California High-Speed Train Project

Los Angeles - Palmdale Section Project EIR/EIS
LAUS to SR-134

DRAFT
ALTERNATIVES ANALYSIS REPORT

Revision	Date	Description
0	04/22/2009	Released for Internal Review
1	04/30/2009	Released for PM Team Review
2	05/20/2009	Incorporates PM Team Comments
3	05/28/2009	Incorporates Authority Comments
4	06/01/2009	Incorporates FRA Comments

TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

ABBREVIATIONS / ACRONYMS

Amtrak.....National Railroad Passenger Corporation
Authority.....California High-Speed Rail Authority
BNSF .....Burlington Northern Santa Fe
Caltrans .....California Department of Transportation
CEQA.....California Environmental Quality Act
CNG.....Compressed Natural Gas
DVD.....Digital Video Disk
EIR.....Environmental Impact Report
EIS .....Environmental Impact Statement
FRA .....Federal Railroad Administration
GIS.....Geographic Information System
HOV.....High Occupancy Vehicle
HST .....High-Speed Train
KOP.....Key Observation Point
LADOT .....City of Los Angeles, Department of Transportation
LA-P.....Los Angeles to Palmdale
LA River .....Los Angeles River
LARRMP .....Los Angeles River Revitalization Master Plan
LASHP.....Los Angeles State Historic Park
LAUS .....Los Angeles Union Station
LOSSAN .....Los Angeles to San Diego Passenger Rail Corridor
LRT .....Light Rail Transit
Metro.....Los Angeles County Metropolitan Transportation Authority
MPH .....Miles per Hour
NEPA .....National Environmental Protection Act
PMT.....Program Management Team
RDLASP.....Rio de Los Angeles State Park
ROW.....Right-of-Way
RRC.....Regional Rebuild Center
RTP .....Regional Transportation Plan
SCAG .....Southern California Association of Governments
SCRRA .....Southern California Regional Rail Authority (Metrolink)
SR .....State Route
SWG.....Stakeholder Working Group
TOD.....Transit Oriented Development
USGS .....United States Geological Survey
UP .....Union Pacific

1.0 INTRODUCTION

The California High-Speed Rail Authority (the Authority) is studying alternative alignments for a high-speed train section between Los Angeles Union Station (LAUS) and Palmdale. This study incorporates conceptual engineering information and identifies feasible and practicable alternatives to carry forward for environmental review and evaluation in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) under the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) for the LAUS to SR-134 portion of the Los Angeles to Palmdale section of the California High-Speed Train (HST) Project.

1.1 CALIFORNIA HST PROJECT BACKGROUND

The California High-Speed Train (CAHST) is planned to provide intercity, high-speed train service on over 800 miles of tracks throughout California, that will connect the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which will include state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 mph over a fully grade-separated, dedicated track alignment, with an expected express trip time between Los Angeles and San Francisco of approximately 2 hours and 40 minutes.

The California HST project will be planned, designed, constructed, and operated under the direction of the California High-Speed Rail Authority (Authority), a state governing board formed in 1996. The Authority's statutory mandate is to develop a high-speed rail system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

1.2 LOS ANGELES TO PALMDALE EIR/EIS BACKGROUND

The Los Angeles to Palmdale High-Speed Train (HST) section is approximately 60 miles long, and extends through a wide variety of land uses, including rural, urban, densely populated cities, and mountainous terrain. The alignment for the Los Angeles to Palmdale Region HST Project is a broad corridor generally running along the existing Metrolink rail corridor through the San Fernando Valley. Within this corridor, the right-of-way is owned by the Los Angeles County Metropolitan Transportation Authority (Metro), and the Southern California Regional Rail Authority (SCRRA) owns the track rights and operates the Metrolink commuter rail service, with freight operated by the Union Pacific Railroad. North and west of Sylmar the alignment passes through mountainous terrain through to Palmdale.

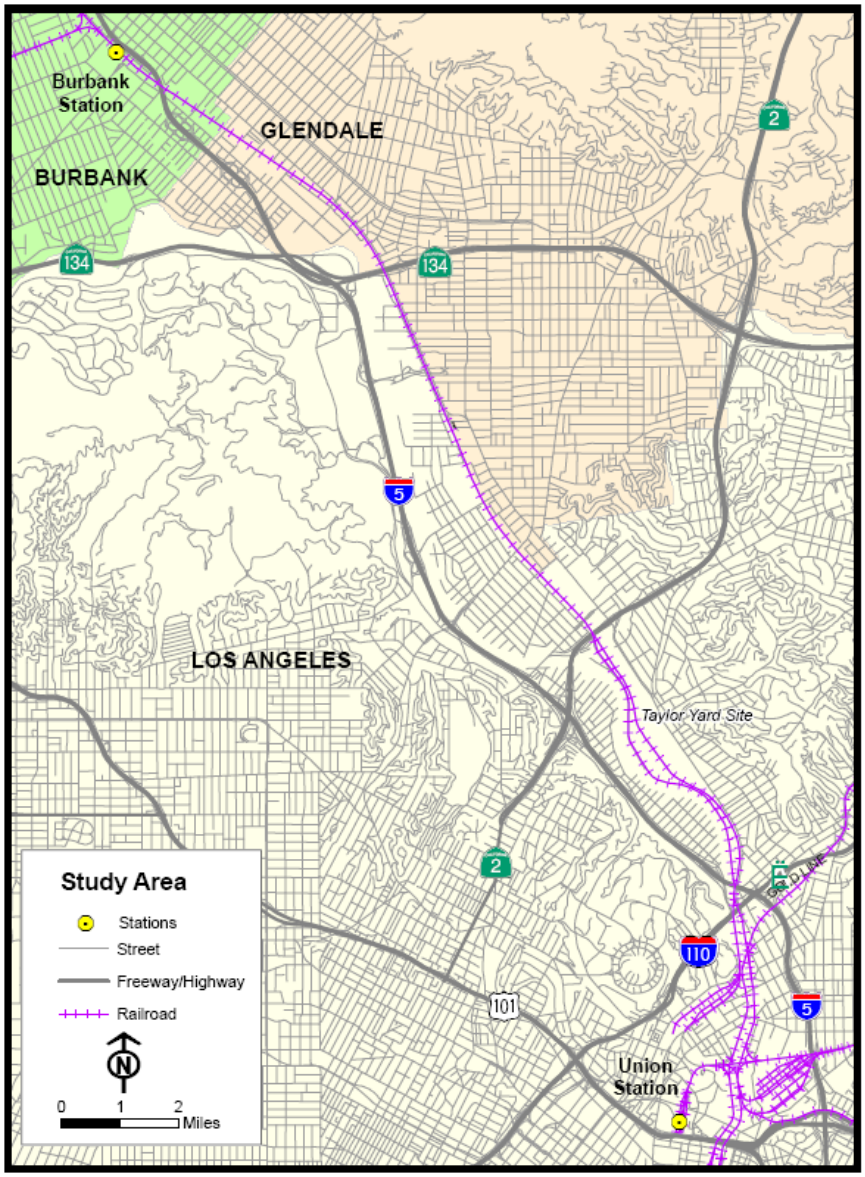
1.3 STUDY AREA

For the purposes of alternatives analysis, the Los Angeles to Palmdale section of HST has been divided into three sub-sections that have different constraints and considerations:

- Los Angeles to SR-134 (LAP1) – in the Los Angeles Basin it extends from the new HST station in the south the SR-134 in the north. The study area is broadly along the existing Metrolink rail corridor.
- SR-134 to Sylmar (LAP2) – in the San Fernando Valley and generally within the existing Metrolink right-of-way (approximately 16 miles).
- Sylmar to Palmdale (LAP3) – in the San Gabriel Mountains generally in a corridor between SR-14 and Soledad Canyon Road. (approximately 36 miles)

This study area from LAUS to SR 134 is based on the preferred option for HST service selected by the Authority and FRA in the Statewide Program EIR/EIS (see Section 3.3). It extends from the new High-Speed Train Station in the south to the SR-134 in the north. The area studied is broadly along the existing Metrolink rail corridor. The Program EIR/EIS identified the study area as a relatively wide corridor within which alignment variations would be studied to connect the existing Los Angeles Union Station with a new HST station located at the existing Burbank Metrolink station (Figure 1-1).

Figure 1-1: Study Area



Source: HMM, URS, Arup JV

1.4 PURPOSE OF STUDY

This Alternatives Analysis (AA) Report uses preliminary planning, environmental, and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering design in the Los Angeles to Palmdale HST Project EIR/EIS. This report is to assist the Authority and the FRA in identifying the range of potentially feasible alternatives to analyze in

the draft Project EIR/EIS. It documents the preliminary evaluation of alternatives, indicating how each of the alternatives meets the purpose for the HST project, how evaluation criteria were applied and used to determine which alternatives to carry forward for detailed environmental analysis, and which alternatives not to carry forward for further analysis.

The analysis begins with the alignment corridor selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments in response to the Project EIR/EIS scoping processes and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for detailed environmental review. After identifying initial project alternatives, alignment plans, profiles, and cross-sections have been developed and used for this preliminary evaluation of the alternatives.

Section 2.0 describes the alternatives development process. Each of the project alternatives is described in detail in Section 3.0. Section 4.0 evaluates the alternatives, and Section 5.0 summarizes the results of the alternatives analysis.

2.0 ALTERNATIVES DEVELOPMENT PROCESS

Preparation of this study involved the development and refinement of alternatives, through a series of processes that are intended to compare alternatives. This study follows a defined alternative analysis process as described in the Authority issued Technical Memo Alternatives Analysis for Project-Level EIR/EIS (December 2008), and uses both qualitative and quantitative measures that reflect a mixture of applicable policy and technical considerations.

Techniques that are used to gather information, develop and compare alternatives are described below:

Field Inspections of Corridors - The potential alignment, right-of-way, and station location are the subject of field inspection by experienced planning personnel, engineers, and analysts with experience in railroad operations, to identify conditions and factors not visible in aerial photos or on maps. Over the course of the study, field inspections become progressively more detailed as the alternatives are refined by the planning and engineering work.

Project Team Input and Review - The project team conducts team meetings to discuss alternatives and local issues that potentially impact alignments.

Qualitative Assessment - A number of the qualitative measures used to describe the alternative alignments are developed by professionals with experience in the construction and operation of high-speed rail and other transportation systems. These measures include constructability, accessibility, operability, maintainability, right of way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts.

Engineering Assessment - Engineering assessments are provided for a number of measures that can be readily quantified at this stage of project development. The engineering assessments can provide information on project length, travel time, and configuration of key features of the alignment such as the presence of existing infrastructure.

GIS Analysis - The bulk of the assessment is performed using GIS data, which enables depictions of the project's interactions with a variety of measurable geographic features, both natural and built. GIS data is used to assess impacts on farmland, water resources, floodplains, wetlands, threatened and endangered species, cultural resources, current urban development, infrastructure, and oil and gas exploration and production.

Assessment and analysis criteria have been developed for each step in the process outlined above. The criteria, as applied, are progressively more technical and quantitative as alternatives evolve.

2.1 HST PROJECT PURPOSE AND OBJECTIVES

The purpose of the Statewide High Speed Train (HST) system is to provide reliable high-speed electric powered train service that links Southern California cities, the Central Valley, Sacramento, and Bay Area, and that delivers predictable and consistent travel times. The HST System will provide greater access and choice of transportation modes, which will increase mobility throughout California.

As a section of the statewide HST system, the purpose of the project is to provide reliable high-speed electric powered train service from Los Angeles to Palmdale and that delivers predictable and consistent travel times. The Los Angeles to Palmdale section of the HST System will provide greater access and choice of transportation modes, which will increase mobility throughout the Los Angeles County region and contribute to the increased mobility throughout California.

Specific project objectives of the HST system within the Los Angeles to Palmdale section include:

- Improve mobility by relieving the mounting capacity and congestion constraints on the local interstate freeways and on State Routes through providing a choice of a high speed train transportation mode.
- Improve mobility by relieving the increasing congestion constraints at the Los Angeles International Airport through providing a choice of a high speed train transportation mode.
- Maximize connectivity and accessibility for passenger rail and transit at Los Angeles Union Station.
- Provide a sustainable reduction in travel time between Los Angeles and Palmdale.
- Provide a HST alignment that is feasible in terms of engineering challenges, construction and right-of-way constraints.
- Minimize disruptions to neighborhoods and communities along the corridor by minimizing right-of-way acquisitions, project design effects, and/or the potential for affecting community resources.
- Preserve environmental quality and protect sensitive environmental resources by reducing emissions and vehicle miles traveled for intercity trips within the Los Angeles County area, and by maximizing avoidance and minimizing impacts to sensitive environmental and natural resources along the project corridor.
- Maximize the ridership/revenue potential by providing reliable HST operation in the Los Angeles to Palmdale section of the statewide HST system.
- Minimize capital and operating costs related to construction, operations and maintenance of the Los Angeles to Palmdale section of the statewide HST system.

2.2 IDENTIFICATION OF ALTERNATIVES TO BE CARRIED FORWARD

The aim of this report is to document the evaluation process and to identify alternatives that should be carried forward through the environmental process and engineering design. Significant issues that would qualify an alternative to be carried forward for further consideration include an alternative which:

- Meets purpose and project objectives (see Section 2.1) in providing a sustainable reduction in travel time between major urban centers.
- Has no environmental or engineering issues that would make approvals infeasible.
- Is feasible or practical to construct.
- Reduces or avoids adverse environmental impacts.

2.3 HST DESIGN OBJECTIVES

To determine each alternative's ability to meet the HST Project's primary intent, the project alternatives are evaluated using system performance criteria that address design differences and qualities in the alignment and the station locations in terms of performance. These objectives and criteria are summarized in Table 2-1.

Table 2-1: Alignment and Station Performance Objectives and Criteria

Objective	Criteria
Max. Ridership/ Revenue potential	Travel Time
	Route Length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operating costs
	Capital cost

2.4 PROJECT ALTERNATIVES ANALYSIS CRITERIA

In addition to the HST Project objectives and criteria presented above, additional measures are used to evaluate and compare the project alternatives. Each of these five additional measures is discussed in more detail below.

A. Land use supports transit use and is consistent with existing, adopted local, regional and state plans, and is supported by existing or future growth areas.

Table 2-2: Land Use Criteria

Land Use		
Measurement	**Method**	**Source**
Development potential for Transit Oriented Development (TOD) within walking distance of station	Sites within 1/2- mile of station	Regional and local planning documents and land use analysis and input from local planning agencies.
Consistency with other planning efforts and adopted plans	Qualitative - general analysis of applicable planning and policy documents	Land Use Analysis. Baseline Conditions Study

B. Construction of the alternative is feasible in terms of constructability and right-of-way (ROW) constraints.

Table 2-3: Constructability Criteria

Constructability and Right of Way		
Measurement	**Method**	**Source**
Constructability, access for construction, within existing transportation ROW	Extent of feasible access to alignment for construction	Plans and maps
Acceptability of existing overbridges	Existing openings in bridges and potential for works to bridges	Plans and drawings. Survey to be carried out.
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads	Plans and maps
Disruption to and relocation of utilities	Number of utility diversions	Plans and maps

C. Minimizes disruption to neighborhoods and communities – extent to which an alternative minimizes right of way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources.

Table 2-4: Community Criteria

Minimized Disruption to Neighborhoods and Communities		
Measurement	**Method**	**Source**
Displacements	Number of residences and businesses displaced, size of properties and by magnitude of property value	Identified using concept drawings and aerial photographs
Property with Access Affected	Number of properties whose access would be permanently disrupted. Number of properties disrupted by construction.	Measured off concept plans and aerial photographs
Local Traffic Effects around Stations	Potential increase in traffic congestion or Level-of-Service at critical intersections	Existing traffic Level of Service from local jurisdictions.
Local Traffic Effects along Route	Potential increase in traffic congestion or Level-of-Service at critical intersections	Existing traffic Level of Service from local jurisdictions.
Highway grade separations and closures	Number of existing grade crossings of the proposed route.	Identified using concept drawings and aerial photographs

D. Minimize impacts to environmental resources - extent to which an alternative minimizes impacts on natural resources.

Table 2-5: Environmental Resources Criteria

Minimized Impact on Environmental Resources		
Measurement	**Method**	**Source**
Waterways and wetlands and natural preserves or biologically sensitive habitat areas affected	Number of new bridge crossings required; acres of wetlands or other special aquatic resource areas affected; and acres of common, threatened and endangered species habitats affected.	Measured off concept plans and GIS layers.
Cultural Resources	Number and type of historic architectural properties and archaeological sites directly impacted.	Based on concept plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys.
Parklands	Number of acres of wildlife refuge an parks directly and indirectly affected.	Based on concept plans and GIS layers; Section 4(f) studies
Agricultural Lands	Acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance.	Based on concept plans and GIS layers.

E. Enhances environmental quality — extent to which an alternative minimizes impacts on the natural environment.

Table 2-6: Natural Environment Criteria

Minimize Impact on Natural Environment		
Measurement	**Method**	**Source**
Noise and Vibration effects on sensitive receivers	Number of receivers with projected noise levels and vibration levels and above FRA impact threshold	Results of FRA screening level assessment. Inventory of potential receivers from site survey and aerial maps.
Change in visual/scenic resources	Number of view corridors and scenic/visual resources affected; extend of elevated structures in scenic areas	Result of general assessment. Survey of alignment corridors and planning documents.
Maximize avoidance of areas with geological and soils constraints	Soils/slope constraints Seismic constraints	USGS maps
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints	Data from records search of hazardous materials locations and generators.

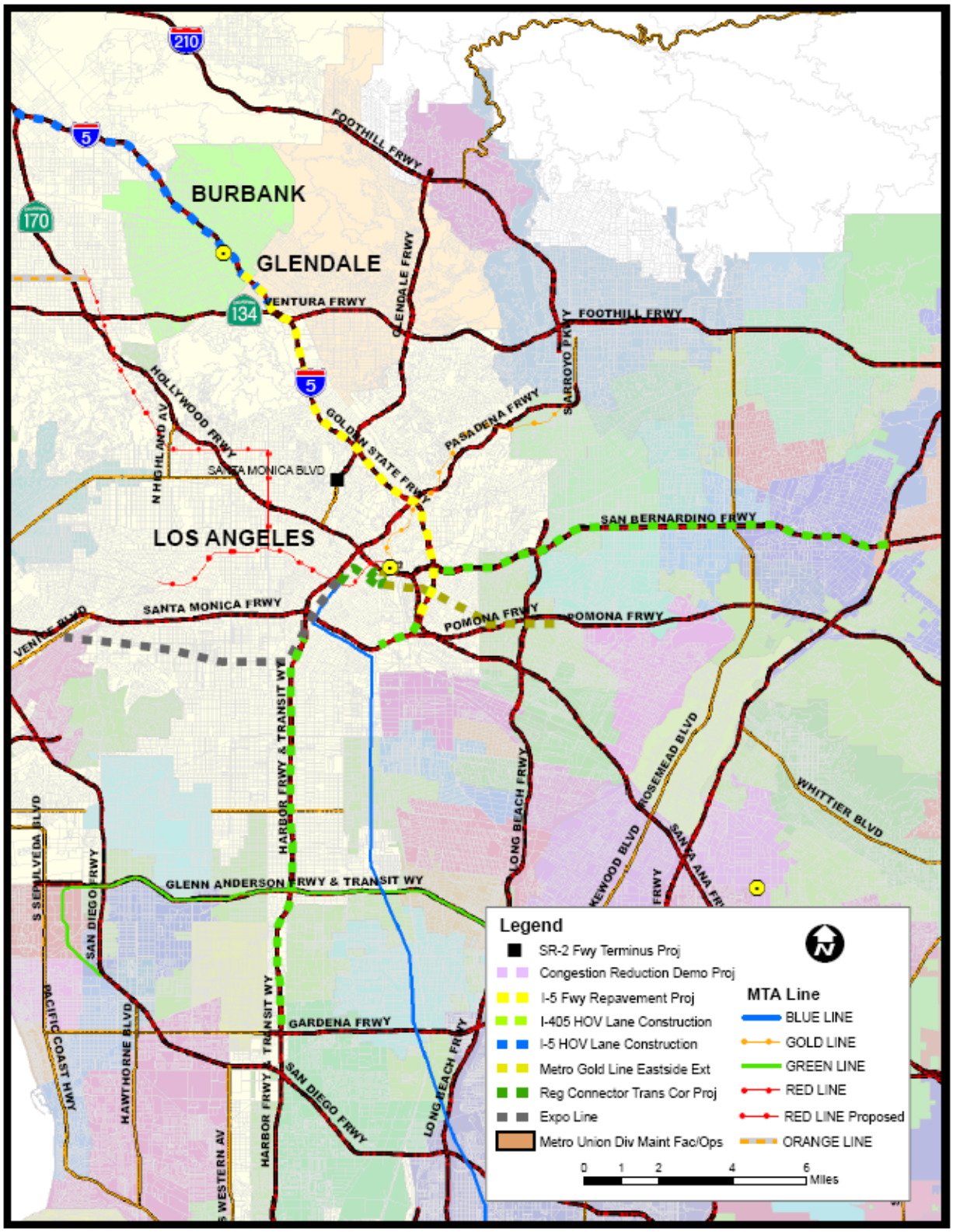
3.0 PROJECT ALTERNATIVES

The evaluation of alternatives is based on the key differentiators between alternatives. Impacts or features of critical importance that are common to all alternatives are summarized in the section below.

