S. EXECUTIVE SUMMARY

S.1. INTRODUCTION

S.1.1. Harbor Subdivision Transit Corridor AA Study Summary

The Los Angeles County Metropolitan Transportation Authority (Metro) initiated an Alternatives Analysis (AA) study in 2008 for the Harbor Subdivision Transit Corridor, an approximately 26-mile-long Metro-owned right-of-way (ROW) in southwestern Los Angeles County. The Los Angeles County Transportation Commission (LACTC), Metro’s predecessor, purchased the Harbor Subdivision in the early 1990s from the predecessor of the Burlington Northern Santa Fe (BNSF) Railway, which currently operates limited freight service along the subdivision. The corridor runs from south of downtown Los Angeles at Redondo Junction southwest to Los Angeles International Airport (LAX), then turns southeast through the South Bay area before ending at Watson Yard in the Wilmington neighborhood of the City of Los Angeles. An overview of the 85-square mile Harbor Subdivision Study Area is shown in Figure S.1. The Study Area runs through the cities (from north to south) of Los Angeles, Vernon, Huntington Park, Inglewood, El Segundo, Hawthorne, Manhattan Beach, Redondo Beach, Lawndale, Torrance, Carson, and Long Beach, and several unincorporated areas of Los Angeles County.

An AA Study is the first step in a process that is required to complete the planning, environmental clearance, design and construction of a large-scale transit project. This AA Study builds on a number of previous studies including the Metro Crenshaw Transit Corridor Project, LAX-specific projects, extensions of the Metro Green Line, and several corridor-wide studies of the Harbor Subdivision. The Harbor Subdivision AA Study began by analyzing both existing and forecasted transportation conditions within the Study Area and detailing a range of project objectives designed to address specific mobility problems. A large number of transit alternatives were subsequently identified to utilize the Harbor Subdivision and potentially connect beyond the Metro-owned ROW to activity centers such as Los Angeles Union Station (LAUS), the downtown Los Angeles area, LAX, central Torrance and the South Bay, and the Harbor areas of San Pedro and Long Beach, as shown in Figure S.2.

The alternatives proposed for the Harbor Subdivision corridor were developed and refined in two stages. The Stage I Initial Screening process examined a large number of options including 25 route and terminus options, six modes, and five potential travel markets. Many of these initial options were eliminated during the initial Stage I analysis due to factors including limited ridership potential, operational constraints, physical / ROW constraints, and or community impacts. As an example, the Bus Rapid Transit (BRT) mode was screened out after the Stage I analysis due to safety and operational issues associated with sharing the corridor with freight trains, grade crossing issues, narrow ROW in some sections, and the lack of significant travel time benefits over existing transit service.
Figure S.1. Metro Harbor Subdivision Transit Corridor – Study Area
Figure S.2. Routing Options Evaluated in Stage I Analysis (Initial Screening)
Following the Stage I Initial Screening, four Build Alternatives incorporating various routing/terminus options, modes and travel markets were advanced into a more detailed Stage II Evaluation. The four Build Alternatives carried forward are summarized in Table S.1 and shown in Figure S.3.

### Table S.1. Build Alternatives Evaluated in Stage II Analysis

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local North</td>
<td>Local service (stations approximately every mile) between LAUS and LAX</td>
</tr>
<tr>
<td>Local South</td>
<td>Local service (stations approximately every mile) between LAX and Harbor Area (San Pedro or Long Beach)</td>
</tr>
<tr>
<td>Regional</td>
<td>Regional service (stations approximately every four miles) between LAUS and Harbor Area (San Pedro)</td>
</tr>
<tr>
<td>Express</td>
<td>Express service (no intermediate stations) between LAUS and LAX</td>
</tr>
</tbody>
</table>

The more comprehensive Stage II evaluation process utilized a wide range of criteria to compare the performance of the four Build Alternatives against each other as well as against the No Build and lower-cost Transportation Systems Management (TSM) Alternatives. Key criteria for the Stage II evaluation include:

