶ Requires review of transportation impacts and assesses applicable fees and/or credits ▶ Supportive of developing TOCs 	<ul style="list-style-type: none"> ▶ Requires review of transportation impacts and assesses applicable fees and/or credits 			
Transit-supportive characteristics	Existing land use and development patterns supports transit	High	High	High	Medium	Medium	Low
	Nearby vacant or under-utilized parcels for redevelopment (Low=Limited; High=Many or High Potential)	Medium	High	Medium	High	High	Medium
	Major destinations/activity hubs within walking distance	Medium	Medium	High	High	High	Medium
	Planned development for new major destinations/activity hubs within walking distance	Low	Medium	Medium	Medium	High	Medium
	Major barriers to access the station from nearby neighborhoods (Low=Poor Access; High=Good Access)	High	Medium	High	Medium	Low	Low

Objectives	Centinela/Venice	Sepulveda/Venice	Overland/Venice	Culver City Transit Center	Centinela/Jefferson	Overland/Jefferson
Ability of station to contribute to walkable neighborhood	High	Low	Medium	Medium	Medium	High
Impact of potential station access on quality of built environment (Low=Negative; High=Positive)	Medium	High	High	Medium	Medium	High
Planned or funded infrastructure projects near the station (Low=Conflict; High=Collaboration)	High	High	Medium	High	Medium	High
Potential for the proposed station to be integrated into existing, future, or adjacent development to support ridership	High	High	High	High	High	High
Existing land use and development patterns support transit	High	High	High	Medium	Medium	Low
Objective: Support first/last-mile connections						
Number of connections to bicycle and quality pedestrian facilities (within ½ mile of stations)	Bike facilities: Class II (0.75)/ Class III (0.09)/Class IV (0.81); Pedestrian Connectivity Score: 192.03	Bike facilities: Class I (0)/ Class II (2.24)/Class III (0); Pedestrian Connectivity Score: 207.84	Bike facilities: Class I (0)/ Class II (1.3)/Class III (0); Pedestrian Connectivity Score: 180.56	Bike facilities: Class I (0)/Class II (0.2)/Class III (0); Pedestrian Connectivity Score: 190.87	Bike facilities: Class I (0)/ Class II (1.51); Pedestrian Connectivity Score: 76.47	Bike facilities: Class I (0.7)/ Class II (0)/Class III (0); Pedestrian Connectivity Score: 240.62
Objective: Investment in disadvantaged communities						
Number of low income and minority residences (within ½ mile of stations)	1,259 low income; 5,958 minority residents	1,258 low income; 4,721 minority residents	1,521 low income; 6,122 minority residents	132 low income; 1,220 minority residents	322 low income; 1,444 minority residents	59 low income; 722 minority residents
Number of zero-car households (within ½ mile of stations)	372 zero-car households	270 zero-car households	598 zero-car households	31 zero-car households	31 zero-car households	104 zero-car households

Source: Sepulveda Mobility Partners, 2019; Fehr& Peers, 2019; Torti Gallas + Partners, 2019

Note: FAR = floor area ratio; ft = foot/feet; ROW = right-of-way; sq. = square; TDM = transportation demand management; TOC = transit-oriented communities

Westside-LAX Concepts – Protect the Environment and Support Community and Economic Development Evaluation

Measure		HRT Overland	HRT Sepulveda	HRT I-405	HRT Centinela (from Expo/Sepulveda)	HRT Purple Line Extension	MRT I-405
Objective: Minimize effects to communities							
Potential for property impacts		Potential impact	Potential impact	Likely impact	Potential impact	Potential impact	Likely impact
Potential for traffic and noise impacts (construction)		Potential impact	Potential impact	Likely impact	Potential impact	Potential impact	Likely impact
Potential for visual impacts		Unlikely to impact	Unlikely to impact	Moderate	Unlikely to impact	Unlikely to impact	Potential impact
Objective: Minimize impacts to transportation network							
Estimated traffic lane miles to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed
Estimated parking lanes to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed
Estimated length of bicycle and pedestrian facilities to be removed		None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed	None anticipated to be permanently removed
Objective: Minimize other environmental impacts							
Other potential environmental impacts	Archaeological and tribal cultural resources	Potential impact	Potential impact	Likely impact	Potential impact	Potential impact	Likely impact
	Environmental justice	Potential impact	Potential impact	Potential impact	Potential impact	Likely impact	Potential impact
	Hazard and hazardous materials	Likely impact	Potential impact	Potential impact	Potential impact	Likely impact	Potential impact
	Historic resources	Potential impact	Unlikely to impact	Unlikely to impact	Unlikely to impact	Potential impact	Unlikely to impact
	Operational noise and vibration	Unlikely to impact	Unlikely to impact	Potential impact	Unlikely to impact	Potential impact	Potential impact
	Seismic resources	Potential impact	Potential impact	Likely impact	Potential impact	Likely impact	Likely impact
	Water resources	Potential impact	Potential impact	Unlikely to impact	Potential impact	Potential impact	Unlikely to impact

Source: Sepulveda Mobility Partners, 2019; Terry Hayes and Associates, 2019

Note: HRT = heavy rail transit; MRT = monorail/rubber tire

Westside-LAX Concepts – Provide a Cost-Effective Solution Evaluation

Measure	HRT Overland	HRT Sepulveda	HRT I-405	HRT Centinela (from Expo/Sepulveda)	HRT Purple Line Extension	MRT I-405
Objective: Minimize cost to achieve benefits						
Capital cost	\$6.8 to \$8.4 billion	\$6.0 to \$7.4 billion	\$6.5 to \$8.0 billion	\$6.7 to \$8.3 billion	\$8.3 to \$10.3 billion	\$6.5 to \$8.0 billion
Annual O&M cost	\$64 to \$68 million	\$59 to \$63 million	\$59 to \$63 million	\$62 to \$66 million	\$82 million	\$40 to \$42 million
Cost per hour of time savings	\$19.35 to \$23.03	\$16.39 to \$19.49	\$19.32 to \$23.02	\$19.74 to \$23.50	\$24.51 to \$28.72	\$21.17 to \$25.46

Source: Sepulveda Mobility Partners, 2019

Note: O&M costs are incremental costs over operating Valley-Westside segment alone.

HRT = heavy rail transit; MRT = monorail/rubber tire; O&M = operating and maintenance