3.1 NO PROJECT ALTERNATIVE

The No Project Alternative represents the existing conditions of the LAUS to SR-134 HST sub-section as it exists today and as it would exist in the future without the Los Angeles to Palmdale HST Project based on future development projects and improvements to the intercity transportation system that are programmed and funded For construction. The alternative includes current and future projects within the study area, as listed by Caltrans, the Los Angeles County Metropolitan Transportation Authority (Metro), the City of Los Angeles Department of Transportation (LADOT), and in the Southern California Association of Governments (SCAG) 2008 Final Regional Transportation Plan (RTP), Major projects included in the No Project Alternative are shown in Figure 3-1 and described below.

Figure 3-1: Current and Future Projects Along the LAUS to SR-134 HST Sub-Section



Source: HMM, URS, Arup JV

3.1.1 Congestion Reduction Demonstration Project

On December 31, 2010 Metro in conjunction with Caltrans and other local transportation agencies will begin a one year demonstration project of converting High-Occupancy Vehicle (HOV) lanes to High-Occupancy Toll (HOT) lanes, also known as Express Lanes. The I-10 El Monte Busway between Alameda Street and the I-605, and the I-110 Harbor Transitway between Adams Boulevard and the Artesia Transit Center will be tolled. General purpose lanes on the I-10 and I-110 will not be tolled. Roadway improvements for this project include the re-striping of the I-10 El Monte Busway between the I-605 and the I-710 to create a second HOT lane; the widening of Adams Boulevard and the restriping of the I-110 Adams Boulevard off-ramp to create a second right-hand turning lane; and the construction of new HOT access transition lanes between the I-110 HOT lanes and the I-110 general purpose lanes to smooth the flow of traffic in and out of the HOT lanes. This project will include expansions and improvements to transit centers, and will also increase transit service and vanpools on the I-10 and I-110 ExpressLanes. See Figure 3-2 for the location of the ExpressLanes. The solid line shows the I-10 project and the dashed line the I-110 project.

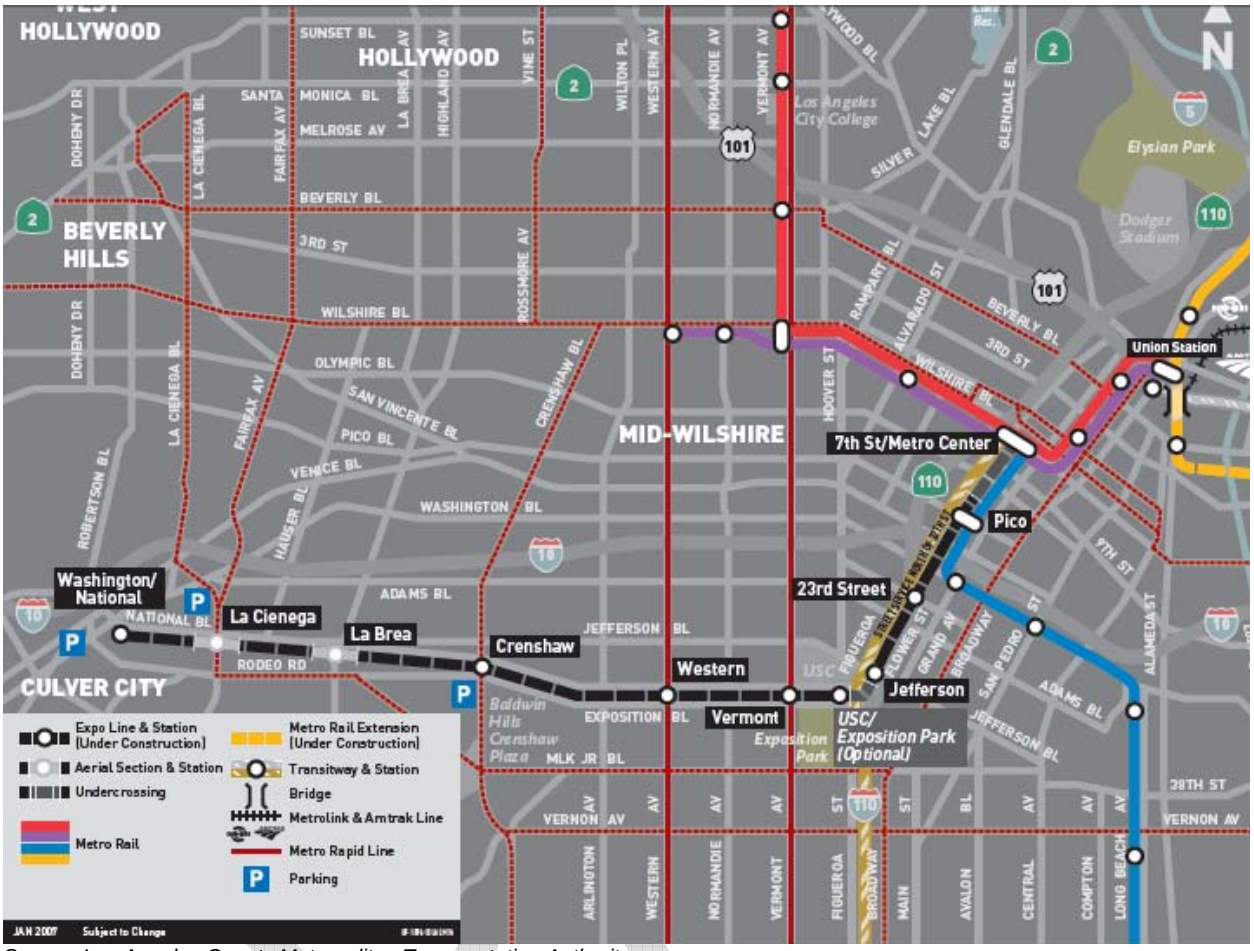
Figure 3-2: Congestion Reduction Demonstration Project

Source: Los Angeles County Metropolitan Transportation Authority

3.1.2 Exposition Light Rail Transit Line (Expo Line)

The Expo Line will travel approximately 8.6 miles along the Exposition railroad right-of-way between downtown Los Angeles and Culver City. Travel time from downtown Los Angeles to Culver City is estimated under 30 minutes, with a projected ridership of 27,000 by 2020. The Expo Line begins at the existing 7th/Metro Center station, and terminates at the Washington/National Station as shown in Figure 3-3. The alignment, which includes eight new stations and two existing stations, will be landscaped and enhanced with bike and pedestrian paths. The Expo Line is scheduled to open in 2010.

Figure 3-3: The Expo Line Alignment



Source: Los Angeles County Metropolitan Transportation Authority

3.1.3 Golden State Freeway (1-5) Repavement Project

The I-5 Repavement Project will replace damaged concrete on the I-5 within the cities of Los Angeles, Glendale, and Burbank in order to improve ride quality and reduce maintenance costs. This segment of the I-5 is adjacent to the LAUS to SR-134 sub-section and within the study area. Work performed will also include guardrail replacement. Construction of the project began in 2005 and is expected to be completed in winter 2010. Approximately 65% of grinding and slab replacement has been completed. Lane and slab work will continue on the northern portion of the project boundaries, followed by bridge work.

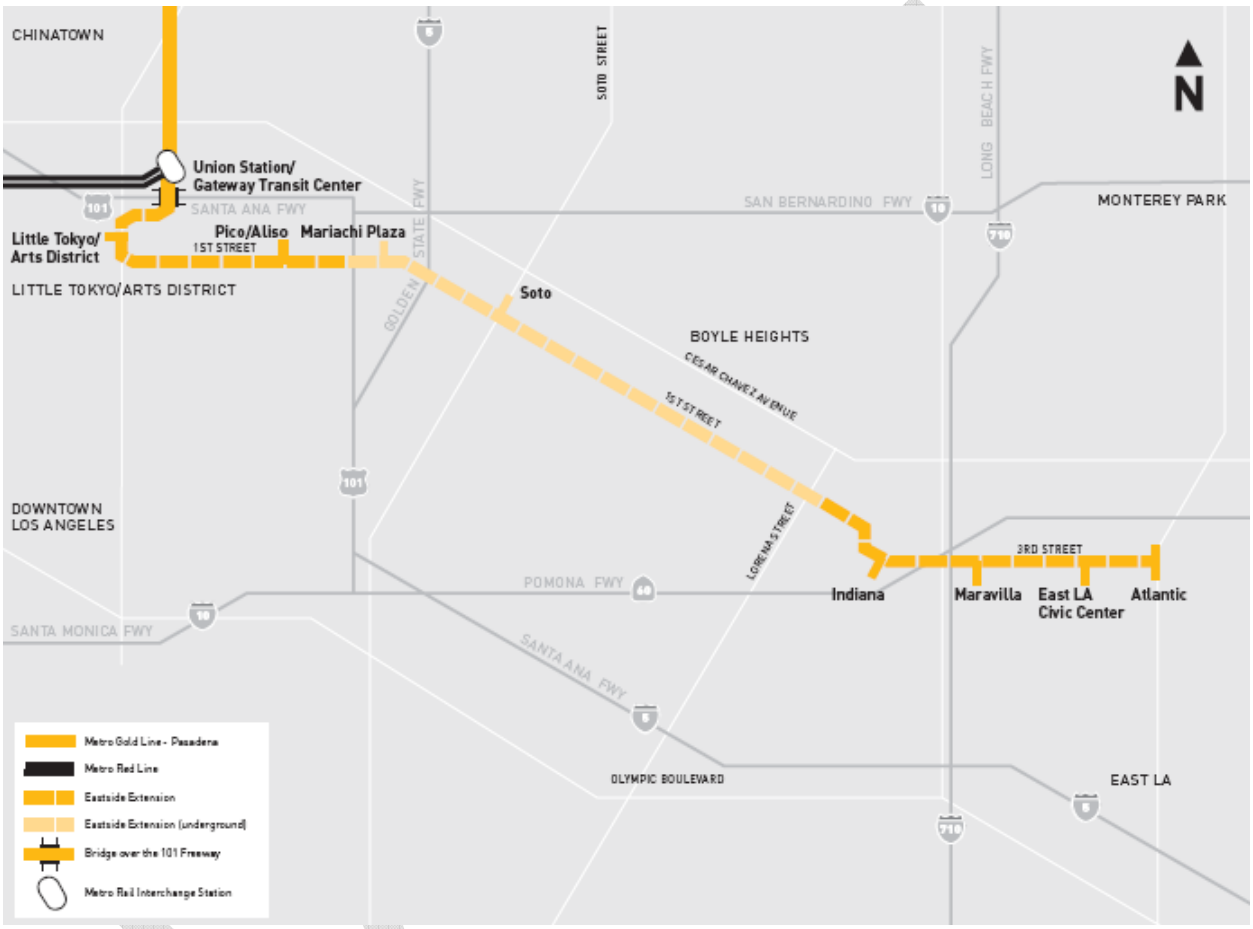
3.1.4 I-5 HOV Lane Construction

Caltrans will construct a High Occupancy Vehicle (HOV) lane in each direction of the I-5 between the City of Los Angeles and the City of Burbank to improve traffic flow and reduce congestion. Work will also include modifications to on- and off-ramps at the Burbank Boulevard interchange and realignment of a segment of the I-5. The project is located north of the LAUS to SR-134 sub-section and within the study area for the Los Angeles Palmdale Section. The HOV lanes will be constructed in four phases. Phase 1 is scheduled to begin in spring 2009 with an anticipated completion of spring 2011. Phase 2 is anticipated to begin in spring 2009 and be completed in the winter of 2012. Phase 3 will begin spring 2009 and is to be completed in 2011. Phase 4 will begin fall of 2008 and be completed in 2012.

3.1.5 Metro Gold Line Eastside Extension

The Eastside Extension will add an additional six miles of tracks to the Metro Gold Line from Union Station to the new Atlantic Station located south of the East LA Community College campus, as shown in Figure 3-3. A total of eight new stations, including two underground stations, will be added to the Gold Line. Twin tunnels approximately 1.8 miles long will be constructed under Boyle Heights. As shown in Figure 3-4, the Eastside Extension from Union Station to Atlantic Station is estimated at approximately 17 minutes. Construction of the Eastside Extension began in 2004 and is expected to open in late 2009.

Figure 3-4: Metro Gold Line Eastside Extension



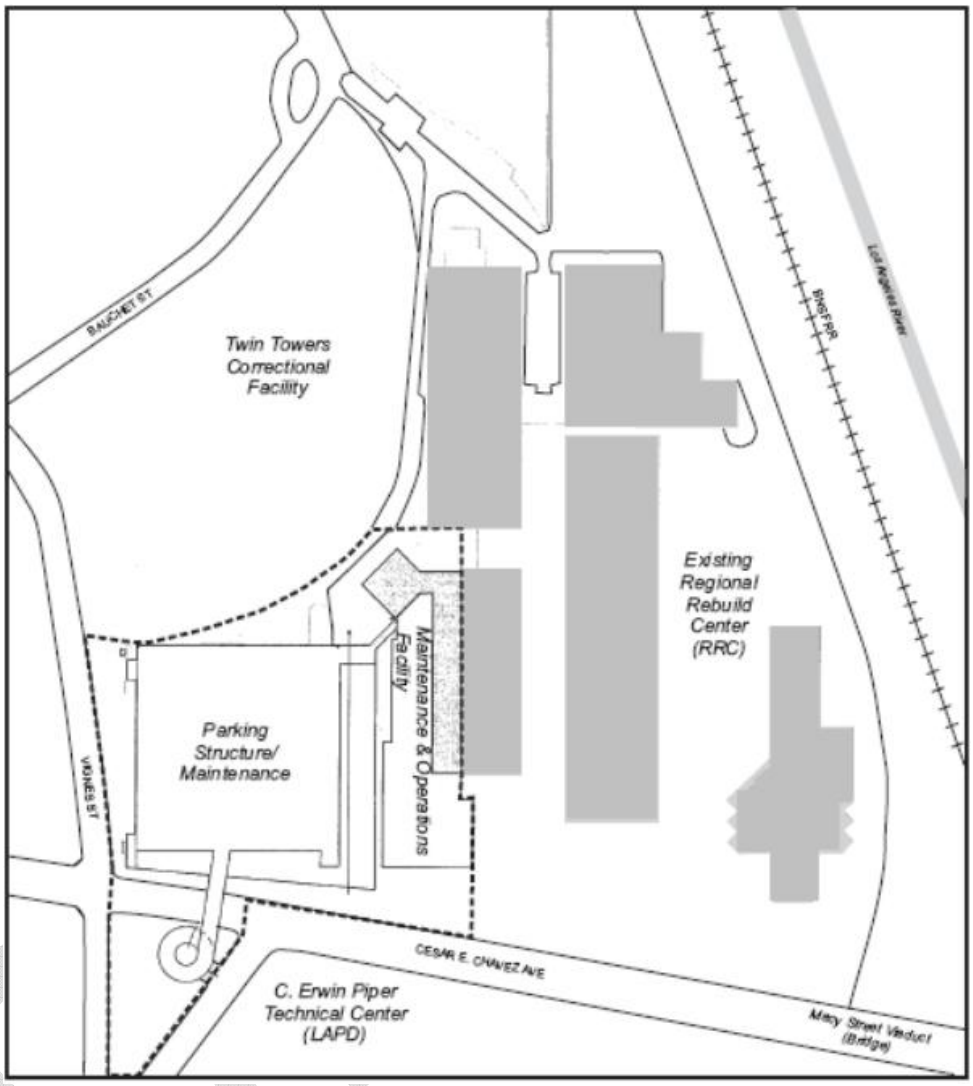
Source: Los Angeles County Metropolitan Transportation Authority

3.1.6 Metro Union Division Bus Maintenance and Operations Facility

The proposed 7.5-acre Metro Union Division Bus Maintenance and Operations Facility project site is located on the northeast and southeast corners of the intersection of Vignes Street and Cesar E. Chavez Avenue, less than a quarter mile northeast of the Union Station. As shown in Figure 3-5, the project would consist of a three-story parking structure and a two-story bus maintenance/office building. A public vehicle access Compressed Natural Gas (CNG) facility would be located adjacent to the parking structure along Cesar E. Chavez Avenue. A maximum of 200 CNG standard buses would be accommodated by the proposed project. Standard buses are typically 35 to 42 feet (ft) in length with a passenger capacity of 45. Ultimately, the proposed project may also accommodate 60-foot long articulated buses. The buses maintained and stored at the proposed Metro Union Division Bus Maintenance and Operations Facility

would likely be transferred from the existing Division 2 bus maintenance facility, which is located at 720 East 15th Street, approximately 2¼ miles southwest of the project site.

Figure 3-5: Metro Union Division Bus Maintenance and Operations Facility

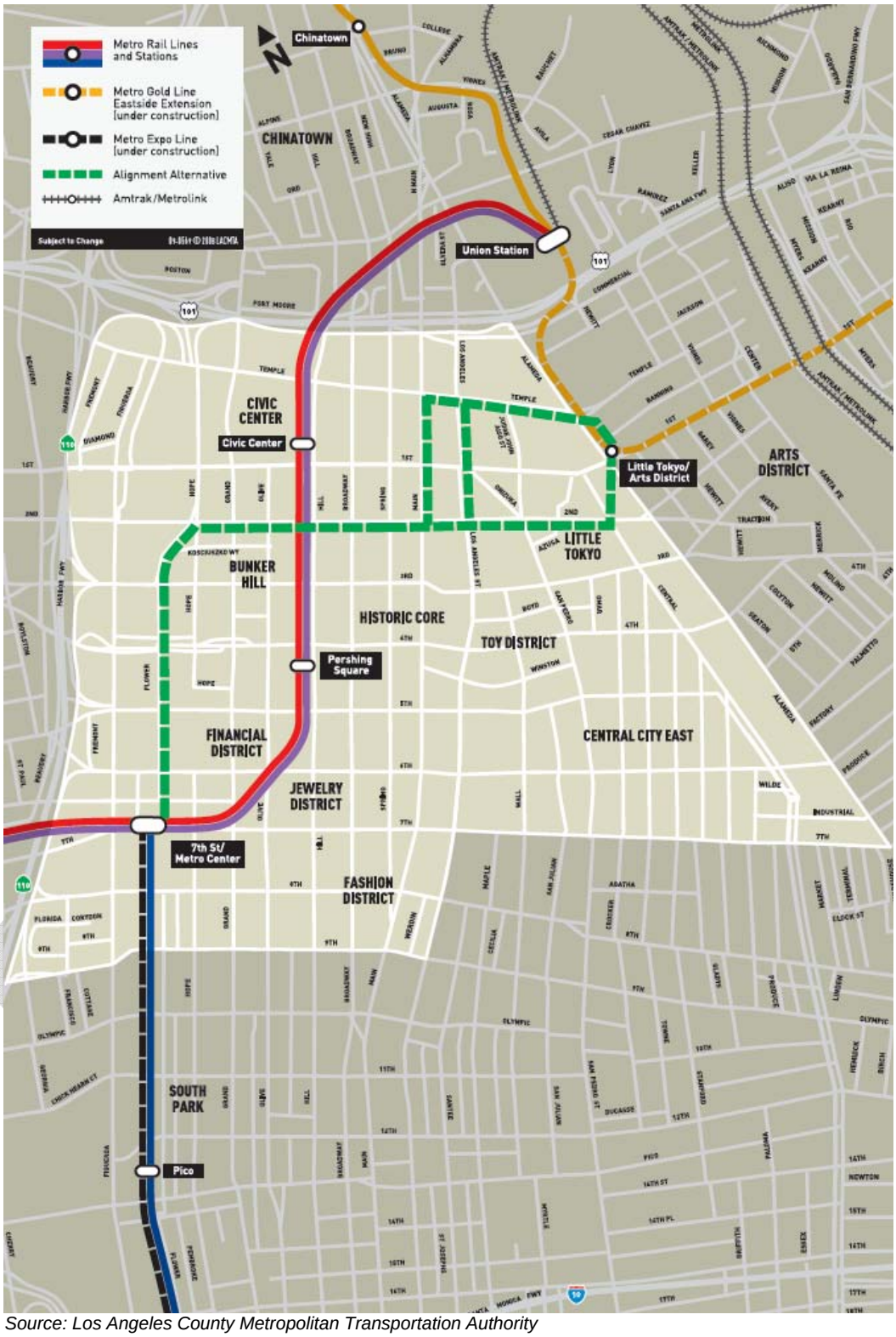


Source: Los Angeles County Metropolitan Transportation Authority

3.1.7 Regional Connector Transit Corridor Project

The Metro is conducting an environmental review of the Regional Connector Transit Corridor, which would create an approximately two-mile transit link between the Gold Line and Blue Line light rail transit (LRT) systems through downtown Los Angeles. As shown in Figure 3-6, the Regional Connector LRT extension would provide a continuous trip between the Pasadena Gold Line and Blue Line and between the Eastside Gold Line and Expo Gold Line, as well as serving several new downtown stations and allowing through-service between the regional LRT lines. The Regional Connector is expected to improve access to both local and regional destinations, and will enable all LA County rail and bus transit, as well as all intercity transit service to operate more efficiently.