- Transportation System Performance
- Cost Effectiveness
- Environmental Benefits/Impacts
- Community Acceptability

Also included in the Stage II evaluation were conceptual engineering activities such as engineering design, urban design, operations planning, and cost estimating. These auxiliary activities yielded the following conclusions:

- The northern section of the Harbor Subdivision ROW along Slauson Avenue is only wide enough to accommodate two sets of tracks (30’ in many sections). Given that the BNSF Railway has an operating agreement with Metro that allows continued freight service along this Metro-owned ROW, any alternatives proposed for the northern section of corridor must be able to share the ROW and or tracks with freight trains. For some Build Alternatives, the transit service must be temporally separated from freight service.
- The corridor is wide enough through Inglewood and most of the South Bay to accommodate both a Local or Regional/Express service and freight service in the existing ROW (using separate, parallel tracks for each service).
- Operational constraints in the northern and southern sections of the corridor preclude the extension of the Local Alternative to LAUS and downtown Long Beach. Instead, these major destinations would be served by transferring to the existing Metro Blue Line.
- Off-Corridor connections in the northern, central, and southern areas of the corridor (to LAUS, LAX, and San Pedro / Long Beach respectively) are more costly than the sections...
Figure S.3. Build Alternatives Evaluated in Stage II Analysis (Comparative Evaluation)
following the existing Harbor Subdivision ROW due to the need to acquire new ROW and build more extensive aerial and or tunnel structures.

- Certain Build Alternatives may be able to utilize proposed infrastructure improvements associated with projects such as the Metro Crenshaw Transit Corridor Project, the California High Speed Train Project (CHSTP), and/or the Metro Green Line extension to LAX. For example, construction of the Metro Crenshaw Transit Corridor Project would require shifting and reconstructing the existing freight tracks between Crenshaw Boulevard and Imperial Highway. With these reconstructed tracks in place, the capital cost of implementing a Regional or Express Alternative between LAUS and LAX would be significantly reduced.

- For each alternative, there are only minor capital cost differences between the various modes which suggest that existing vehicle types should be used as much as possible to simplify fleet composition and maintenance activities. Light Rail Transit (LRT) vehicles similar to the existing Metro Rail fleet are recommended for the Local Alternatives (running Self-Propelled Railcars (SPR) on Metro Rail tracks would require extensive operational analysis and offer little advantage over the existing Metro Rail fleet). Commuter Rail Transit (CRT) vehicles similar to the fleet utilized by the Southern California Regional Rail Authority (or Metrolink) is recommended for the Regional/Express Alternatives. SPR technologies, however, remain a viable option for those Alternatives utilizing the freight tracks. An SPR alternative may offer advantages in reduced noise, pollution, vibration and a higher level of community acceptability over CRT.

Detailed Stage II analysis was also performed for shorter segments of the four Build Alternatives that are described in Table S.1 and shown in Figure S.3. This analysis was conducted to better evaluate the off-corridor segments in relation to their affect on the full Build Alternatives. Table S.2 describes these shorter segments of the Build Alternatives and provides overall ratings for each alternative and segment from the Stage II Evaluation.
**Table S.2. Harbor Subdivision Build Alternatives and Analysis Segments**