Figure 3-6: Regional Connector Transit Corridor



Source: Los Angeles County Metropolitan Transportation Authority

3.1.8 State Route 2 (SR-2) Freeway Terminus Improvement

The Metro, in cooperation with LADOT and Caltrans, is in the process of completing a Draft Initial Study/Environmental Assessment (IS/EA) for SR-2 Freeway Terminus Improvement project. The SR-2 terminus is located within the LAUS to SR-134 study area near Glendale Boulevard and Duane Street. The project aims to improve traffic flow and reduce congestion at the SR-2 terminus, to provide pedestrian enhancement at the terminus, and to ensure compatibility with existing residential and commercial uses. Six potential alternatives were selected and each alternative considered is analyzed in the draft ES/EA. Alternatives include widening existing ramps, realigning ramps with variations to full or partial retention of the bridge and flyover, and realigning ramps and removing bridge and flyover.

3.2 RELATED STUDIES

3.2.1 SCRRA Strategic Assessment Review

The Southern Californian Regional Rail Authority (SCRRA) is a joint powers authority responsible for the design, construction and administration of passenger rail services on behalf of Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties. The SCRRA operate passenger rail services under the Metrolink brand.

In January 2007, the SCRRA produce a Strategic Assessment which details current ridership and service levels, assesses likely future demand and proposes increases in train service provision to cater for this demand. The primary subjects of the assessment are patronage and financial.

The Strategic Assessment outlines ways in which Metrolink ridership could be trebled by 2030 and recommends that significant increases in train service frequency and capacity are taken forward.

A summary of the assessment is provided in the *SCRRA Strategic Assessment Review* Technical Memo produced in January 2009. The key finding is that an allowance for two Metrolink tracks should be provided from LAUS to Sylmar to allow Metrolink to add passing sidings as train service frequency increases.

Funding to implement the SCRRA proposals is currently very limited and generally allows the completion of minor projects such of grade separation of existing grade crossings.

3.3 PROGRAM-LEVEL ALTERNATIVES

3.3.1 Statewide Program EIR/EIS Alternatives

The statewide Program EIR/EIS for the CAHST was completed in November 2005. The Authority and FRA selected the technology for the HST system and identified potential route and station location options through the program environmental analysis. For a more detailed examination of these issues, refer to the *California High-Speed Train Final Program EIR/EIS*.

The Program EIR/EIS examined three major system alternatives for the statewide transportation network. They were:

- **No Project Alternative** – The State's transportation network as it is today, along with funded projects included in regional transportation plans.
- **Modal Alternative** – Enhancements to the State's transportation network using existing modes and technologies (mainly expanded airports and highways).
- **High-Speed Train Alternative** – A new high-speed train system to connect California's major urban centers.

The HST Alternative was selected based on the Program EIR/EIS. The No Project Alternative was not able to provide the needed level of intercity mobility in the future, while the Modal Alternative provided reduced mobility compared to the HST Alternative. In addition, the Modal Alternative would have a higher cost than the HST Alternative, and more significant environmental impacts.

3.3.2 Los Angeles Union Station (LAUS) to SR -134 Routing and Station Alternatives

The following are the HST alternative corridor options that were considered and rejected in the Program EIR/EIS:

- Los Angeles International Airport (LAX) as Los Angeles Terminus Station: Southern terminus at LAX failed to meet the purpose and need and basic project objectives because it forecasted to result in low ridership and revenues and would not accommodate extensions to San Diego, Orange County, or Inland Empire (Riverside and San Bernardino Counties). It also would require high capital and operating and maintenance costs. Ridership for the LAUS option would be more than 1 million passengers a year greater than the LAX terminus option.
- Coastal Corridor (San Jose to Los Angeles): The coastal corridor has the least potential for HST service at maximum speeds exceeding 150 mph (240 kph). Coastal corridor travel times between Los Angeles and the San Francisco Bay Area would be considerably longer than either the SR-99 or I-5 corridors considered due to challenging and sensitive geography which would result in a longer route.

The following are the corridor alignments and station options considered and eliminated from further consideration in the Program EIR/EIS:

- I-5 Freeway: This alignment would extend southeast generally following I-5 from Sylmar to the area of LAUS. This alignment would have severe impacts on social and economic resources (established housing, businesses), and would be incompatible with the existing development and would involve substantial right-of-way and property acquisition, tunneling, and considerable use of aerial structures to pass over existing overpasses and connector ramps and would therefore be impracticable. These aerial structures would also result in visual impacts. Further, it would impact parklands because it would pass on an aerial structure through several parks.
- LAUS (LAUS South-Stub Configuration): This station would have severe operational impacts because it would not allow for through services other than for LAX to Inland Empire or San Diego connections. Further, its proposed location is considered sensitive for cultural and historical resources.
- LAUS (Los Angeles River West): This station site located north and east of LAUS would displace an existing MTA bus yard being considered as a maintenance yard site for the Eastside LRT extension, which would result in high right-of-way constraints and would be incompatible with the existing and planned development.
- LAUS (Cornfield Site): This station site located north of LAUS does not meet project objectives because it would have low connectivity and slow approach speeds and is located on a site that has been proposed for park development and is included in the Los Angeles River Greenbelt planning effort.

The corridor alignments and station options were evaluated in the Program EIS/EIR for the LAUS to SR -134 subsection are:

- MTA/Metrolink: This alignment would extend northwest generally following the MTA/Metrolink alignment between SR 134 and the LAUS area.

- Combined I-5/Metrolink: This alignment would extend southeast following the Metrolink alignment would generally follow I-5 to a tunnel under Elysian Park to the LAUS area. Station options in the LAUS area would include the existing LAUS and LAUS South Through.
- LAUS (LAUS South Through): This potential station site would provide connections for the UPRR/El Monte alignment to Inland Empire and would connect to the LOSSAN and LAX corridor regions.
- LAUS (Los Angeles River East): This potential station site would serve the MTA/Metrolink alignment, be compatible with existing/planned development, have lower capital costs than some other potential station sites, and connect with the LOSSAN corridor region.

The Program EIR/EIS analysis found that widespread use of shared-use track for the HST system failed to meet the project purpose, objectives, and performance criteria. Such shared-use track was only considered reasonable for service to the urban centers on shared tracks with other passenger rail services in limited sections of the HST system. The Program EIR/EIS concluded that a predominatly dedicated HST system was feasible and practicable.

3.3.3 Preferred Program-Level Corridor Alignment and Station Location

The Authority and FRA selected the MTA/Metrolink as the preferred option for HST service between SR -134 and Los Angeles (Figure 1-1). Between SR -134 and Los Angeles Union Station, the MTA/Metrolink refers to a relatively wide corridor within which alignment variations will be studied at the project level. It was selected because it would have less potential for environmental impact, and would have less constructability issues than the Combined I-5/Metrolink alignment option and have fewer potential impacts to local and regional parks.

During the project-level environmental review for the SR 134 to LAUS subsection, the Authority has and will continue to work closely with the potentially affected communities to avoid, reduce, and/or include feasible measures to mitigate potential impacts to local communities.

The existing LAUS is the preferred HST station location option to serve Los Angeles. The LAUS HST station would be an elevated structure constructed over the current Metrolink and Amtrak tracks. LAUS is the transit/rail transportation hub of southern California and would have the highest connectivity and accessibility for serving the Los Angeles metropolitan area. LAUS is the primary destination for the Metrolink Commuter rail services, the Los Angeles Metro Red Line, the Pasadena Gold Line, the Amtrak Surfliner service, and the regional bus transit services. The existing LAUS option would avoid and minimize potential impacts on the environment. This option is the preferred by the City of Los Angeles Department of Transportation and the LOSSAN Rail Corridor Agency.

As part of the project EIR/EIS the Authority has identified feasible and practicable alignment variations less damaging to parklands, water, and biological resources as well having less community impacts, to evaluate during the project-level environmental review. The Authority will continue to work with local, state, and federal agencies as well as the public (including local neighborhoods) in carrying out engineering and environmental studies.

3.4 Development of Project Alternatives

3.4.1 Initial Development of Alternatives

Alignment alternatives were initially developed to serve the three LAUS locations identified through the Anaheim to LA Project EIR//EIS:

- above ground station location option originating above the existing LAUS station,

- below ground station location option originating below the existing LAUS station and
- below ground station location option originating from a site between the existing LAUS and the LA River currently occupied by the City of Los Angeles C. Erwin Piper Technical Center (known as the PiperTech location).

With the preparation of the Los Angeles River Revitalization Master Plan (LARRMP), the process of identifying alignments was initiated based on commitments outlined in the Program EIR/EIS. The LARRMP was developed by the City of Los Angeles Ad Hoc River Committee with the goal of exploring and developing opportunities to transform the river as we know it today into a vibrant greenway that connects and enhances the greater Los Angeles communities. It was recognized by the Authority that alternatives heading north of LAUS through this highly urbanized areas would require close consideration of the LARRMP to identify alternatives that included feasible measures to avoid or minimize potential impacts to local communities and proposed re-development along the Los Angeles River.

Working closely with public agencies, community groups, elected officials, and representative of local communities, the Authority developed alignment alternatives leaving LAUS heading north to the SR-134. These alternatives are discussed further in Section 3.6

A study objective was that alternatives should be compatible with future redevelopment along the Los Angeles River. The LARRMP acknowledged the presence of rail operations within the redevelopment area and the presence of high-speed rail, without defining how they would coexist or what improvement would be necessary to permit rail operations.

In addition to the development of alignment alternative options heading north from LAUS, a concurrent study was carried out by the Authority's Los Angeles-Anaheim Section team to evaluate the feasibility of the three station options at or near Union Station. This work is described in the next section.

3.5 Los Angeles Union Station Alternatives Analysis Study

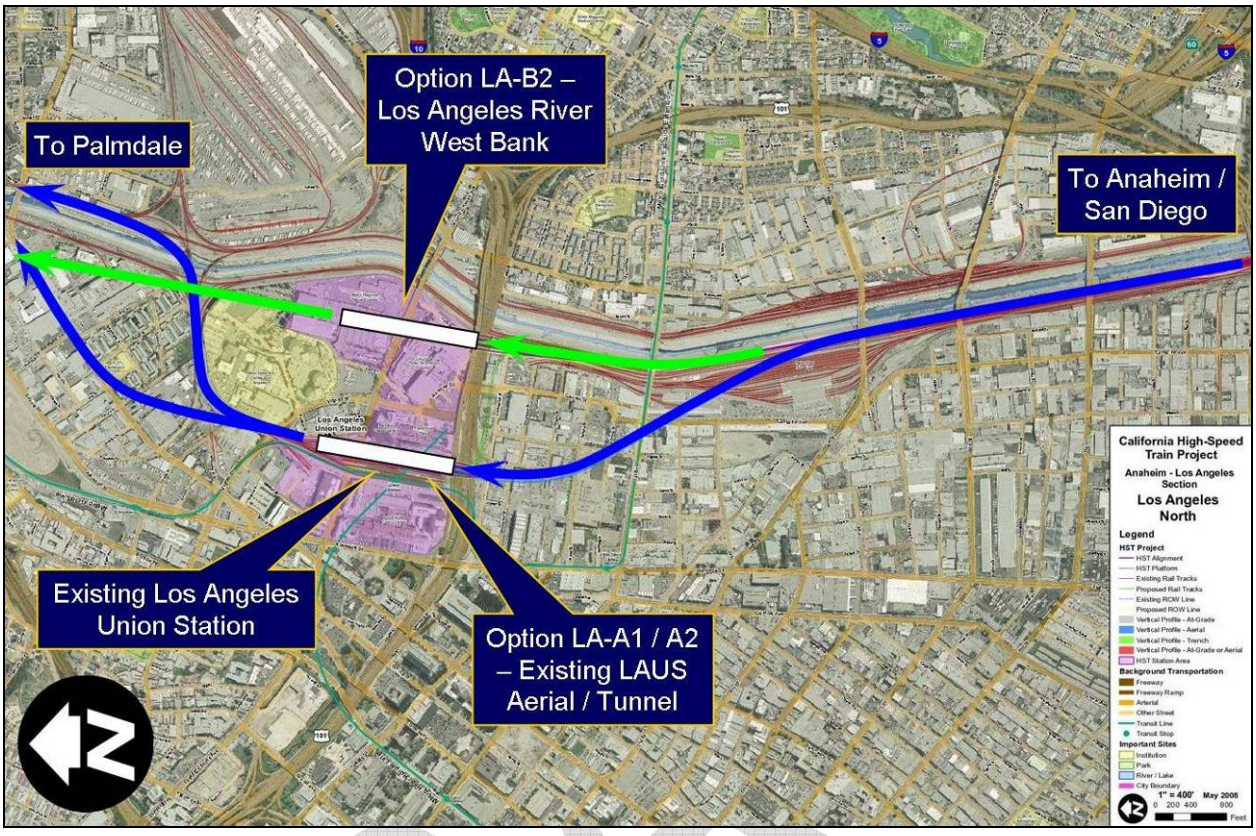
The Authority prepared an assessment of the possible locations for a HST station in Los Angeles in the *Anaheim to Los Angeles Project EIR/EIS Alternatives Analysis Report (April 2009).* Please note that station locations referred to in this section as LA-A1 and LA-A2 are called the LAUS station locations in the rest of the report. The station referred to as LA-B2 or the West Bank location in this section is generally referred to as the PiperTech station location.

3.5.1 Introduction

Los Angeles Union Station (LAUS) currently serves as the transportation hub for the Los Angeles region, serving Amtrak intercity trains, Metrolink commuter trains, Metro Red and Purple Line subway trains, Metro Gold Line light rail trains, and a variety of local and regional bus services. Union Station will serve as the northern terminus of the Anaheim to Los Angeles HST Section, with connections to the north and east provided by other sections of the statewide HST system.

The HST alignment does not follow the existing Los Angeles to San Diego (LOSSAN) Passenger Rail Corridor into Union Station, as it includes many low-speed curves and loops into the station from the north. Instead, the project diverges from the existing LOSSAN corridor along the Los Angeles River to follow a new alignment into Union Station from the south. The neighborhood south of Union Station has undergone significant redevelopment in the years since the program-level environmental analysis was completed and presents many constraints. An overview of the Los Angeles Union Station is shown in Figure 3-7.

Figure 3-7: Los Angeles Union Station Area – Overview



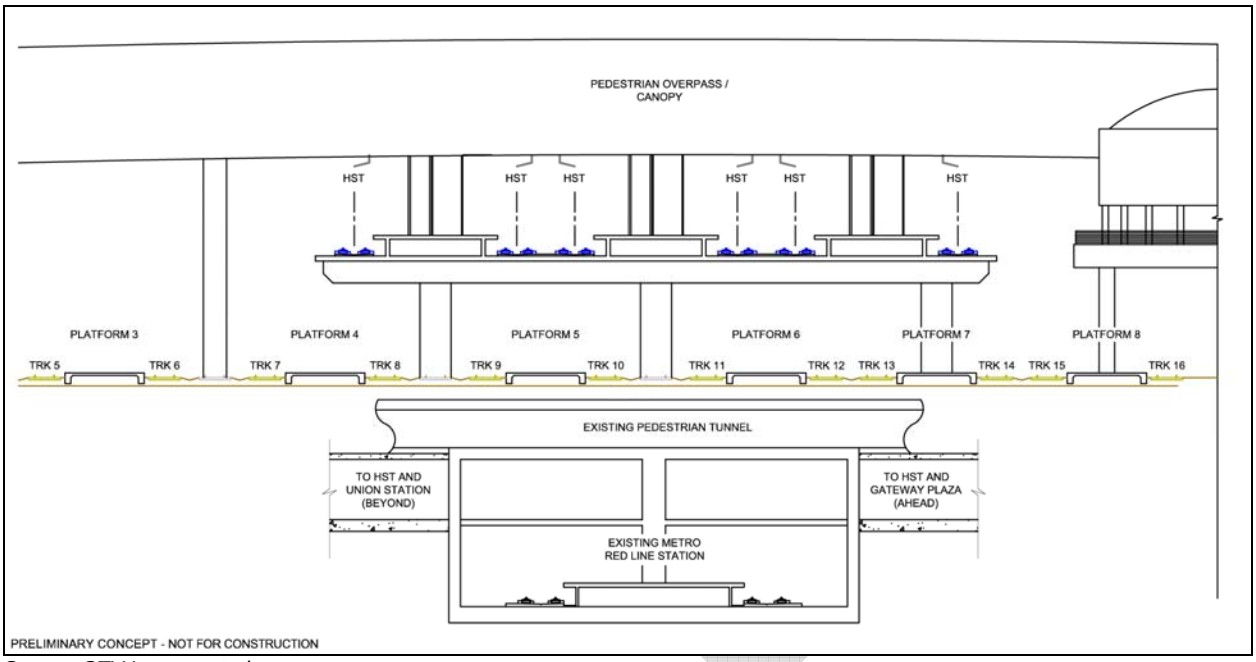
Source: AE LLC, STV Incorporated

Three options are examined in the following subsections. For further detail on Los Angeles Union Station issues, see the Los Angeles Union Station HST Station Option Evaluation Technical Memorandum.

3.5.2 Aerial HST Station above Existing LAUS

LAUS Option A1, the station location selected for Los Angeles Union Station in the Program EIR/EIS, is located approximately 30 ft above the existing station tracks at Union Station. The station includes 6 tracks and three platforms, and connects to the other amenities at LAUS. A typical cross-section for the station (including a conceptual station canopy) is shown in Figure 3-8.

Figure 3-8: Typical Cross-Section – Aerial HST Station above Existing LAUS

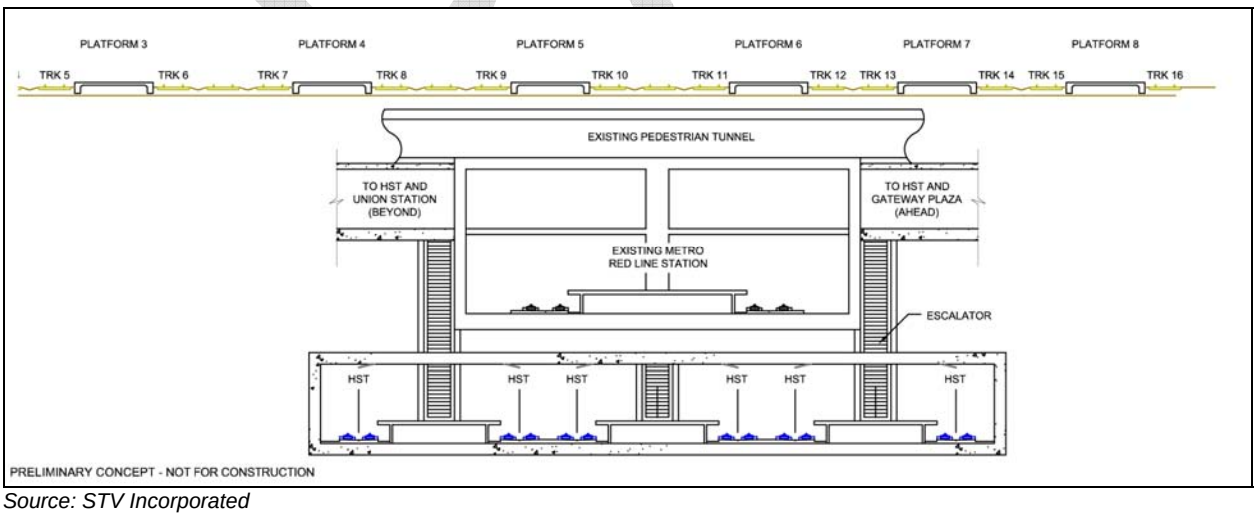


Source: STV Incorporated

3.5.3 Deep Tunnel HST Station below Existing LAUS

Given the potential impacts of the aerial Union Station option and its approaches, an underground option has also been examined. This option locates the HST tracks and platforms in a deep tunnel configuration underneath the existing Union Station and Metro Red / Purple Line subway station. A typical cross-section for this configuration is shown in Figure 3-9.

Figure 3-9: Typical Cross-Section – Deep Tunnel HST Station below Existing LAUS



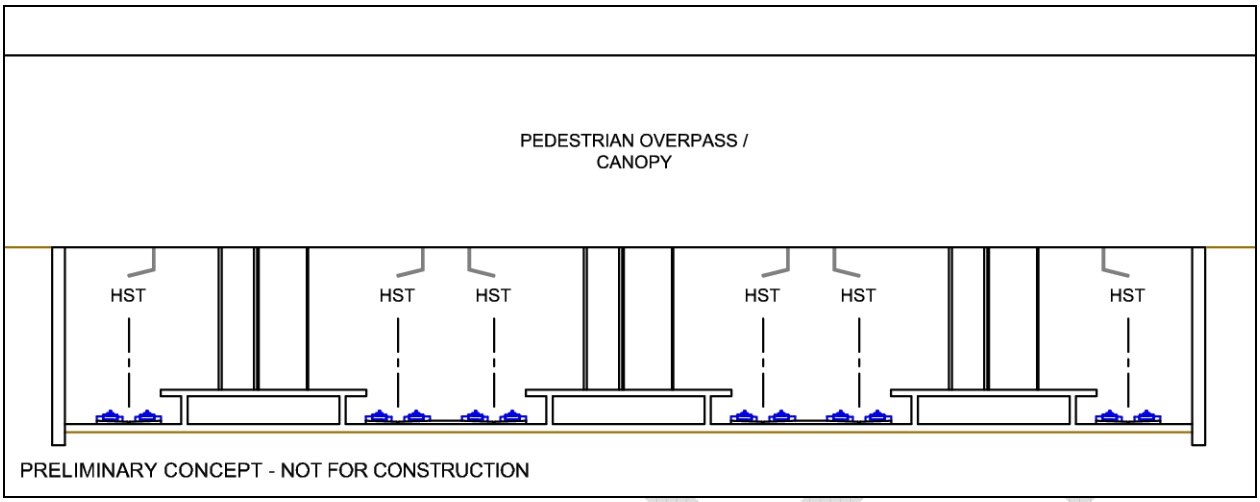
Source: STV Incorporated

3.5.4 Shallow Trench HST Station on LA River West Bank

A HST station alternative on the West Bank of the Los Angeles River could be built very close to ground level, likely a cut-and-cover / trench station slightly below grade. Station amenities would be located in a new structure on the site of the City of Los Angeles' C. Erwin Piper Technology Center (PiperTech) and

Metro's Regional Rebuild Center (RRC) site. A typical cross-section of the station (including a conceptual station canopy) is shown in Figure 3-10.

Figure 3-10: Typical Cross-Section – LA River West Bank Station



Source: STV Incorporated

3.5.5 Evaluation Table – Los Angeles Station Options

Evaluation Measure	Aerial Station above Existing LAUS	Deep Tunnel Station below Existing LAUS	LA River West Bank Station
Ridership / Revenue Potential	No difference between options.		
Intermodal Connections	Amtrak / Metrolink / Gold Line tracks will be one level directly below HST platforms (at-grade). Metro Red / Purple Line will be two-levels down (below-grade). Issues are mainly related to vertical circulation (escalators, elevators, etc).	Metro Red Line will be one level above; Amtrak / Metrolink / Metro Gold Line will be two (2) levels above. Circulation issues will mainly be vertical (escalators, elevators, etc).	Union Station connections to other lines are approximately 1,200 to 1,700 ft from the HST station. Vertical circulation elements may traverse part of this distance. Moving walkways / people mover may be needed.
Capital Costs	Approx. $590 million	Approx. $2,366 million	Approx. $506 million
Operating Costs	Operating costs comparable to West Bank option, less than Deep Tunnel option.	Highest operating costs to run tunnel equipment.	Operating costs comparable to Aerial option, less than Deep Tunnel option.
Operations Issues	Construction above active railroad tracks will require significant coordination with Metrolink / Amtrak during construction period.	No operations issues foreseen.	Will require construction beside / below existing Metrolink / Amtrak tracks along LA River.
Station Area Development Potential / Consistency with Other Planning Efforts	Existing Union Station and Alameda District Plans identify joint development opportunities around Union Station property.		ROW takes may create coordinated development opportunities, including large parcel that the PiperTech building currently occupies and the area between LAUS and the proposed West Bank station.

Evaluation Measure	Aerial Station above Existing LAUS	Deep Tunnel Station below Existing LAUS	LA River West Bank Station
Constructability	A HST station could be built above active station tracks, where knockouts above ground level could accommodate tracks and platforms; Approach options will need significant demolition of existing structures and cross many streets; transport of materials, hazardous materials.	A large mining shaft would have to be located close to Union Station in order to remove subterranean material and soil and reach a depth (100 ft) to construct a HST station, pedestrian tunnel and vertical circulation facilities. A potential mitigation strategy would involve the disposal of excavated materials via long haul to some distant disposal location to be determined. In addition, the mine shaft would have to be dropped in close proximity to a location with sufficient space to stockpile soil and materials excavated during intensive mining and construction operations. Given the dense built environment around Union Station, there is no obvious place where mining operations of this scale will not result in local impacts to traffic circulation and access to Metro property bounded by Cesar Chavez, Alameda, Vignes and the 101 freeway. Additionally, the horizontal width required for a dome to accommodate new platforms, portals, six tracks, three platforms, underground station, vertical access to feed down to the new platforms, new utilities, and connection to existing passage way leading to union station is extensive. It may not be feasible to construct a substructure (including all foundation structures as drilled shaft, excavation, backfilling, support of excavation, footing, columns) that adequately supports the underground Red Line station above the platforms.	The alternative will require railroad coordination and property takes at PiperTech and RRC sites, but otherwise isolated from surrounding communities; constructability of a trenched HST station is not expected to result in significant community disruption.
Displacements / Property Access Impacts	Construction and operation of a HST Station can be accommodated on existing Union Station property. The approaches will need significant ROW to allow for the construction of the HST tracks, with extensive displacement of existing uses and the potential for access issues at other existing properties. Just south of First St. the HST aerial structure would veer northwest and then turn to the north, and would require the take of approximately five industrial / commercial buildings and other vacant properties.	A below-grade HST Station can be constructed under the existing station with minimal additional ROW needed for both the station and the approaches. Underground ROW easements would be required for the approaches. Property takes would be required for the portal and the staging area.	A full take of the City of Los Angeles' PiperTech property would be required and the relocation of Metro's RRC. Metro is also in construction on the Union Bus Division at the south end of the RRC property just north of Cesar Chavez Avenue. The alignment north of a West Bank HST Station also may result in a partial take of the Los Angeles County Detention Center.
Station Area Traffic Impacts	The HST Station would introduce large numbers of new vehicle trips within the LAUS area at the parking structure.		
Waterways / Sensitive Habitat Areas	The HST Station and approaches would be elevated above the LA River floodplain. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches would be located below flood level of LA River, flooding risks would be avoided by flood-proofing techniques designed to protect ventilation and portal structures. There are no sensitive habitat areas within the LAUS area.	The HST Station and approaches are located adjacent to LA River and possibly below the existing river bottom, which would require additional flood-proofing during construction and operation phases. There are no sensitive habitat areas within the LAUS area.

Evaluation Measure	Aerial Station above Existing LAUS	Deep Tunnel Station below Existing LAUS	LA River West Bank Station
Cultural Resources	An aerial HST Station at LAUS and would have an aerial structure above the Los Angeles River historical bridges would have a potential significant impact to the bridges and to LAUS itself.	An underground HST Station and approaches would have a potential to affect buried archaeological resources in a culturally sensitive area.	A HST Station at the West Bank location would have a potential significant impact to the historical bridges south of the station.
Parklands	The crossing of the LA River could have an effect on the LA River Revitalization Plan.	The HST Station and approaches would be underground and not affect any City parks.	Locating the HST Station on the West Bank of the LA River would have a potential affect on the LA River Park. Locating the HST Station next to the LA River could provide for a new gateway and development opportunities near these areas of the LA River.
Agricultural Lands	There are no agricultural lands within this area that would be affected.		
Noise / Vibration	The HST aerial structure would pass through an industrial / commercial area immediately south of LAUS. Uses that abut on the ROW would be exposed to noise and vibration affects during construction and operation.	During construction there would noise and vibration effects in the area of the portal and the staging area. Once the HST tracks are underground and at the underground station there would be no noise impacts. There would be the potential for vibration affects to the uses located above the tunnel during construction and operation.	The construction and operation of a HST Station along the west bank of the Los Angeles River would have a small potential for noise and vibration affects to the surrounding industrial uses.
Visual / Scenic Resources	The aerial station and its elevated approaches are highly visible within surrounding communities. There are industrial and commercial uses close to the aerial ROW and they would have a direct view of the aerial structures. There are also residential uses located to the southwest and north of the ROW that would have a direct line of sight of the aerial structure and station.	An underground HST Station and approaches would not be visible and there is no potential for impacts to visual or scenic resources.	A West Bank HST Station would be a new aesthetic presence along the LA River. There are mainly industrial / commercial uses adjacent to the area, and there is little potential for impacts to visual / scenic resources.
Geologic / Soil Constraints	There are no known geologic or soils constraints within the area of LAUS.	While there are no known geologic or soils constraints within the area of LAUS, digging a tunnel can encounter potential problems.	There are no known geologic or soils constraints within the area of LAUS.
Hazardous Materials	There is a potential that underground contamination from the industrial uses within the LAUS area that could impact construction of aerial Station and HST tracks.	There is a potential that underground contamination from the industrial uses within the LAUS area that could impact construction of an underground station and HST tracks.	There is a potential that underground contamination from the industrial uses within the LAUS area that could impact construction of the station or the HST tracks.

3.5.6 LAUS Location Conclusions

3.5.6.1 Aerial Station above Existing LAUS

An aerial HST alignment to an elevated HST station will result in some noise/vibration issues and some community impacts. However, locating a HST station above the existing Union Station best meets pedestrian accessibility and circulation between HST and connecting Metrolink, Amtrak, Red Line, Gold Line and local fixed route bus service. This option provides equal pedestrian access to the underground option, but at significantly lower cost and less burdensome constructability overall. However, this option does trigger Section 106 and 4(f) and right-of-way issues between Union Station and I-5 heading north of Union Station.

3.5.6.2 Deep Tunnel Station below Existing LAUS

Construction of an underground HST station would be costly and extremely difficult. A large mining shaft would have to be located close to Union Station in order to remove subterranean material and soil and reach a depth (100 ft) to construct a HST station, pedestrian tunnel and vertical circulation facilities.

Building a temporary support structure underneath the Red Line box that can allow for ongoing operation of all existing rail lines without affecting existing underground structures – all while allowing access to construct the HST station – is extremely challenging from a constructability standpoint.

In addition, the mine shaft would have to be dropped in close proximity to a location with sufficient space to stockpile soil and materials excavated during intensive mining and construction operations. Given the dense built environment around Union Station, there is no obvious place where mining operations of this scale will not result in significant local impacts to traffic circulation and access to Metro property bounded by Cesar Chavez Avenue, Alameda Street, Vignes Street and the 101 Freeway.

Given its major constructability issues, the Deep Tunnel option is not practicable or feasible and will not be carried further.

3.5.6.3 LA River West Bank Station

Metro's Regional Rebuild Center (RRC) is the main heavy maintenance and rehabilitation facility for Metro's 2,600 bus fleet, and the City of Los Angeles' PiperTech building is the largest general services facility in the United States, housing over 20 individual city departments. The displacement impacts to these facilities associated with the West Bank HST station option are substantial and would represent significant disruption and relocation of city services. Metro is constructing a new bus division (Union Bus Division) on the southwest corner of Cesar E. Chavez Avenue and Vignes Street. Given Metro's plan for this area, it is expected that a West Bank HST station option that results in condemnation of the RRC and partial take of the Union Bus Division (currently under construction) would be disruptive to Metro's operations and future plans for expanded service. The LA River West Bank Station does not provide direct interconnectivity to other modes of transportation including Metro Red Line and Metrolink.

A station on the West Bank is not practicable because of the significant impacts to Metro and City of Los Angeles services and substantial costs for ROW acquisition and relocation. This alternative will not be carried forward.

3.5.7 Union Station Options Eliminated / Carried Forward

Options to be eliminated from further consideration:

- Deep Tunnel Station below Existing LAUS
- LA River West Bank Station

Options to be carried forward:

- Aerial Station above Existing LAUS

As described below, alignment alternatives were initially developed from all three Union Station location options, but eventually only the alternatives running from an elevated station above the existing Metrolink Los Angeles Union Station are analyzed in this report.

3.6 LAUS TO SR-134 PROJECT ALTERNATIVES

The corridor alignment selected by the Authority and FRA with the Statewide Program EIR/EIS was the starting point for the identification of project alignment alternatives for this sub-section of the HST system. This corridor was defined as a relatively broad corridor (Figure 1-1) connecting LAUS to the HST station located near the existing Burbank Metrolink Station. The broad corridor includes a mixture of transportation corridors, commercial and industrial uses, parks and residential communities in a highly urbanized setting. The development of alignment alternatives through the corridor considered the reasonableness and practicality of reaching the elevated LAUS station being carried forward for consideration while following existing rights-of-way wherever possible while minimizing impacts to

surrounding communities and land use constraints, and planned developments. The Program-Level Alternative along the MTA/Metrolink corridor provided the greatest opportunity to develop alignment alternatives that met these objectives while meeting the project purpose, needs and objectives.

The LAUS to SR-134 subsection was split into three parts to conduct this study:

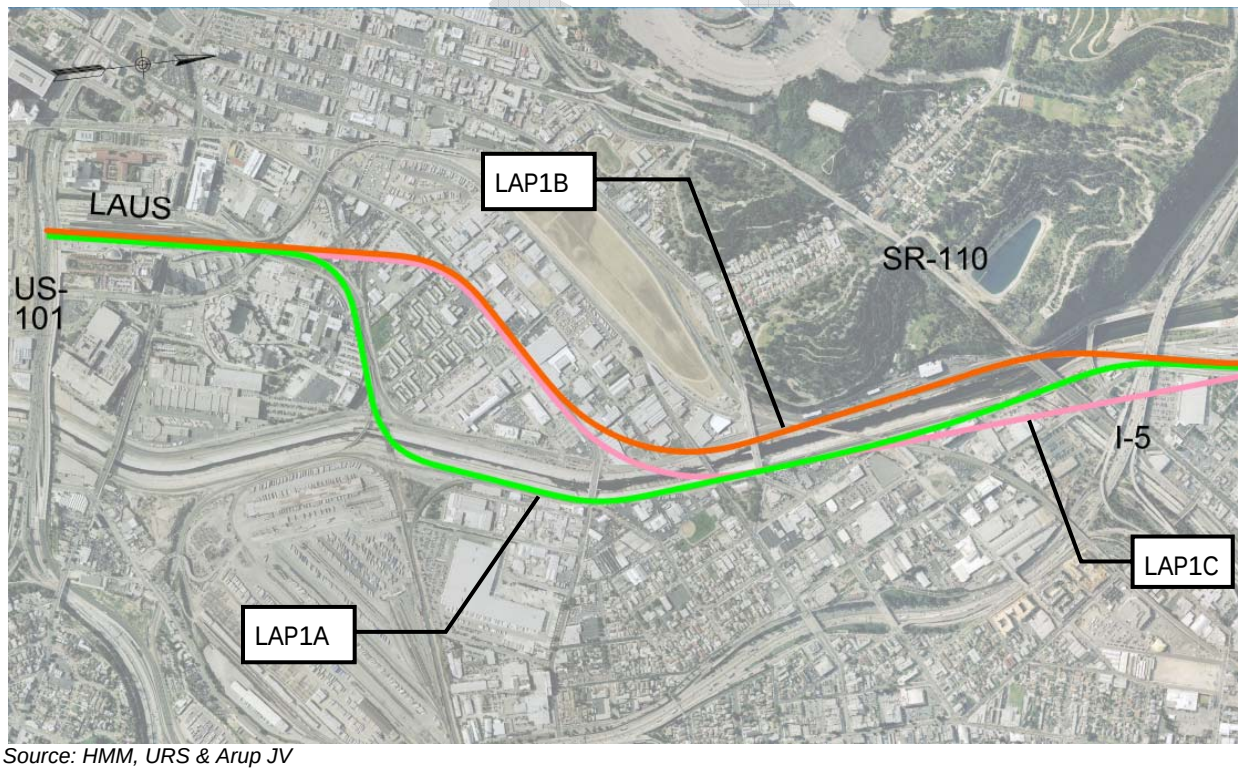
- LAUS to I-5,
- I-5 to SR-2,
- SR-2 to SR-134.

3.6.1 LAUS to I-5

Various alignment alternatives were developed originating from three LAUS locations prior to completion of the study identifying the elevated LAUS station as the only practicable option. Few alternatives were available that would serve the elevated HST station location above LAUS were and join the Metrolink corridor passing under I-5. The alternatives were further constrained by the existing development in this area and so follow the existing transport corridors (Metrolink, Gold Line, local roads). The elimination of the LAUS underground and PiperTech HST station locations removed any tunnel options from further consideration.

The three alignment alternatives developed are shown in Figure 3-11 and briefly described below.

Figure 3-11: Alternatives from LAUS to I-5



Source: HMM, URS & Arup JV

LAP1A would originate from an above ground LAUS station and run on viaduct above the existing station approach tracks. It would then cross over the LA River and run along the east bank of the river parallel to Metrolink Tracks at grade and in trench before passing beneath the existing I-5 and SR 110 bridges.

LAP1B would originate from an above ground LAUS station and run on viaduct above Main Street. It would then turn and run along the west bank of the LA River passing over Spring Street and Broadway

before descending to grade near the Metro Gold Line Yard. It would then cross the river south of the I-5 at the location of the existing Metrolink bridge.

LAP1C would originate from an above ground LAUS station and run on viaduct over Main Street, Spring Street and Broadway and then passing over the I-5 and SR-110 viaducts on an 80 foot tall viaduct.

3.6.2 I-5 to SR-2

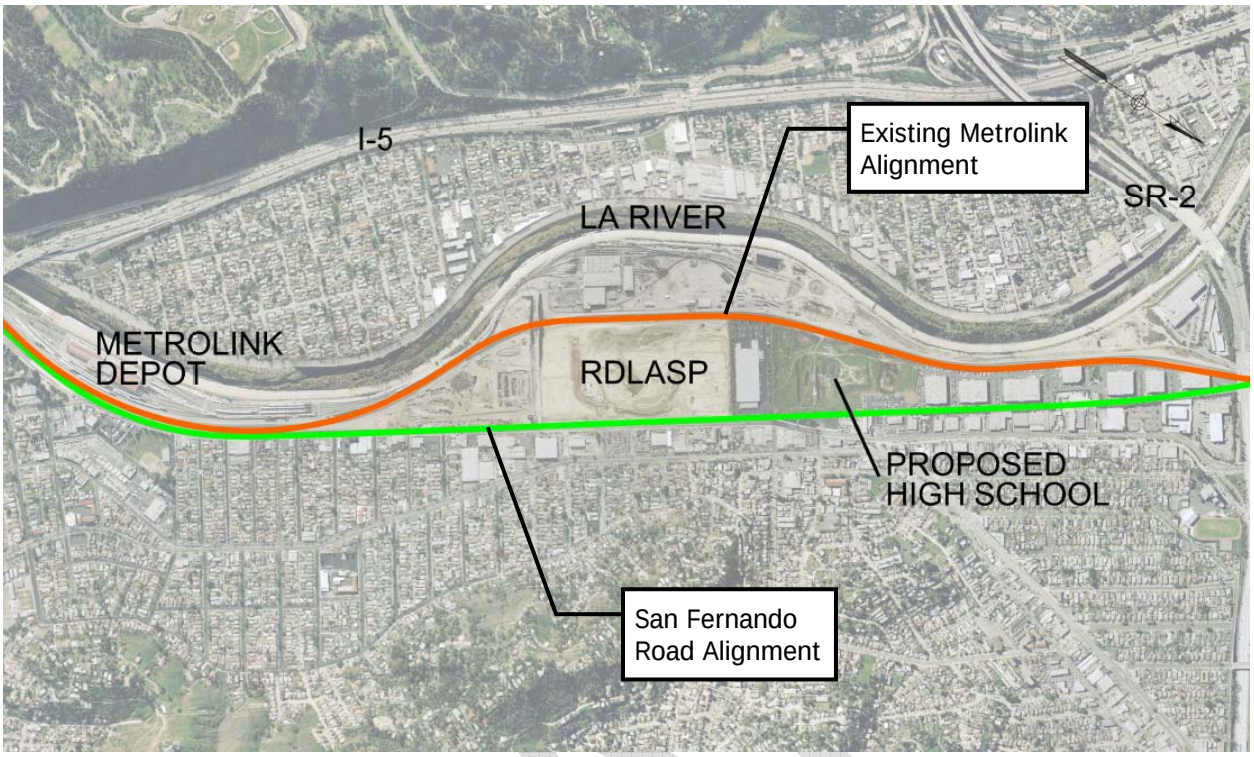
Between I-5 and SR-2, constraints were presented by the LA River, the Metrolink Depot, Rio De Los Angeles State Park and construction of a proposed high school development. To avoid and minimize the impacts to these land uses, two alignments were developed following the existing Metrolink Alignment and following San Fernando Road. These are shown in Figure 3-12.

At-grade alignments were viewed as unacceptable because the right-of-way would have further divided the park from either the community, as in the case along San Fernando Road, or further separate the park from the Los Angeles River as in the case following the existing Metrolink alignment. In either case, alternative access would have been necessary.

Viaducts in this area were ruled out following community outreach due to the significant visual impact to the park and the barrier that would be created between the surrounding neighborhoods, the park and the river.

Options to these two alternative routes were developed which had the HST running in a trench either along San Fernando Road or along the existing Metrolink right of way, and including Metrolink in the trench alongside HST operations (see Figures 4-7 and 4-13). With both Metrolink and HST in a shared trench alongside the Park, considerable benefit could potentially be realized. This would include the elimination of at-grade Metrolink operations to the west of the Park opening up access to the Los Angeles River, and partly covering the trench for lengths of up to 800 feet allowing compatible uses such as parking, recreation and landscaping enhancing the corridor and the surrounding area. These land bridges covering the trench at critical locations could provide pedestrian and vehicular connectivity between the community, RDLASP and the LA River.

Figure 3-12: Alternatives from I-5 to SR-2



Source: HMM, URS & Arup JV

3.6.3 SR-2 to SR-134

Between the SR-2 and SR-134 only one alignment was developed which follows the existing Metrolink alignment at grade. This is shown in Figure 3-13. The presence of several below grade crossings in addition to the over crossings for the SR-2 and SR-134 limit the opportunity to consider viaduct and trench options, so through this portion an at-grade alternative was viewed as viable provided the corridor is enhanced to provide for Metrolink and HST operations. It would also be disruptive to the existing railroad operations and costly to build a trench or viaduct while keeping the Metrolink tracks open and available to traffic.