<table>
<thead>
<tr>
<th>Alternative / Segment</th>
<th>Description</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local North Alternative</strong></td>
<td>Light Rail from Downtown Los Angeles to LAX</td>
<td>1</td>
</tr>
<tr>
<td>Little Tokyo/Arts District – Slauson Ave</td>
<td>Light Rail along Alameda St / Metro Blue Line Corridor</td>
<td>2</td>
</tr>
<tr>
<td>Metro Blue Line – Crenshaw Blvd</td>
<td>Light Rail along Slauson Ave Corridor</td>
<td>3</td>
</tr>
<tr>
<td><strong>Local South Alternative</strong></td>
<td>Metro Green Line Extension to South Bay</td>
<td>4</td>
</tr>
<tr>
<td>Metro Green Line – Redondo Beach RTC</td>
<td>Metro Green Line Extension to Redondo Beach</td>
<td>5</td>
</tr>
<tr>
<td>Redondo Beach RTC – Torrance RTC</td>
<td>Metro Green Line Extension to Torrance</td>
<td>5</td>
</tr>
<tr>
<td>Torrance RTC – Normandie Ave</td>
<td>Metro Green Line Extension to Harbor Gateway</td>
<td>5</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
<td>Metro Green Line Extension to San Pedro via Normandie / Gaffey</td>
<td>3</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via I-110</td>
<td>Metro Green Line Extension to San Pedro via I-110</td>
<td>4</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
<td>Metro Green Line Extension to Long Beach via Sepulveda / Willow</td>
<td>4</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via Pacific Coast Highway (PCH)</td>
<td>Metro Green Line Extension to Long Beach via PCH</td>
<td>4</td>
</tr>
<tr>
<td><strong>Regional Alternative</strong></td>
<td>Regional Rail – LAUS to South Bay</td>
<td>3</td>
</tr>
<tr>
<td>LAUS – Century/Aviation</td>
<td>Regional Rail – LAUS to LAX Area</td>
<td>2</td>
</tr>
<tr>
<td>Century/Aviation – Vermont Ave</td>
<td>Regional Rail – LAX Area to Harbor Gateway</td>
<td>1</td>
</tr>
<tr>
<td>Vermont Ave – San Pedro via I-110</td>
<td>Regional Rail Extension to San Pedro</td>
<td>2</td>
</tr>
<tr>
<td><strong>Express Alternative</strong></td>
<td>Express Rail – LAUS to LAX</td>
<td>1</td>
</tr>
</tbody>
</table>

Ratings: 1 (Worst) – ○ 2 – ○ 3 – ○ 4 – ○ 5 (Best) – ●

**Phased Implementation Strategy**

Based on the Stage II Evaluation, alternatives and segments have been prioritized into the phased implementation strategy listed below and shown in Figure S.4.

**Priority I:**
- **Local South Alternative:** Metro Green Line to Torrance Regional Transit Center (RTC)
Priority II (not in rank order):
- Regional Alternative: LAUS to Vermont/I-110
- Local North Alternative: Metro Blue Line to Crenshaw Boulevard

Priority III (not in rank order):
- Local South Alternative: Torrance RTC to San Pedro via I-110
- Local South Alternative: Torrance RTC to Long Beach via Sepulveda / Willow
- Regional Alternative: Vermont/I-110 to San Pedro
- Express Alternative: LAUS to LAX

Implementation of Priority II and or Priority III projects is largely dependent upon the availability of funding and the prior or potential implementation of other transportation-related investments.

Alternatives to Consider for Draft Environmental Phase

Given its strong performance in the Stage II evaluation process and its ability to meet the Purpose and Need for the Harbor Subdivision Transit Corridor Study, the Metro Green Line extension to the Torrance RTC is the Build Alternative recommended to be considered for future study in the Draft Environmental Impact Statement / Environmental Impact Report (EIS/EIR).
Figure S.4. Harbor Subdivision – Phased Implementation Strategy
S.1.2. Executive Summary Purpose & Structure

This Executive Summary provides a synopsis of the Harbor Subdivision AA Study, with a similar structure to the overall report that follows. The structure of the Executive Summary is as follows:

- S.2. Purpose and Need, including study area mobility problem and project objectives
- S.3. Alternatives, including initial set of options, Stage I Initial Screening, Alternatives to be carried forward for Stage II Evaluation
- S.4. Further Project Definition, including engineering, operations, and urban design issues
- S.5. Stage II Evaluation Criteria
- S.6. Stage II Evaluation – Transportation System Performance
- S.7. Stage II Evaluation – Cost Effectiveness
- S.8. Stage II Evaluation – Environmental Benefits and Impacts
- S.9. Stage II Evaluation – Community Acceptability
- 0. Stage II Evaluation – Overall Results and Summary
- S.11. Community / Stakeholder Outreach
- S.12. Conclusions of AA Study

S.2. PURPOSE & NEED

This Purpose and Need section establishes the existing conditions and mobility problem in the Harbor Subdivision corridor, as well as defining the objectives for the Harbor Subdivision AA Study. The most pressing mobility problems in the corridor include:

- Heavy Traffic Congestion
- Poor Transit Travel Times and Schedule Reliability
- Poor Transit Connections
- Lack of Regional Connections

S.2.1. Harbor Subdivision Background & History

This AA builds upon numerous corridor studies completed within the last twenty years that focused on the Harbor Subdivision ROW and its immediate vicinity. This study, however, is a departure from prior studies insofar as it represents the first comprehensive effort to identify a program of alternatives for the Harbor Subdivision Transit Corridor that serves multiple travel markets. Several past studies focused on the examination of the “Coastal Corridor,” a potential transit line paralleling the I-405 through the South Bay. Others have focused on a Metro Green Line extension north to LAX, which would utilize the Harbor Subdivision ROW between Imperial Highway and Century Boulevard. In addition, numerous studies have
examined passenger service along the Crenshaw Corridor, which is planned to utilize the Harbor Subdivision ROW between Crenshaw Boulevard and Imperial Highway, a distance of five miles. The most recent Metro study, completed in 2006, examined the feasibility of implementing transit service along the entire length of the Harbor Subdivision corridor from south of downtown Los Angeles to the Harbor Area. This study found passenger service along the Harbor Subdivision to be feasible, and serves as the basis for this AA.

S.2.2. Harbor Subdivision Characteristics

The Harbor Subdivision ROW runs through a number of diverse communities in southwestern Los Angeles County. The existing configuration of the corridor is a key factor in determining the type of transit improvements appropriate for future implementation. Several key characteristics are described in the following sections.

Study Area Jurisdictions

The Study Area runs through the jurisdictions listed below and shown in Figure S.1.

- City of Los Angeles, including all or portions of the following areas:
  - Downtown Los Angeles
  - South Los Angeles
  - Chesterfield Square
  - Hyde Park
  - Westchester
  - Harbor City
  - Wilmington
  - San Pedro
- Vernon
- Huntington Park
- Inglewood
- Hawthorne
- El Segundo
- Lawndale
- Manhattan Beach
- Redondo Beach
- Torrance
- Carson
- Long Beach
- County of Los Angeles, including portions of the following unincorporated areas:
  - Florence
  - View Park
  - Ladera Heights
  - Lennox
  - Del Aire
  - Harbor Gateway

ROW Width

When LACTC purchased the Harbor Subdivision ROW in the early 1990s, the purchase included most elements of the Subdivision. BNSF, however, did not sell the entire width of the ROW in several locations where they retained freight functions. These areas include: the Malabar Yard in Vernon, wide ROW sections in the Hyde Park and Westchester areas of the City of Los Angeles, and industrial sidings through Torrance. Corridor ROW widths are shown in Figure S.5.
For approximately nine miles of the Harbor Subdivision (about 1/3 of its length, almost all of it between Redondo Junction and Crenshaw Boulevard in South Los Angeles), the ROW is approximately 30 to 40-feet wide and there is insufficient space for both freight trains and transit vehicles to operate side by side. If freight service is to be preserved in these sections, additional ROW takes or temporal separation of services will be required. The remainder of the corridor (from Inglewood south) can accommodate parallel freight service and a new transit service in the same ROW, with ROW widths generally approaching 100'.

Grade Crossings

The Harbor Subdivision corridor is crossed by 118 streets, railroads, and other public and private facilities along its 26-mile length. Of these crossings, 96 are at-grade, with 70 in the northern section of the corridor between Vernon and LAX (many crossings in the South Bay are already grade separated). While some of these streets carry low volumes of traffic and could potentially be closed, a large number of crossings will need to be upgraded or grade separated before transit service can be introduced along the corridor. An Initial Grade Crossing Analysis consistent with the Metro Grade Crossing Policy was undertaken as part of this AA study, with the results summarized in Section S.8.4. Numerous improvements at grade crossings will be required to ensure safe and reliable transit operations.