Figure 3-13: Alternative from SR-2 to SR-134

Source: HMM, URS & Arup JV

3.7 AGENCY COORDINATION AND PUBLIC OUTREACH

In 2008, Interagency and Stakeholder meetings for the Los Angeles to Palmdale Section were held on the following dates:

- March 5 and 6, 2008, Interagency Coordination Meetings
- May 6, 2008, Norwalk Sport Center Stakeholder Meeting
- May 22, 2008, Interagency Coordination Meetings

The first of two Interagency Coordination meetings was held on March 5 and 6, 2008, 1:30 p.m. to 3:30 p.m. at the Wilshire Grand Hotel in Los Angeles. Both the Los Angeles to Palmdale and the Anaheim to Los Angeles Sections made presentation of the project alternatives developed. Planning and environmental agencies were invited on March 5 and transportation agencies on March 6.

A Stakeholder Working Group (SWG) meeting was held on May 6, 2008. Over 1,000 community leaders were invited to the meeting, which was held in conjunction with the Anaheim to Los Angeles section. The meeting was held at the Norwalk Sports and Arts Complex in Norwalk, California.

The purpose of the SWG meeting was to continue developing open communication among differing interests, provide overview of alignment alternatives under development and serve to move the project forward in the spirit of cooperation while providing regional involvement. The combined group's discussions included community concerns from both HST Sections; the Los Angeles to Palmdale and Anaheim to Los Angeles.

The meeting was attended by 45 SWG members representing elected offices, school districts, environmental groups, safety agencies, universities, chambers, local public agencies and other community-based organizations.

Prospective members were asked to agree to their Roles and Responsibilities and to sign a letter of commitment for the SWG. The meeting information distributed included a copy of the agenda, presentations, letter of commitment, roles and responsibilities, Interest Form, Los Angeles to Palmdale and Anaheim to Los Angeles section Fact Sheets and a project DVD.

The second Interagency Coordination Meetings was held at the Los Angeles County Metropolitan Transportation Authority (Metro) building on May 22, 2008. Planning and environmental resource agencies were invited in the morning and Transportation agencies in the afternoon. Presentations were given on the Anaheim to Los Angeles alternatives and station locations and the LAUS to SR 134 alternatives.

Detailed notes and lists of questions asked at these three meetings can be found in Appendix A of the *Anaheim to LA Fiscal Year 2007-2008 Public Participation Summary Repor*t dated January 2009.

3.8 INITIAL REVIEW OF ALTERNATIVES

Each of the alternatives was developed with consideration of the Los Angeles River Master Plan and each one represented different benefits to those proposed plans. The HST station underground at LAUS and the PiperTech site on the west bank of the LA River have been eliminated from further consideration. Therefore the four tunnel alternatives connecting to these station locations have also been eliminated.

The three alternatives leaving existing LAUS from above-ground platforms were further studied. However, due to the length (approximately 5 miles) and height (up to 80 ft) of the long viaduct option (LAP1C) and concerns raised by the local communities and planning agencies, this option was eliminated from further consideration due to the potential visual impacts and its incompatibility with redevelopment of the Los Angeles River and residential communities along the corridor.

The remaining two alternatives leaving above ground LAUS were viewed as more compatible with future redevelopment along the Los Angeles River.

Alternative LAP1A offers the potential of consolidating existing Metrolink and Freight rail operations to the east bank of the river alongside HST tracks for the area just south of Main Street to the I-5. The HST alignment would be placed into a trench to avoid the at-grade crossing with historic Main Street Bridge, and return to grade before crossing over the Arroyo Seco River and passing under Spring Street, Broadway and the Gold Line Bridges. Alternative LAP1A has been viewed by many as providing the potential for improved river access on both sides of the river and may additionally provide for park development and river access along the east bank.

The west bank alternative LAP1B leaves existing LAUS and continues on a viaduct running above the redevelopment area of the Los Angeles State Historic Park over Main Street and passes over Spring Street and Broadway as it parallels the Los Angeles River, dropping to grade just before the SR-110 and crosses the Los Angeles River parallel to the existing Metrolink tracks.

The next challenge for the development of alternatives exists between I-5 and the SR-2 through Rio De Los Angeles State Park (Taylor Yard). At-grade alternatives through the Park would follow either the existing Metrolink right of way or along San Fernando road. At-grade alignments were viewed as having unacceptable impacts because the right-of-way would have further divided the park from either the community, as in the case along San Fernando Road, or further separate the park from the Los Angeles River as in the case following the existing Metrolink alignment. In either case, new access across the HST line would have been necessary. It was for these reasons at-grade alternatives were dismissed from further consideration through the Park.

The Authority instead focused on putting the HST into a trench either along San Fernando Road or along the existing Metrolink right-of-way, and including Metrolink in the trench alongside HST operations. With both Metrolink and HST in a shared trench through the Park, considerable benefit could potentially be realized. The first would be to eliminate at-grade Metrolink operations to the west of the Park thus removing an access barrier to the Los Angeles River, and secondarily the trench could potentially be partly covered for lengths of up to 800 feet allowing compatible uses such as parking, recreation and landscaping, thus enhancing the corridor and the surrounding area. It was for these reasons the Authority decided to pursue alternatives in a trench through the Park on either the east or west sides.

The alignment following San Fernando Road, although having greater impact on the properties facing San Fernando Road, allows the highest design speed through this area, best meeting the project objectives. The alignment following the existing Metrolink alignment would have less impact on proposed and existing developments, but would incur significant time penalties due to permanent speed restrictions. Both of these alignments will be carried forward so they can be assessed in more detail.

Between SR-2 and SR-134 the presence of several below grade crossings in addition to the over crossings for the SR-2 and SR-134 make viaduct and trench options inpracticable, so through this portion only an at-grade option is considered reasonable to provide for Metrolink and HST operations.

Alignments to be carried forward are any combination of the remaining options described above. The possible combinations are shown in

Table 3-1.

Table 3-1 Combinations of Options

Alternative	LAUS to I-5	I-5 to SR-2	SR-2 to SR-134
1	LAP1A - LAUS above ground – East Bank at-grade, partial trench	San Fernando Road Alignment in trench	Existing Metrolink Alignment
2	LAP1A - LAUS above ground – East Bank at-grade, partial trench	Existing Metrolink Alignment in trench	Existing Metrolink Alignment
3	LAP1B - LAUS above ground – West Bank short aerial, partial trench	San Fernando Road Alignment in trench	Existing Metrolink Alignment
4	LAP1B - LAUS above ground – West Bank short aerial, partial trench	Existing Metrolink Alignment in trench	Existing Metrolink Alignment

4.0 EVALUATION OF ALTERNATIVES

The evaluation of alternatives revolves around the differences between the options in the first and second of the three sub-sections. The alternatives are presented in the tables below in two combinations:

- Alternative 1, Originates from an above ground LAUS station and runs on viaduct above the existing station approach tracks. It would then cross over the LA River and run along the east bank of the river parallel to Metrolink Tracks at grade and in trench before passing beneath the existing I-5 and SR 110 bridges (LAP1A). Alternative 1 continues along San Fernando Road in trench to SR-2, and at grade to SR-134
- Alternative 2, Originates from an above ground LAUS station and runs on viaduct above the existing station approach tracks. It would then cross over the LA River and run along the east bank of the river parallel to Metrolink Tracks at grade and in trench before passing beneath the existing I-5 and SR 110 bridges (LAP1A). Alternative 2 continues along the Metrolink alignment in trench to SR-2, and at grade to SR-134
- Alternative 3, Originates from an above ground LAUS station and runs on viaduct above Main Street. It would then turn and run along the west bank of the LA River passing over Spring Street and Broadway before descending to grade near the Metro Gold Line Yard (LAP1B). It would then cross the river south of the I-5 at the location of the existing Metrolink bridge. Alternative 3 continues along San Fernando Road in trench to SR-2, and at grade to SR-134
- Alternative 4 Originates from an above ground LAUS station and runs on viaduct above Main Street. It would then turn and run along the west bank of the LA River passing over Spring Street and Broadway before descending to grade near the Metro Gold Line Yard (LAP1B). It would then cross the river south of the I-5 at the location of the existing Metrolink bridge. Alternative 4 continues along the Metrolink alignment in trench to SR-2, and at grade to SR-134

4.1 IMPACTS COMMON TO ALL ALTERNATIVES

Impacts that are common to all alternatives (Alternatives LAP1A and LAP1B, and either alignment San Fernando Road or Metrolink through Taylor Yard) are summarized as follows:

4.1.1 Biological Resources

Special status species are reported to occur within the USGS quadrangles surrounding the study area. Special status species were determined to have an absent or low potential for occurrence.

Adverse indirect effects of the Project will include noise, construction traffic, and light. Indirect impacts are anticipated along viaduct routes and minimal impacts are anticipated as the viaducts approach grade and trench levels. Indirect impacts are anticipated to be short-term and spatially constrained to the study area.

Overall, the alternatives are not anticipated to significantly adversely affect habitat for common or special status species; riparian habitat; sensitive natural communities; native plants and wildlife; natural watercourses and wetlands; or any local policies or ordinances within the study area. Implementation of avoidance, minimization, and mitigation measures will mitigate the impacts that Project construction will have regarding destruction of nests, mortality of nestlings or adults, disruption of breeding activities, annual production, or changing migration or foraging patterns of common or special status species.

4.1.2 Cultural Resources

Direct impacts to approximately 40 known historic-period properties may occur. These include removal or modification of the built environment to accommodate the proposed alignment or stations and visual changes to the historic context and visual narrative of a property, landscape, or district.

Indirect impacts to historic-period properties may occur as result of noise, vibration from construction activities and from operation of the high-speed train and as changes to historic integrity aspects of feeling and setting. Implementation of avoidance and mitigation measures (such as the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings) would minimize adverse effects and significant impacts to properties.

Impacts to 27 known archaeological resources may occur, such as removal or modification of an intact resource to accommodate the proposed track, catenaries, or footings for elevated structures.

No impacts to human remains are anticipated given there are no known cemeteries within the proposed right-of-way. Two former historic period cemeteries are located within a 0.5-mile radius of the project, but all known remains were moved to other cemeteries and are no longer active. With implementation of mitigation measures, potential impacts to human remains would be reduced to a less than significant level.

4.1.3 Landscape Resources

Eight Key Observation Points (KOPs) were identified in this section. These are viewing locations chosen to be representative of the most visually sensitive areas that would view the project. The KOPs identified were:

- KOP 1 – West Bound Traveler View - Corner of Cesar Chavez and Vignes
- KOP 2 – Southwesterly Student View – Ann Street School
- KOP 3 – Easterly Recreational User View – Elysian Park
- KOP 4 – Northeasterly Recreational User View – LASHP (the Cornfield)
- KOP 5 – Westerly Recreational User View – RDLASP
- KOP 6 – Southerly Recreational User View – Taylor Yard
- KOP 7 – Westerly Visitor View – Forest Lawn Memorial Park
- KOP 8 – Westerly Residential View – Gardena Avenue

Further details are provided in the November 2008 *Aesthetics and Visual Quality Report* which makes up part of the *LAUS to SR-134 Baseline Conditions Report*.

4.1.4 Agricultural Lands

There are no impacts to agricultural lands within the study area. There are 25.75 acres of land with existing agricultural uses within the study area between State Route 2 and State Route 134, as identified by the Southern California Association of Governments (SCAG). No Prime Farmlands, Farmlands of State or Local Importance, or Unique Farmlands are located within the study area

4.1.5 Geotechnical Constraints

All alternatives are subject to ground rupture, shaking and failure as a result of a strong earthquake. There is a potential for migration of potentially explosive and/or toxic gases into subsurface facilities due to being within Methane Hazard Zones. The alternatives are all subject to failure of natural or construction cut slopes or retention structures.

4.1.6 Hazardous Materials

The project may generate hazardous materials or waste from building demolition, excavation through contaminated soils, and/or dewatering in areas where groundwater may be contaminated.

Hazardous materials are likely within existing rail alignments and former rail yards. Hydrocarbons, lead and arsenic are expected in near surface soils (0 to 5 ft). Contaminated soil and groundwater are likely to require removal during construction of trenches (volatile organic compounds and hydrocarbons in vicinity

of Taylor Yard). Building demolition will generate debris, asbestos, lead, universal wastes, and encounter underground storage tanks.

A Federal National Priorities List (NPL)/Superfund site, San Fernando Valley Area 4, Pollock Wellfield Area, Los Angeles, and a State of California Solid Waste Landfills site, E.L. Flemming Dump, located at 5431 San Fernando Road, Los Angeles are in close proximity to the alignment.[1]

4.1.7 Land Uses and Constraints

The adjacent land uses to the LAUS to SR-134 sub-section, which includes all alignment alternatives evaluated in this report, are shown in Figure 4-1. Major land uses immediately adjacent to the LAUS to SR-134 sub-section and within a half-mile radius include approximately 31% residential uses, 10% commercial uses, 19% industrial uses, 20% transportation and utility uses, and 8% open space and recreation uses. Areas of constraints include:

Residential Areas:

- Glendale
- City of Los Angeles
- County of Los Angeles

Parks/Open Space:

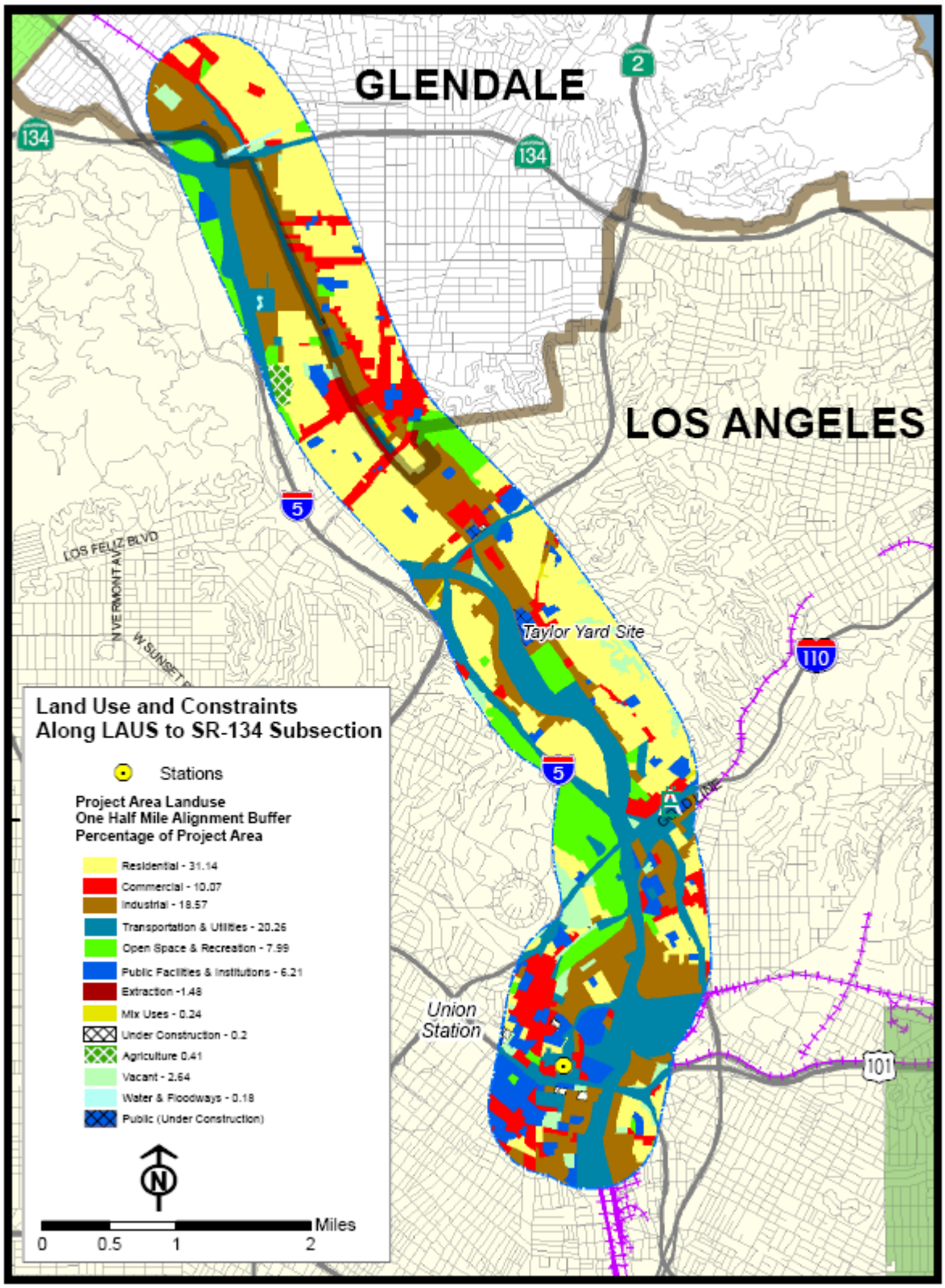
- Rios de Los Angeles State Park
- Los Angeles State Historic Park
- Elysian Park
- Cypress Park
- Elysian Valley Recreation Center Park
- Los Feliz Municipal Golf Course
- North Atwater Park
- Griffith Park
- Harding and Wilson Municipal Golf Course
- Pacific Community Center and Park
- Forest Lawn Memorial Park

Transportation:

- Union Station
- Taylor Yard
- Los Angeles Amtrak
- Glendale Amtrak/Metro

[1] California High-Speed Train Program EIR/EIS, Bakersfield to Los Angeles Region, Hazardous Materials/Wastes Technical Evaluation, January 2004

Figure 4-1: Land Use and Constraints along LAUS to SR-134 Sub-section

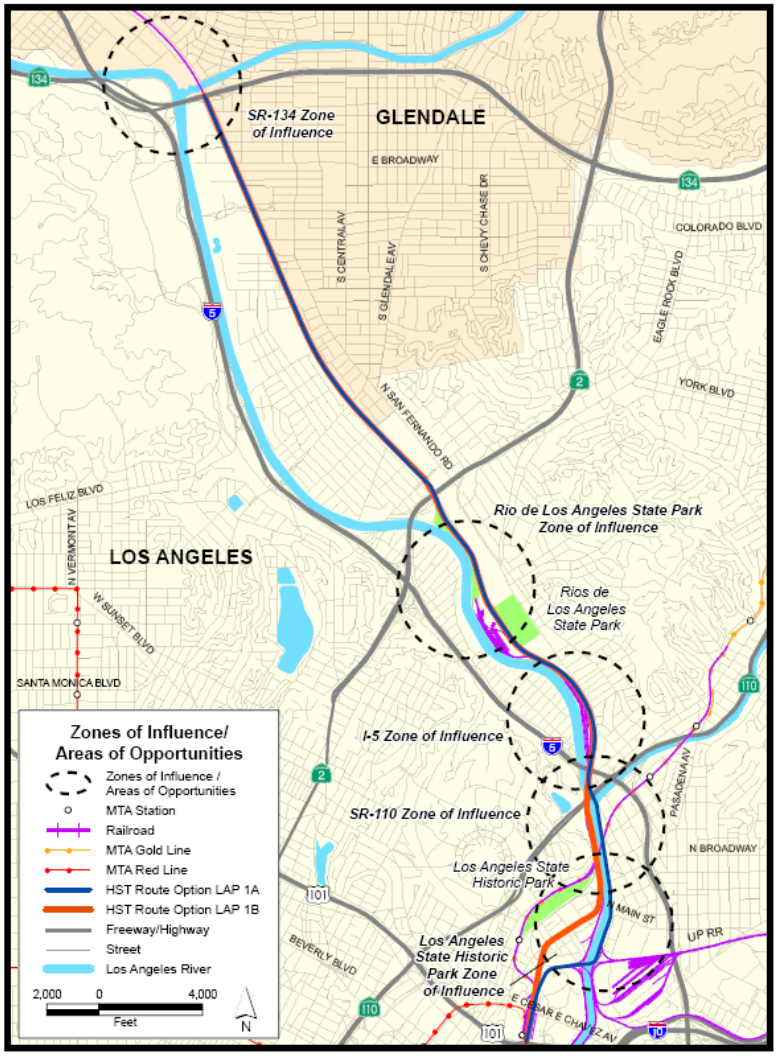


Source: HMM, URS & Arup JV

4.1.8 LA River Constraints

The project has the potential to impact the implementation of Los Angeles River Revitalization Master Plan (LARRMP), which includes the Rio de Los Angeles State Park (RDLASP) and the Los Angeles Historic Park (LASHP), in areas within a half-mile radius of the potential HST alignments. Figure 4-2 illustrates the potential areas of impact to the LA River. The LARRMP defines the LA river corridor as a half-mile on each side of the 32-mile LA River within the City of Los Angeles, and outlines several areas along the LA River as areas of opportunity for river restoration and revitalization. These areas have been identified as zones of influence and include the intersection of SR-134 and the LA River, the RDLASP, the intersection of the I-5 and the LA River, the intersection of I-110 and the LA River, and the LASHP. Restoration of the LA River may include the expansion of the river corridor, river and channel framework, and the creation of an open space and recreation plan. In addition to restoration, the LARRMP will modify and unify land uses and zoning along the river corridor to provide more consistent land uses and zoning between jurisdictions and to allow more recreational uses and the redevelopment of underutilized industrial sites. The HST alignments identified may conflict with the LARRMP goals of creating open space and recreation areas, improving the visual character of the river corridor, providing adjacent bike lanes, and preserving habitat.

Figure 4-2: Potential Areas of Impact to the Los Angeles River



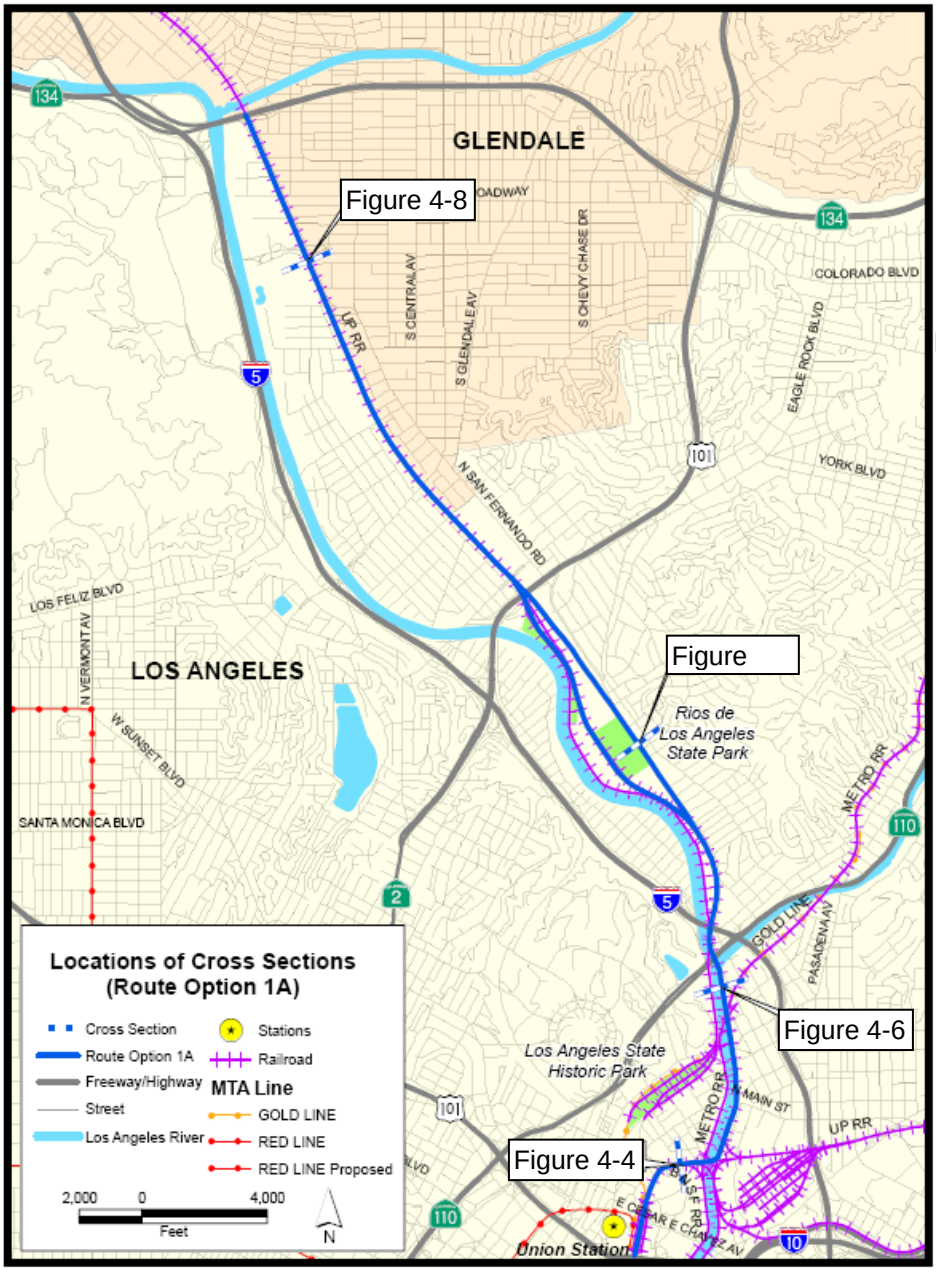
Source: HMM, URS & Arup JV

4.2 ALTERNATIVES 1 AND 2

4.2.1 LAUS to I-5

Alternatives 1 and 2 (LAP1A) run from an above ground HST station above the existing LAUS Station. It is shown in outline on Figure 4-3, which also gives a key plan of the showing the locations of cross sections referred to in the text below. All cross sections look from south to north.

Figure 4-3: Key Plan and Locations of Cross Sections

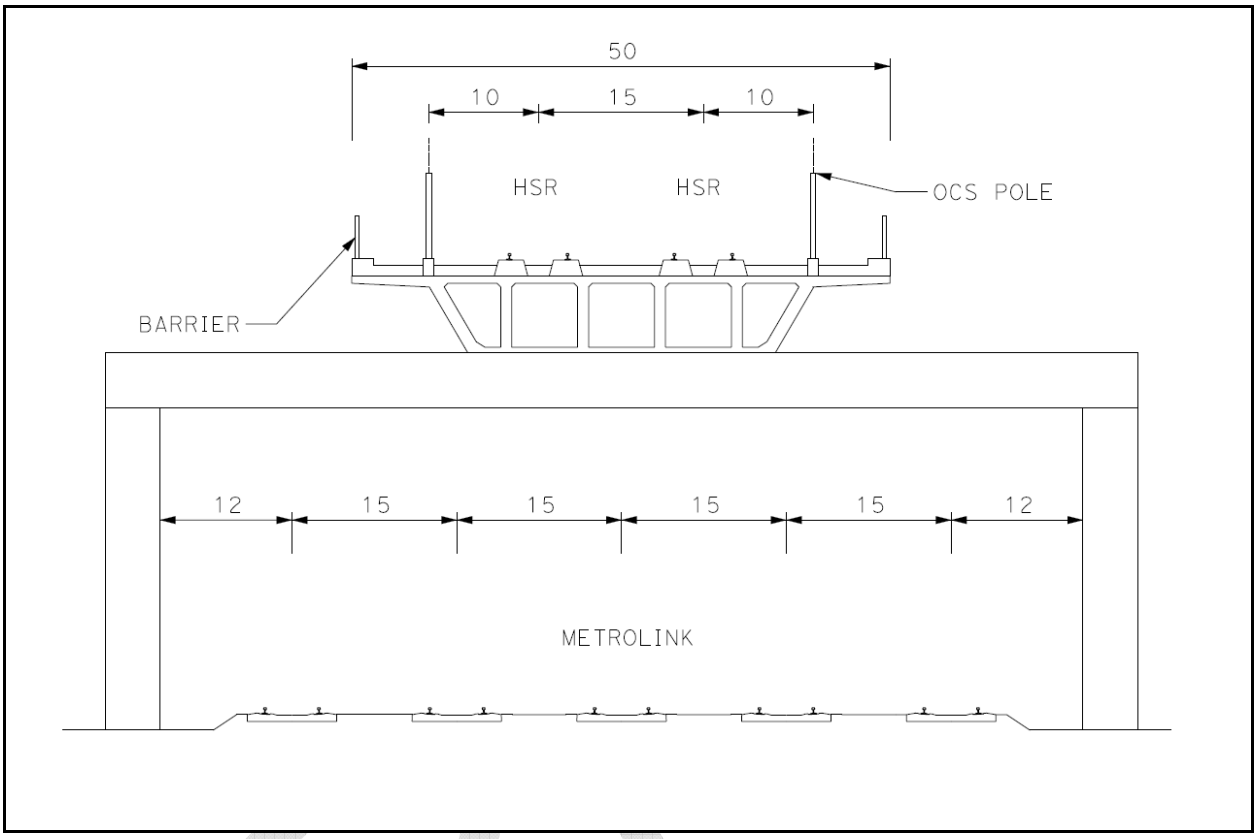


Source: HMM, URS & Arup JV

The route turns east immediately north of the station and follows an aerial alignment above the existing Metrolink tracks towards the LA River. This is shown conceptually in cross section in Figure 4-4. The

general form and details of the structure are to be determined. The 650 foot (ft) radius curves required to follow this alignment impose a speed limit of 30 mph.

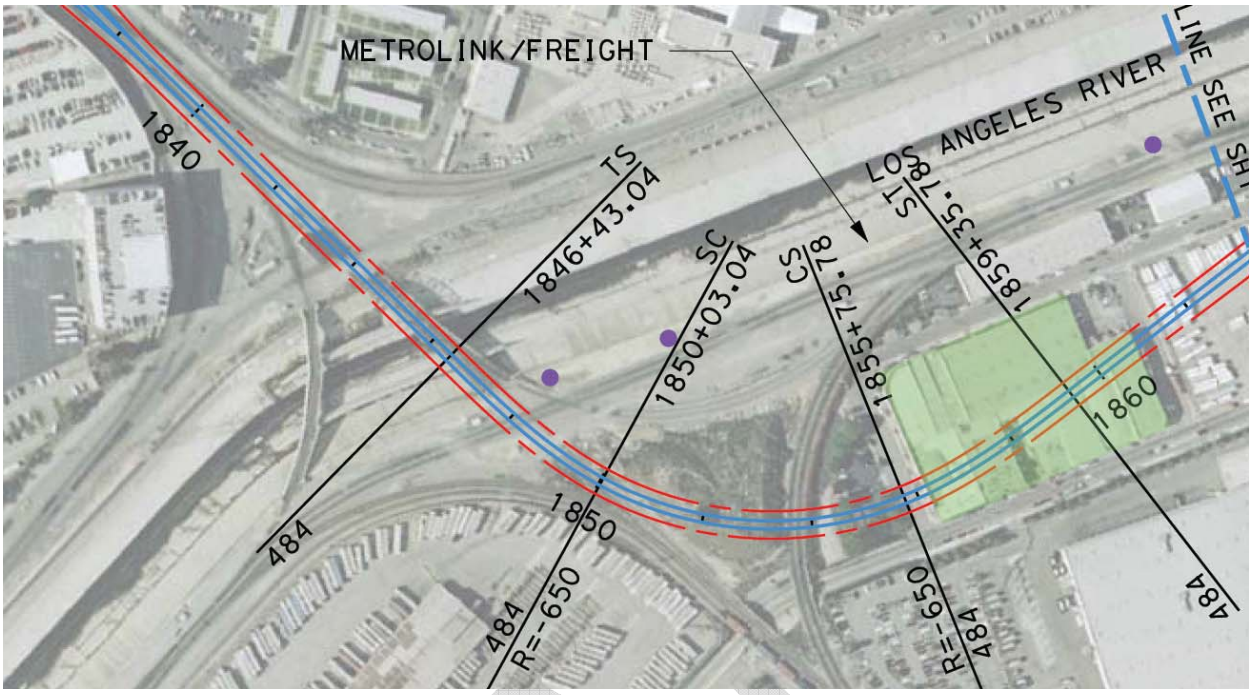
Figure 4-4: Viaduct above LAUS Approach Tracks (see Figure 4-3 for location)



Source: HMM, URS & Arup JV

The route then crosses the LA River and aligns with the east bank of the river, while reducing in height to bring the aerial structure down to grade. This would require a skewed, curved structure as shown in Figure 4-5. The gradient of the tracks in this area would be 3.5%, which is the exceptional limit for gradient, for approximately 2500 ft.

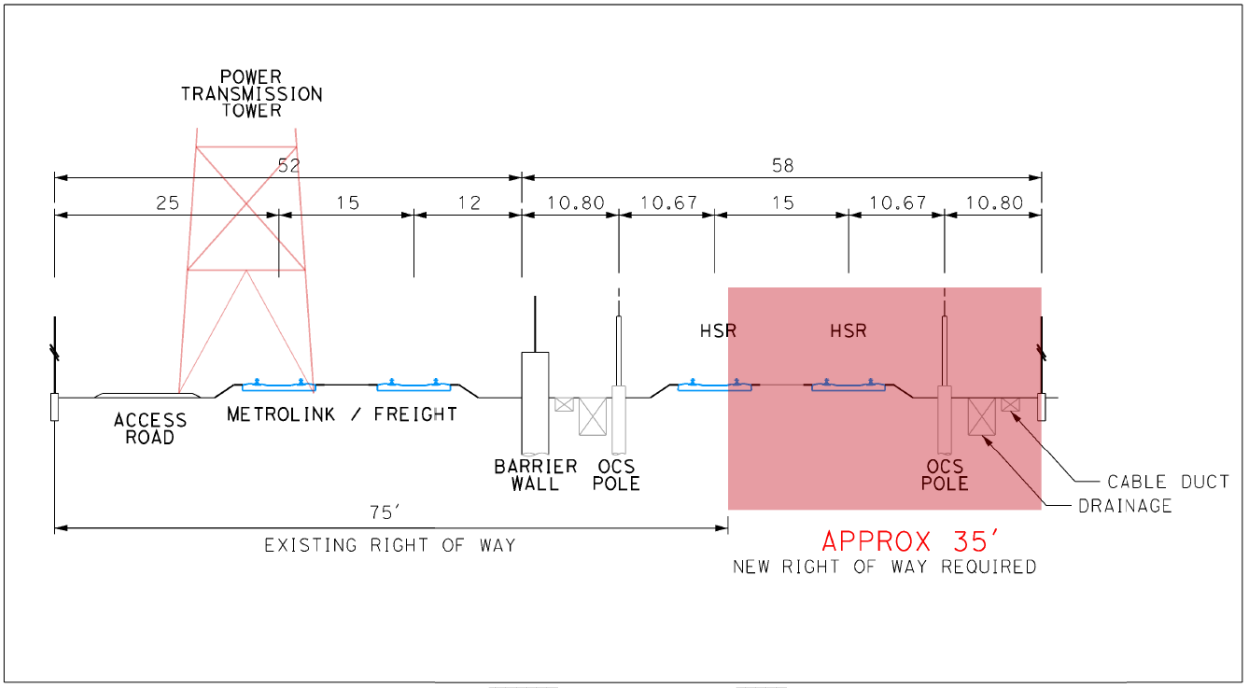
Figure 4-5: New Crossing of the LA River



Source: HMM, URS & Arup JV

The route then passes into a short trench under Main Street before returning to grade before the Arroyo Seco River and following the existing rail corridor under the Spring Street, Broadway, Gold Line, SR-110 and I-5 bridges. Passing under the existing Main Street requires a gradient of 3.5% and a retained cut of approximately 2000 ft in length. A 110 ft wide corridor would be required for 2 Metrolink tracks and 2 high speed rail tracks side by side as illustrated in Figure 4-6. This would require land take alongside the existing Metrolink right of way, which varies between approximately 50 ft and 95 ft. It would also require relocation of the existing power transmission lines currently within the Metrolink right of way.

Figure 4-6: New Crossing of LA River (see Figure 4-3 for location)

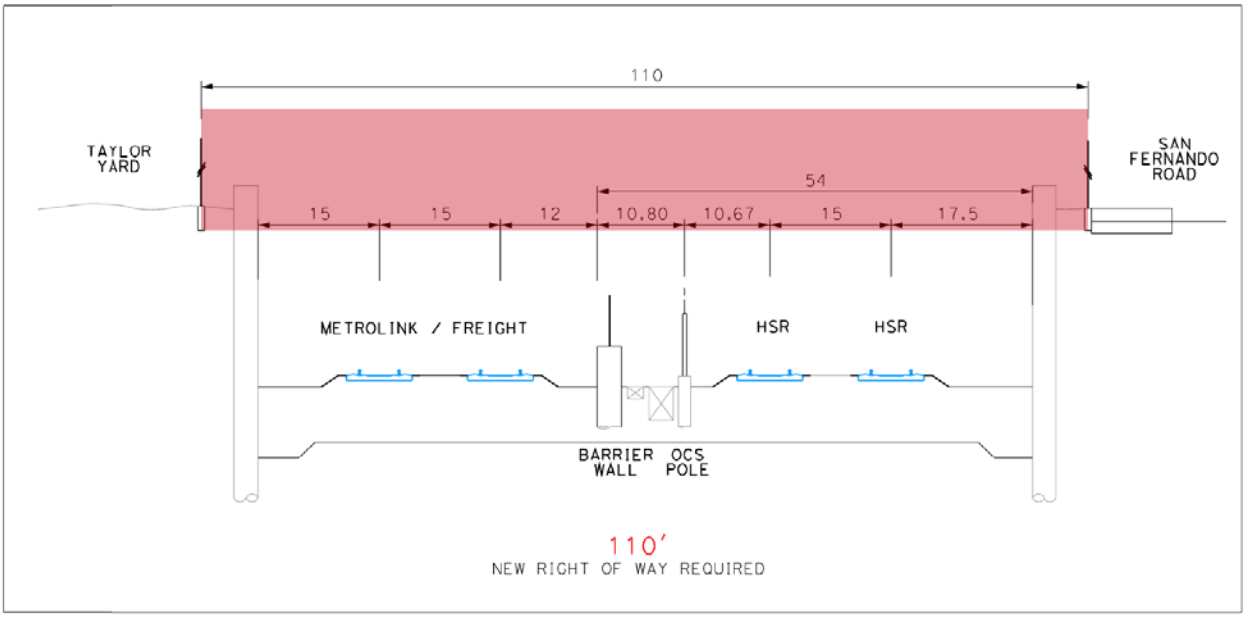


Source: HMM, URS & Arup JV

4.2.2 I-5 to SR 2

North of I-5, the route runs into a trench shared by Metrolink and freight tracks through Taylor Yard. This is shown in cross section in Figure 4-7. This trench either would run alongside San Fernando Road to the east of the site (Alternative 1) or follow the route of the existing Metrolink tracks (Alternative 2). The horizontal curves required to follow San Fernando Road would not impose a speed restriction more onerous than curves further along the alignment (135 mph).

Figure 4-7: Typical Trench Section along San Fernando Road (see Figure 4-3 for location)



Source: HMM, URS & Arup JV

The tracks would then rise out of the trench at SR-2, continuing at grade to pass under the SR-134 at the existing rail level. Climbing out of the trench would require a gradient of 2.50% for approximately 1250 ft. To accommodate freight traffic the gradient could be flattened, with an associated increase in length and reduction in depth of trench over the length of the slope.

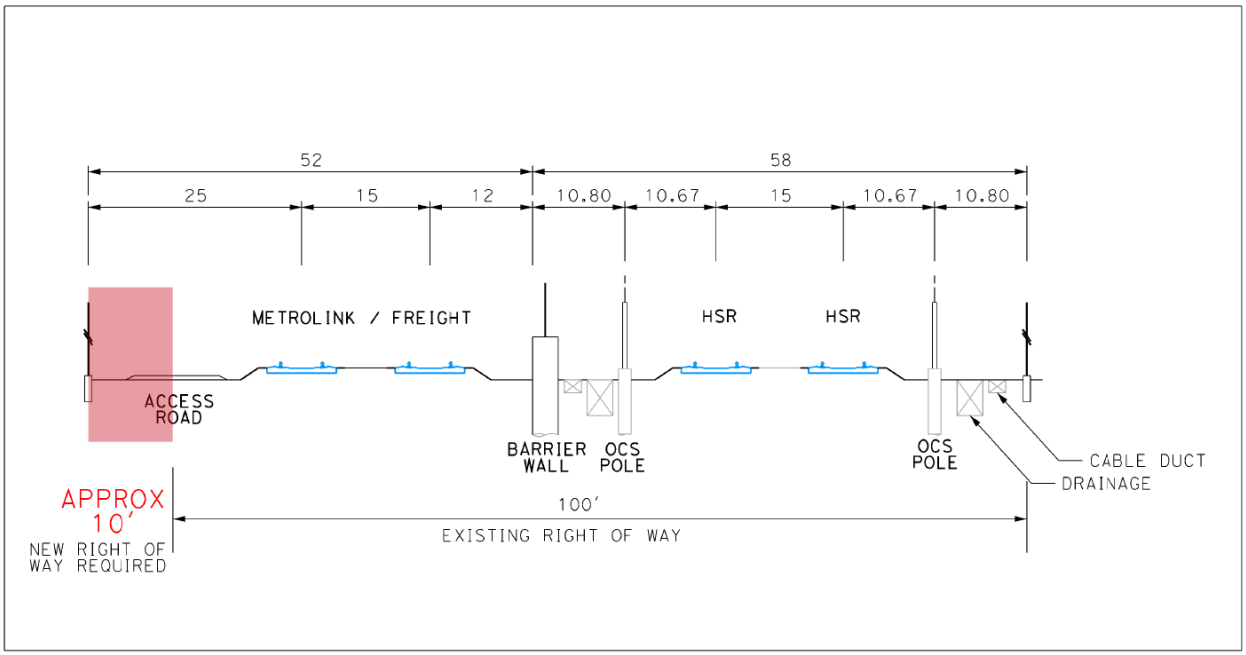
The route along San Fernando Road would remove the Metrolink alignment from the middle of the Taylor Yard site. This is considered desirable by the local authority and Rio de Los Angeles State Park, as it would facilitate at-grade access between Rio de Los Angeles State Park and the LA River.

4.2.3 SR 2 to SR 134

The alignment would then follow the existing rail corridor at grade between SR-2 and SR-134 for both Alternatives 2 and 3. The third existing track through the Glendale Station area would be eliminated and the station would need reconfiguration. The configuration with the Metrolink tracks to the west of the HST tracks would require new pedestrian bridges over the HST tracks to provide access between the relocated station building and car park and the passenger platforms. This would remove the existing pedestrian grade crossings of the tracks in the station area and improve the safety of the crossings for passengers.

There are three at-grade crossings of the existing railway at Chevy Chase Drive, Broadway and Doran Street that would need to be closed or grade separated. Grade separation would be achieved by realigning the roads above or below the railway.

Figure 4-8: At grade section between SR-2 and SR-134 (see Figure 4-3 for location)



Source: HMM, URS & Arup JV

The 110 ft wide corridor required for two HST tracks and two Metrolink tracks, as shown in Figure 4-8, would require the purchase of a 10 ft strip along the existing 100ft right of way. To accommodate a speed above 125 mph, the HST track spacing would be increased to 16.5 ft with a total width of 111.5 ft. Although the strip could be on either the east of west side of the existing right of way, it would need to remain on the chosen side throughout. If the required cross section could be reduced to 100 ft through use of exceptional limits, significant disruption and land take could be avoided.

Table 4-1: Evaluation Summary – Alternatives 1 and 2 (LAP1A)

Evaluation Measure	Comments
Design Objectives	
Journey time	6 minutes 30 seconds for the San Fernando Road (Alternative 1) alignment at Taylor Yard. Limited to 35 mph for approx. 12,000 ft from LAUS, and then increasing to 135 mph. If the existing Metrolink alignment (Alternative 2) is adopted through Taylor Yard, speed is limited to 60 mph for that portion and the journey time increases by approx. 50 seconds to 7 minutes 20 seconds
Route length	8.390 miles for the San Fernando Road alignment (Alternative 1) at Taylor Yard, increasing to 8.437 miles for the existing Metrolink alignment (Alternative 2) through Taylor Yard
Intermodal Connections	Good - Terminates at existing LAUS station. Connections to metro, Metrolink, Amtrak, buses and taxis at existing location.
Operating Costs	Lower operating cost as fewer large structures to maintain (tunnels and viaducts). Small radius curves and steep grades would cause additional maintenance requirements.
Capital Costs	LAUS to I-5 portion likely to be less costly – fewer large structures (viaduct over Metrolink tracks). The cost of the slightly longer alignment through Taylor Yard on the existing Metrolink alignment (Alternative 2) may be compensated by greater ROW costs on the San Fernando Road alignment (Alternative 1).
Land Use	
Potential for TOD	High - The HST station would be located at LAUS, above the existing Metrolink and Amtrak tracks. LAUS is a transit and rail transportation hub with high connectivity and accessibility for the Los Angeles metropolitan area.
Consistency with other planning efforts	Lower consistency along the viaduct portion of this route. Medium consistency along at grade and trench sections on the east bank of the LA River, which is planned for open space and recreation (Downey Recreation Center).
Constructability	
Constructability	A HST station could be built above active station tracks, where knockouts above ground level could accommodate tracks and platforms. Careful phasing would be required to construct the trench along San Fernando Road (Alternative 1) without severing access to the plots of land within the Taylor Yard site. If the existing Metrolink alignment is adopted through Taylor Yard (Alternative 2), construction would have to be phased to minimize impacts on Metrolink operations.
Acceptability of existing overcrossings	The route passes under the following existing bridges and overcrossings: Spring Street(42 ft, 36 ft and 30 ft), Broadway (111 ft span), Gold Line, SR-110 (96 ft and 68 ft spans), Figueroa Drive, I-5 (161 ft span), SR-2 (186 ft span), and SR-134 The eastern approach to Spring Street would require replacement. The remaining bridges with the possible exception of Figueroa St would allow the proposed railroads to pass beneath them. Minor realignment of the alternatives would be required when detailed surveys of the bridges have been carried out.

Evaluation Measure	Comments
Disruption to existing railroads	A purchase of some of the Metrolink right of way on the east bank of river would be required. The Metrolink railroad would require realignment in this area. The viaduct over existing throat and approach to LAUS would cause considerable disruption to railroad operations during construction. Between I-5 and SR-2, the San Fernando Road alignment requires re-routing of Metrolink, compared with temporary relocations of Metrolink if the existing Metrolink alignment is followed through Taylor Yard.
Disruption to and relocation of utilities	Six power transmission towers would need to be relocated along the east bank of the LA River. This could be an opportunity to relocate the cables, either to a different location or underground, to improve the visual appearance of the LA River in line with the LA River Master Plan. Gas and oil pipelines cross the alignment in a number of locations, particularly along the Metrolink alignment and San Fernando Road. Telecommunications (telephone, cable, fiber-optic lines, etc) networks owned by providers including Qwest, PPSI, USP and AT&T cross the alignment at a number of locations as well as the communications and signaling cables serving the existing railroad. There are numerous storm drainage pipes that would need to be relocated, mainly along existing roads.
Community Impacts	
Displacements	There are 85 parcels impacted by the alignment, consisting of 55 commercial parcels and 30 residential parcels. The impacts range from a small land take at the edge of the parcel to requiring the demolition of the buildings on the plot. The viaduct along the existing railroad would pass alongside residential and commercial properties. Neighborhoods within the City of Los Angeles Community Plan Areas may be affected by this route, with greater impacts on neighborhoods lying within the viaduct portion of the route and lesser impacts on those that lie within grade and trench level portions. These neighborhoods are located within Los Angeles Community Plan Areas for Boyle Heights, Central City, Central City North, Northeast Los Angeles, and Silverlake/Echo Park/Elysian Valley. Additionally, this route has greater impacts on neighborhoods that lie along the viaduct portion of the route in Chinatown and the Cornfields Arroyo Seco Specific Plan Redevelopment Area. Glendale Station would require reconfiguration, with the potential to move the station building, which is on the National Register of Historic Places. Some commercial premises adjacent to the railroad on the east bank of the LA River, in the Sony business park and adjacent to the railroad between SR-2 and SR-134 would require relocation.

Evaluation Measure	Comments
Property with Access Affected	For the San Fernando Road alignment (Alternative 1) at Taylor Yard, the route passes along the edge of a proposed housing development, Rio de Los Angeles State Park, a proposed high school site, and through the Sony Business Park. Connections to San Fernando Road would be via a series of land bridges. Grade separations of local roads may impact access to existing properties and alternative access would be provided.
Local Traffic Effects around Stations	There are no HST stations within the study area. The impacts of construction at LAUS are considered in the *Los Angeles Union Station HST Station Option Evaluation* report.
Local Traffic Effects along Route	The construction works immediately adjacent to San Fernando Road may require temporary lane narrowing to provide sufficient separation between live traffic lanes and the construction site. The works at Main Street, Broadway and Spring Street bridges will require temporary closures of these roads. Existing local roads with grade crossings of the railroad could be closed as part of the package of grade separations and consolidations. This would be done following traffic surveys and impacts analysis.
Highway grade separations and closures	The junction between Albion Street and Main Street would need to be reconfigured. This would have the benefit of removing the existing highway junction which is at the same location as the railroad crossing. Three existing grade crossings between SR-2 and SR-134 would be grade separated. These are Chevy Chase Drive, Broadway and Doran Street. These would all require temporary closures during construction.
Environmental Resources	
Waterways / Sensitive Habitat Areas	Sections of this route are within the 100-year flood level. The amount of track within this area would increase if local lowering of tracks were required to pass under the historic bridges. Flood mitigation measures would be required.
Cultural resources	In addition to the common impacts described above, this alternative passes under the Main St, Spring St, and Buena Vista historic bridges. Portions of these historic bridges may be modified or reconstructed as a result of the route. The eastern approach to Spring Street would require replacement and the trench under the approach to Main Street would both require changes to the existing surroundings of the historic bridges. Therefore, the proposed route would impact portions of historic-period properties. However, implementation of the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* would minimize adverse effects and significant impacts to properties.

Evaluation Measure	Comments
Parklands	The route would run directly adjacent to Downey Recreation Center (on North Spring Street) in a trench and there would likely be impacts to the park during construction. The route would run between San Fernando Road and Rio De Los Angeles State Park in a trench. There would likely be impacts on the park during construction. Land bridges would be constructed to mitigate the discontinuity caused by the railroad trench. Numerous historical resources, including the historic bridges along the Los Angeles River would be impacted. During construction, there are 12 Section 4(f) resources that would have potentially significant impacts before mitigation due to increased noise/vibration levels, 5 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to historical resources, and 13 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to visual quality from observation points at parks and historic structures. During operation, there are 12 Section 4(f) resources that would have potentially significant impacts before mitigation due to increased noise/vibration levels, and 2 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to visual quality from observation points at parks and historic structures.
Agricultural Lands	No impacts to agricultural lands in the study area.
Natural Environment	
Noise and Vibration	There would be greater impacts to sensitive receivers along this route with higher impacts along the viaduct that include schools (Ann Street School), and private and public housing. As the route approaches grade and trench levels, there are medium level impacts receivers that include park and recreational areas (Downey Playground and Recreation Center, Elysian Park, River Garden Park, Cypress Park and Recreation Center, Rio State Park and Taylor Yard, Chevy Chase Park and Pacific Community Park), schools (Glassel Park Elementary), Churches (Young Nak Presbyterian, Sungsan Korean, Russian Seventh Day Adventist, and New Hope) and a wide variety of single and multi-family residential areas.
Visual/scenic resources	Operation of the proposed viaduct under this Alternative will introduce immediately recognizable visual components to urban mixed-use, and traditional small urban community landscape types. Potential impacts would occur from structures (viaducts, catenaries), vehicles, signage, and lighting that may occur where there is an above-ground or trench alignment. Key Observation Points (KOP) 1-4 would be affected by the potential for the construction or construction area to be visible to sensitive viewers. KOP 1-4 would also directly be impacted by viaduct operations visible to sensitive viewers. Indirect impacts resulting from viaduct operations affecting visual character will affect KOPs 1-4.
Geotechnical Constraints	Less affected than LAP1B by geotechnical and geologic hazards because route is not located near the base of significant slopes susceptible to landslides.

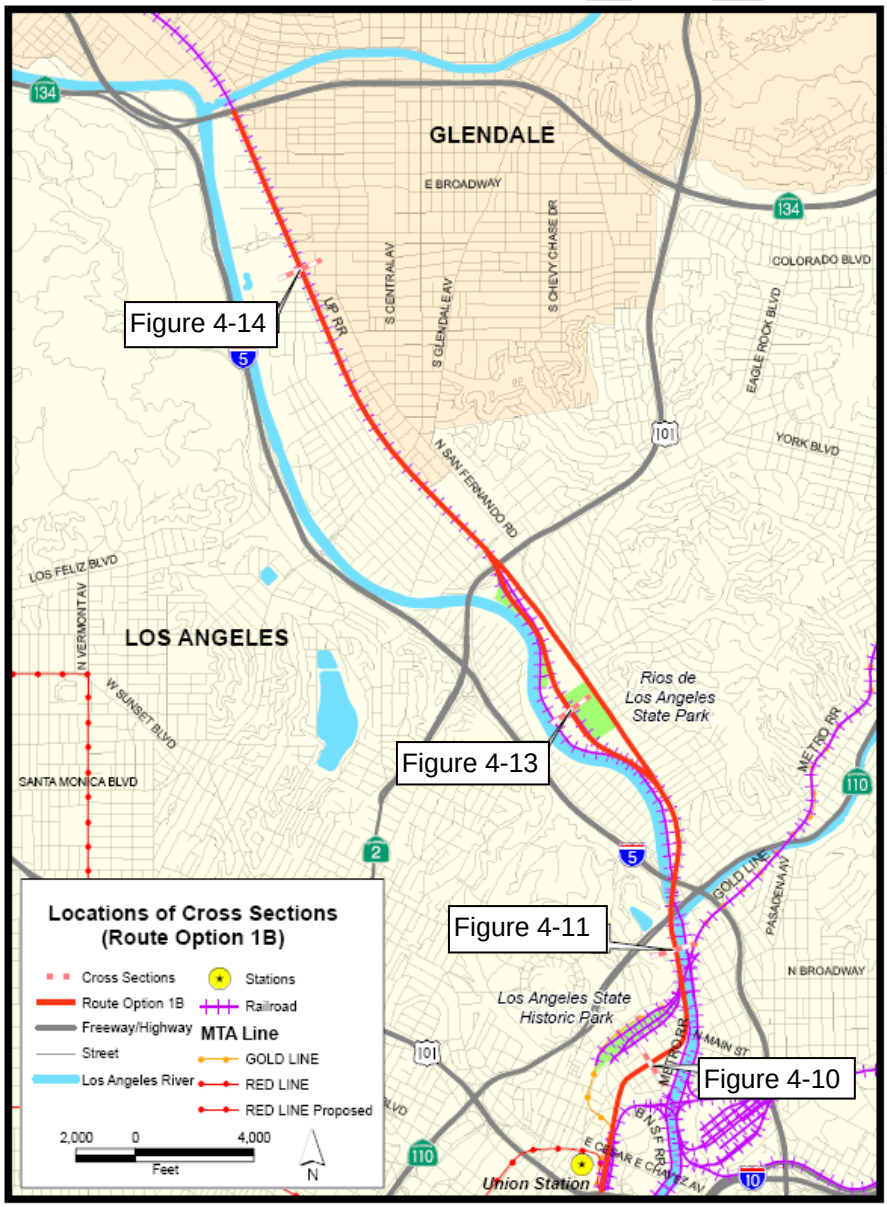
Evaluation Measure	Comments
Hazardous Materials	No additional impacts from hazardous materials under this alternative.

4.3 ALTERNATIVES 3 AND 4

4.3.1 LAUS to I-5

Alternatives 3 and 4 (LAP1B) begin at an above ground HST station, above the existing LAUS Station. It is shown in in outline on Figure 4-9, which also gives a key plan of the showing the locations of cross sections referred to in the text below. All cross sections look from south to north

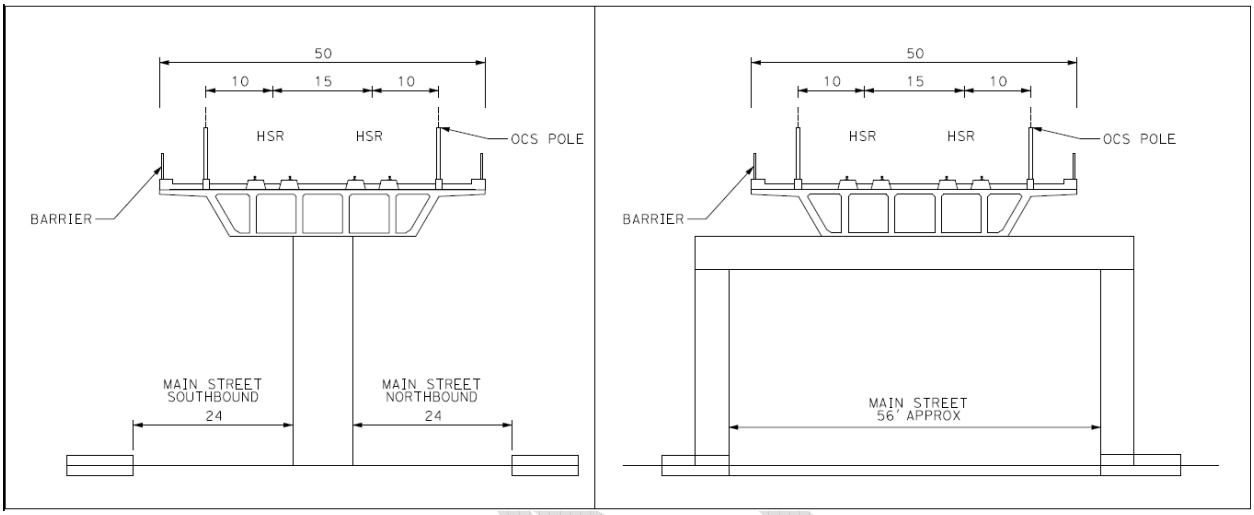
Figure 4-9: Key Plan and Locations of Cross Sections



Source: HMM, URS & Arup JV

The route follows an aerial alignment along Main Street, approximately 25 ft above street level on a new viaduct as shown in Figure 4-10. Main Street is currently approximately 56 ft wide from curb to curb. The speed limit of 40 mph could be achieved on the 1100 ft curve using exceptional geometric limits. This speed limit would be maintained for approximately 10,000 ft from the station (to the river crossing).

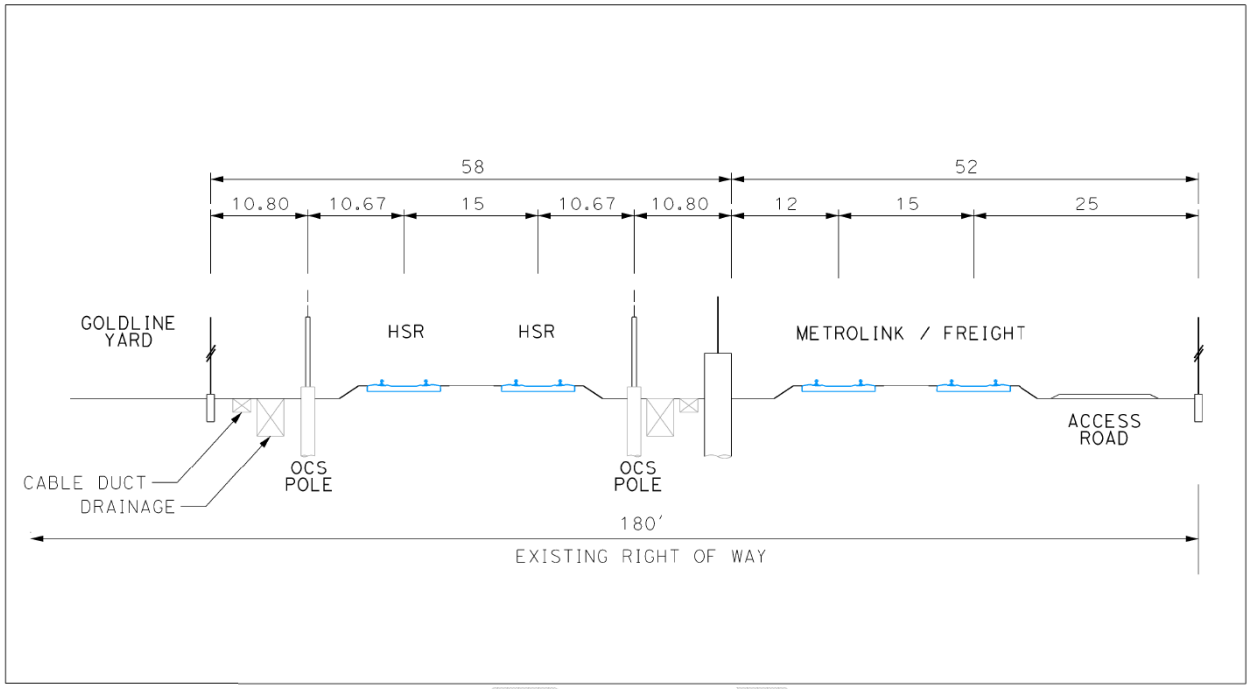
Figure 4-10: Possible Configurations of Viaduct above Main Street (see Figure 4-9 for location)



Source: HMM, URS & Arup JV

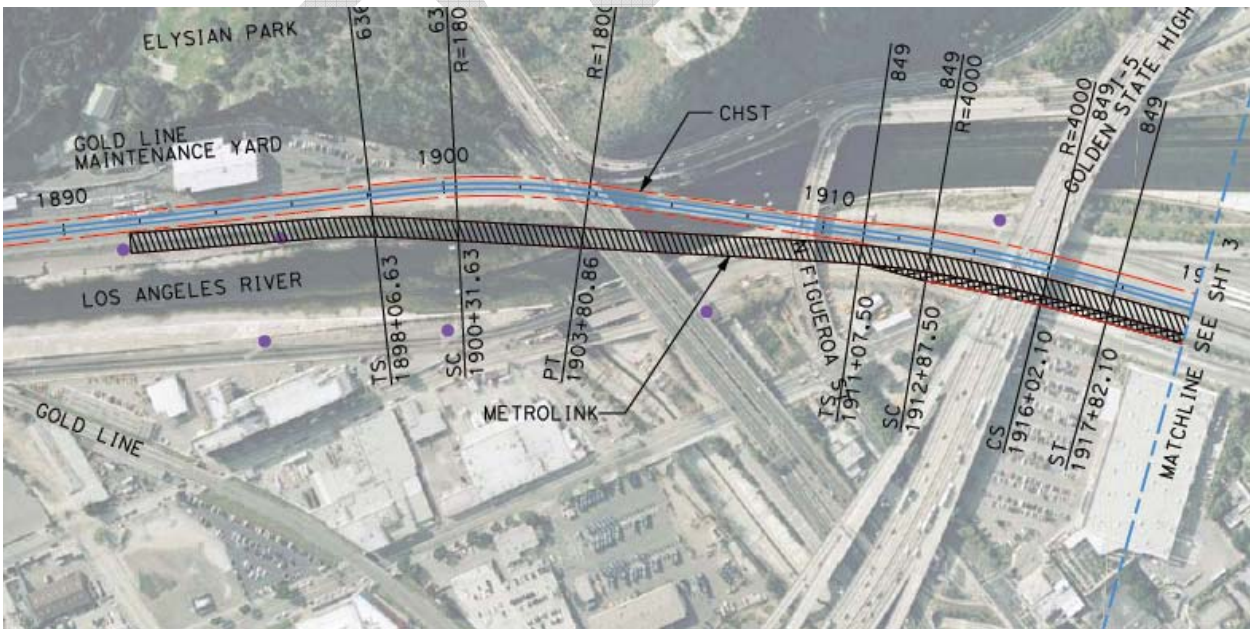
This route passes through a commercial area and near adjacent residential areas which includes the nearby Ann Street elementary school (located at 126 Bloom Street, Los Angeles, CA). It turns to the east and follows the west bank of the river, passing over Spring Street and Broadway bridges before dropping to grade and passing under the SR-110. This would require a gradient of 1.5% for approximately 1500 ft. The route would then run at grade along the west bank of the river, following the existing rail corridor, (Figure 4-11) and then crossing the river at-grade on the existing Metrolink bridge with Metrolink diverted onto a new bridge parallel to it.

Figure 4-11: At Grade Section on West Bank of the LA River (see Figure 4-9 for location)



Source: HMM, URS & Arup JV

Figure 4-12: New Crossing of the LA River

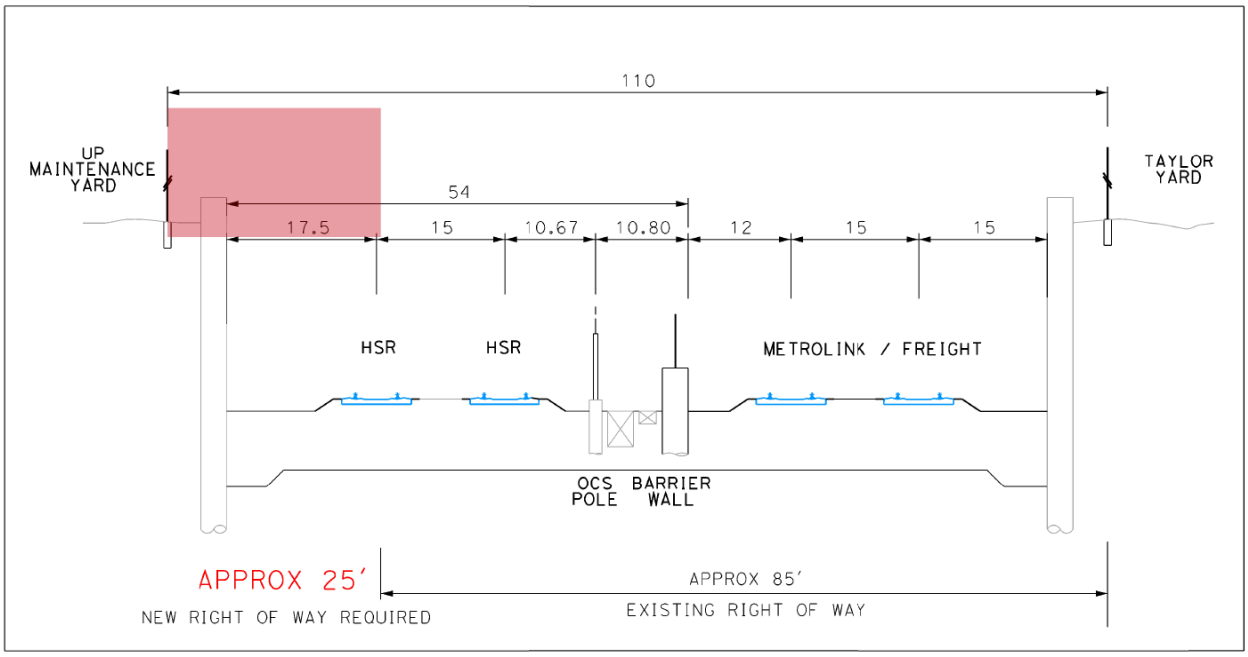


Source: HMM, URS & Arup JV

4.3.2 I-5 to SR 2

The route would then drop into a trench at a gradient of 2.6% for approximately 600 ft (as shown in cross section in Figure 4-13) and follow San Fernando Road (Alternative 3) or the Metrolink alignment (Alternative 4) through the Taylor Yard site. A spur, crossing the trench could be provided to provide access at grade to a reception track serving the Metrolink maintenance yard. Reconfiguration of the yard or removal of the outermost yard track would be required to accommodate the access spur. A replacement for this track could potentially be provided elsewhere on the site. The horizontal alignment with curves of 2400 ft to 3000 ft would impose a speed limit of 60 mph using desirable design criteria. The existing railroad right of way in this area is approximately 85 ft wide, so approximately 25 ft additional width would be required.

Figure 4-13: Typical Trench Section through Taylor Yard along existing Metrolink alignment (see Figure 4-9 for location)

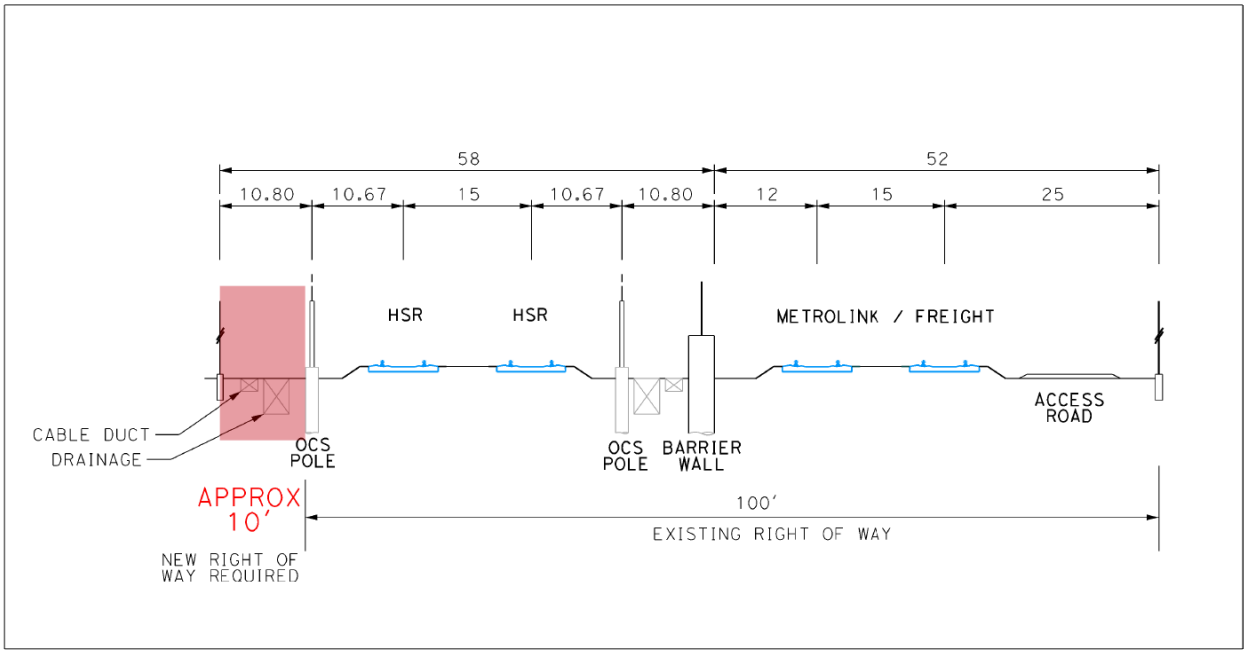


Source: HMM, URS & Arup JV

4.3.3 SR 2 to SR 134

The alignment would then rise out of the trench at a gradient of 2.5% and follow the existing rail corridor at grade between SR-2 and SR-134 (Alternatives 3 and 4). The third track through the Glendale Station area would be eliminated and the station would need reconfiguration. The station building would require relocation further to the east.

Figure 4-14: At grade section from SR-2 to SR-134 (see Figure 4-9 for location)



Source: HMM, URS & Arup JV

The 110 ft wide corridor required for two HST tracks and two Metrolink tracks, as shown in Figure 4-14, would require the purchase of a 10 ft strip along the existing 100 ft right of way. To accommodate a speed above 125 mph, the HST track spacing would be increased to 16.5 ft with the total width of 111.5 ft.

There are three at-grade crossings of the existing railway at Chevy Chase Drive, Broadway and Doran Street that would need to be closed or grade separated. Grade separation would be achieved by realigning the roads above or below the railway

Table 4-2: Evaluation Summary – Alternatives 3 and 4 (LAP1B)

Evaluation Measure	Comments
Design Objectives	
Journey time	5 minutes 36 seconds.Speeds would be limited to 40 mph for a distance of 4,500 ft from the station and 60 mph for the remainder of the section following the existing Metrolink alignment (Alternative 4) through Taylor Yard, before increasing to 135 mph at SR-2. If the San Fernando Road alignment (Alternative 3) is adopted at Taylor Yard, speed for that portion can then increase to 135 mph and the journey time reduces by approx. 50 seconds to 4 minutes 46 seconds.
Route length	8.333 miles for the existing Metrolink alignment (Alternative 4) through Taylor Yard, reducing to 8.286 miles for the San Fernando Road alignment (Alternative 3) at Taylor Yard
Intermodal Connections	Good - Terminates at existing LAUS station. Connections to metro, buses and taxis at existing location.
Operating Costs	The long viaduct required for this alternative would have greater ongoing maintenance costs than LAP1A. Small radius curves and steep grades would cause additional maintenance requirements.

Evaluation Measure	Comments
Capital Costs	Likely to be costlier due to the longer viaduct exiting LAUS. Greater ROW costs on the San Fernando Road alignment (Alternative 3) may be compensated by the cost of the slightly longer alignment through Taylor Yard on the existing Metrolink alignment (alternative 4).
Land Use	
Potential for TOD	High The HST station would be located at LAUS, above the existing Metrolink and Amtrak tracks. LAUS is a transit and rail transportation hub with high connectivity and accessibility for the Los Angeles metropolitan area.
Consistency with other planning efforts	Lower consistency along the viaduct portion of this route as there is a surrounding residential area that lies directly to west. Medium consistency as the route drops to grade along the west bank of the LA River and continues at grade and trench sections as it approaches SR-134.
Constructability	
Constructability	Construction at the existing LAUS site above the existing operational station and approach tracks would be constrained by working restrictions near live tracks and access limitations. Constructing the HST above Main Street would cause considerable disruption to the roadway during construction. This could be minimized by the construction of straddle bents and segmentally launching pre-cast bridge sections. The straddle bents would be used for the section over Main Street (from station 1842+00 to 1856+00, approximately 14 bents, assuming a 100 ft spacing), with single columns used for the remainder of the viaduct. There would be a long-term visual impact, although this is a largely industrial area and the viaduct would be similar in appearance to the existing Gold Line viaduct over Vignes Street. For the existing Metrolink alignment through Taylor Yard, construction would have to be phased to minimize impacts on Metrolink operations. If the San Fernando Road option is chosen, careful phasing would be required to construct the trench without severing access to the plots of land within the Taylor Yard site.
Acceptability of existing overcrossings	The route passes under the following existing overcrossings: SR-110 (96 ft and 68 ft spans), Figueroa Drive, I-5 (161 ft span), SR-2 (186 ft span), and SR-134. Each of the bridges, with the possible exception of Figueroa St would allow the proposed railroads to pass beneath them. Minor realignment of the alternatives would be required when detailed surveys of the bridges have been carried out.
Disruption to existing railroads	Although this route would run above the existing railroad on the west bank of the LA River, substantial columns supporting the new viaduct would be required approximately every 130 ft. Construction of these would cause considerable disruption to the railroad. Some realignment of the existing tracks may be required to site these columns. Relocation of the Gold Line Yard may be required and would be desirable. Between I-5 and SR-2, the San Fernando Road alignment requires re-routing of Metrolink, compared with temporary relocations of Metrolink if the existing Metrolink alignment is followed through Taylor Yard.

Evaluation Measure	Comments
Disruption to and relocation of utilities	Although only two power transmission towers would need to be relocated, the aerial viaduct alongside the power lines on the east bank of the river would require relocation of the transmission lines for a length of approximately 2500ft. This could be an opportunity to relocate the cables, either to a different location or underground, to improve the visual appearance of the LA River in line with the LA River Master Plan. Gas and oil pipelines cross the alignment in a number of locations, particularly along the Metrolink alignment and San Fernando Road. Telecommunications (telephone, cable, fiber-optic lines, etc) networks owned by providers including Qwest, PPSI, USP and AT&T cross the alignment at a number of locations as well as the communications and signaling cables serving the existing railroad. There are numerous storm drainage pipes that would need to be relocated, mainly along existing roads.
Disruption to Communities	
Displacements	There are 69 parcels impacted by the alignment, consisting of 39 commercial parcels and 30 residential parcels. The impacts range from a small land take at the edge of the parcel to requiring the demolition of the buildings on the plot. The viaduct would pass over the low-income housing between Main Street and the railroad track, requiring some land take. Land take would be minimized with this alternative because of the elevated nature of the alignment on the west side of the LA River. Land would be required for columns and piers north of LAUS for the viaduct, and realignment of the Gold Line would require an additional bridge over the river. Neighborhoods within the City of Los Angeles Community Plan Areas may be affected by this route with greater impacts on neighborhoods lying within the viaduct portion of the route and lesser impacts on those that lie within grade and trench level portions. These neighborhoods are located within Los Angeles Community Plan Areas for Boyle Heights, Central City, Central City North, Northeast Los Angeles, and Silverlake/Echo Park/Elysian Valley. Additionally, this route also affects neighborhoods that lie along the viaduct portion of the route including the Arroyo Seco Cornfields Redevelopment area and Elysian Park, and Taylor Yard along the trench portion. Some commercial premises between Main Street and the Cornfield near the LA River and some premises adjacent to the railroad between SR-2 and SR-134 would require relocation.
Property with Access Affected	For the San Fernando Road alignment at Taylor Yard, the route passes along the edge of a proposed housing development, Rio de Los Angeles State Park, a proposed high school site, and through the Sony Business Park. Connections to San Fernando Road would be via a series of land bridges. Grade separations of local roads may impact access to existing properties. Alternative access would need to be provided.
Local Traffic Effects around Stations	There are no HST stations within the study area. The impacts of construction at LAUS are considered in the *Los Angeles Union Station HST Station Option Evaluation* report.

Evaluation Measure	Comments
Local Traffic Effects along Route	The construction works immediately adjacent to San Fernando Road may require temporary lane narrowing to provide sufficient separation between live traffic lanes and the construction site. Existing local roads with grade crossings of the railroad could be closed as part of the package of grade separations and consolidations.
Highway grade separations and closures	The viaduct above Main Street could require the reconfiguration of Main Street if center columns were used. With either straddle bents over the road or columns in the centre of the road, there would be considerable disruption during construction. Three existing grade crossings between SR-2 and SR-134 would be grade separated. These are Chevy Chase Drive, Broadway and Doran Street. These would all require temporary closures during construction.
Environmental Resources	
Waterways / Sensitive Habitat Areas	Sections of this route are within the 100-year flood level. The amount of track within this area would increase if lowering of the track profile were required to pass under the historic bridges. Flood mitigation measures would be required.
Cultural resources	In addition to the common impacts described above, this alternative would pass over Spring Street and Buena Vista historic bridges, but the project would not directly affect or impact these historic-period properties. The proposed route has the potential to indirectly impact portions of historic-period properties as a result of noise, vibration from construction activities, and from operation of the high-speed train, as well as changes to historic integrity aspects of feeling and setting. Implementation of avoidance and minimization measures would minimize adverse impact and significant effects to properties.
Parklands	The alignment would pass close to Los Angeles State Historic Park (the former Cornfield) and would have an impact on the townscape in this area. It would run along the back (west side) of Rio De Los Angeles State Park in a trench. There would likely be impacts on the park during construction. Numerous historical resources, including the historic bridges along the Los Angeles River would be impacted. During construction, there are 12 Section 4(f) resources that would have potentially significant impacts before mitigation due to increased noise/vibration levels, 5 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to historical resources, and 11 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to visual quality from observation points at parks and historic structures. During operation, there are 12 Section 4(f) resources that would have potentially significant impacts before mitigation due to increased noise/vibration levels, and 6 Section 4(f) resources that would have potentially significant impacts before mitigation due to impacts to visual quality from observation points at parks and historic structures.
Agricultural lands	No impacts to agricultural lands in the study area.
Natural Environment	

Evaluation Measure	Comments
Noise and Vibration	Potential impacts to sensitive receivers along this route such as schools (Ann Street School), park and recreational areas (Downey Playground and Recreation Center), Churches (Young Nak Presbyterian), and private and public housing would occur along the viaduct. As the route approaches grade and trench levels, the potential for impact would be reduced to receivers that include park and recreational areas (Elysian Park, River Garden Park, Cypress Park and Recreation Center, Rio State Park and Taylor Yard, Chevy Chase Park and Pacific Community Park), schools (Glassel Park Elementary), Churches (Sungsan Korean, Russian seventh Day Adventist, and New Hope) and a wide variety of single and multi-family residential areas.
Visual/scenic resources	The high viaduct would cause a long term visual impact to sensitive viewers along Main Street including nearby residents and students at the Ann Street Elementary School. Operation of the proposed viaduct under this alternative will introduce immediately recognizable visual components to urban mixed-use, and traditional small urban community landscape types. Potential sources of impacts result from structures (viaducts, catenaries), vehicles, signage, and lighting that may occur where there is an above-ground or trench alignment. Key Observation Points (KOP) 1-4 would be affected by the potential for the construction or construction area to be visible to sensitive viewers. KOP 1-4 will be impacted by viaduct operations visible to sensitive viewers. KOP 1-4 will also be impacted from viaduct operations affecting visual character.
Geotechnical Constraints	Passes along the base of significant slopes susceptible to landslides.
Hazardous Materials	No additional impacts from hazardous materials under this alternative.

5.0 ANALYSIS SUMMARY AND CONCLUSIONS

Based on the results of this evaluation, it is recommended that the four alternatives originating from an elevated HST station above LAUS (Table 5-1) be carried forward for further consideration. Between I-5 (Golden State Freeway) and SR-2 (Glendale Freeway), each of these alternatives can either follow the existing Metrolink alignment through the Taylor Yard site, or follow San Fernando Road with the potential to remove the Metrolink alignment from the middle of the Taylor Yard site facilitating at-grade access between Rio de Los Angeles State Park and the Los Angeles River. Further, where the HST and Metrolink tracks run alongside each other, the HST tracks can be either to the east or the west of Metrolink. In summary the routes of the four alternatives to be carried forward to preliminary design and environmental review are:

LAUS to I-5 (Golden State Freeway)

- Elevated HST station above existing LAUS, east bank of Los Angeles River, at-grade and partial trench (LAP1A as shown on Figure 3-11).
- Elevated HST station above existing Union Station, west bank of Los Angeles River, aerial and partial trench (LAP1B as shown on Figure 3-11).

I-5 to SR-2 (Glendale Freeway)

- Trench shared with Metrolink and freight tracks alongside San Fernando Road east of Taylor Yard.
- Trench shared with Metrolink and freight tracks through Taylor Yard.

SR-2 to SR-134 (Ventura Freeway)

- At grade utilizing the existing rail corridor, either east or west of Metrolink tracks, with right-of-way widened as necessary.

Thus this results in four alternatives to be carried forward as summarized below in Table 5-:

Table 5-1: Alternatives to be Carried Forward

Alternative	LAUS to I-5	I-5 to SR-2	SR-2 to SR-134
1	LAP1A - LAUS above ground – East Bank at-grade, partial trench	San Fernando Road Alignment in trench	Existing Metrolink Alignment
2	LAP1A - LAUS above ground – East Bank at-grade, partial trench	Existing Metrolink Alignment in trench	Existing Metrolink Alignment
3	LAP1B - LAUS above ground – West Bank short aerial, partial trench	San Fernando Road Alignment in trench	Existing Metrolink Alignment
4	LAP1B - LAUS above ground – West Bank short aerial, partial trench	Existing Metrolink Alignment in trench	Existing Metrolink Alignment

APPENDIX A. Fiscal Year 2007-2008 Public Participation Summary Report

APPENDIX B. ALIGNMENT ALTERNATIVE 1 and 2: PLAN & PROFILE DRAWINGS

C-1.2-001-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 1 of 7

C-1.2-002-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 2 of 7

C-1.2-003-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 3 of 7

C-1.2-004-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 4 of 7

C-1.2-005-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 5 of 7

C-1.2-006-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 6 of 7

C-1.2-007-A Option LAP1A – Existing Union Station, Elevated HST Station East Bank of LA River – Sheet 7 of 7

APPENDIX C. ALIGNMENT ALTERNATIVE 3 and 4: – PLAN & PROFILE DRAWINGS

C-1.3-001-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 1 of 7
C-1.3-002-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 2 of 7
C-1.3-003-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 3 of 7
C-1.3-004-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 4 of 7
C-1.3-005-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 5 of 7
C-1.3-006-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 6 of 7
C-1.3-007-A	Option LAP1B – Existing Union Station, Elevated HST Station Main Street and West Bank of LA River – Sheet 7 of 7