S.2.3. Study Area Demographics

The demographics of the Harbor Subdivision Study Area are well suited for the implementation of a new transit service. High population and employment densities, large numbers of transit-dependent residents, and transit-supportive land uses throughout the Study Area are described in the following sections.
Population and Employment

The Harbor Subdivision Study Area is home to a large percentage of the residents and businesses in Los Angeles County, as shown in Figure S.6.

With approximately 875,000 residents (9% of the county-wide population) and 700,000 jobs (15% of county-wide employment), the Study Area is an important hub for activity in the region. Significant growth is also projected for the Study Area, with the population projected to increase 15% to approximately 1 million residents by 2030 and employment projected to increase 18% to 835,000 jobs. Residential densities are concentrated in South Los Angeles and Inglewood while the Study Area’s largest employment centers are found in downtown Los Angeles, the LAX / El Segundo area, Torrance, and the Harbor region.

Transit Dependent Households

Many riders use transit out of necessity, as they do not have other means of travel. Transit dependency is closely correlated with income, with the rate of automobile ownership and automobile travel generally increasing with household income. Study Area Transit Dependency is shown in Figure S.7.

The Harbor Subdivision Study Area has high rates of transit dependency, with approximately 20% of households in the Study Area not having access to personal automobiles as compared to only 13% for South Los Angeles County as a whole. The majority of these households are concentrated in South Los Angeles, Huntington Park and downtown Los Angeles, which has the largest transit-dependent population (49%) in the Study Area.
Study Area Land Uses

The dense urban and suburban land uses in the Harbor Subdivision Study Area are an ideal environment in which to introduce new high-capacity transit service. The prevailing land use pattern in the Study Area is low- to medium-density residential, with housing representing 44% of uses in the Study Area. The Study Area also has large concentrations of industrial uses, and is much more industrial than South Los Angeles County as a whole (22% versus 7%) with concentrations in the downtown Los Angeles and Harbor areas. Commercial properties, generally concentrated in downtown Los Angeles and the South Bay, make up approximately 12% of the Study Area’s land uses, which compares to 7% in South Los Angeles County. The Study Area’s mix of land uses makes it an attractive location for transit investments. Transit is well-situated for areas with a combination of land uses, enabling residents to utilize transit for a variety of purposes including travel to / from work, home, shopping, etc. An overview of Study Area land uses is given in Figure S.8.

Nearly 1/3 of the land directly abutting the ROW is transportation or utility related, and an additional 30% of the corridor-adjacent land is industrial. Low and high-density residential development abuts approximately 17% of the corridor, with concentrations in Lawndale, Redondo Beach, Torrance, Harbor Gateway, and Carson. Another 13% is commercial, generally focused on large office parks in El Segundo, Hawthorne, and Redondo Beach. The remaining 10% of land adjacent to the corridor is a mix of uses, including parks and public uses in the downtown Inglewood area. While large portions of the Study Area are residential, the majority of the corridor has a one or more block buffer of industrial and commercial uses.
along the Subdivision that reduces negative impacts to the residential neighborhoods associated with new transit investments.

**S.2.4. Travel Markets**

Given the demographics of the Study Area, the next step is to examine the travel behavior of residents, visitors, and workers. This section describes where in the Study Area and region trips are being made, and the suitability of the Harbor Subdivision for serving travel markets such as the I-405 and I-110 corridors and several other local and regional markets.

**Trip Patterns**

Daily trip volumes to and from designated districts within the Study Area provide an idea of the relative share of regional versus local trips and the relative strength of regional versus local travel markets. Figure S.9 depicts a spider diagram that shows the current daily volume of trips to and from each Study Area district from other districts in the Los Angeles Region.

There are several general observations that can be gathered from a district-to-district analysis of trip patterns:

- **There is a strong connection between districts within the Study Area.** Generally, the highest shares of non-internal trips are to adjacent districts.
- **There is a large market along the I-405 corridor.** There is a large travel market between adjacent districts as well as for more regional trips. Severe congestion on the I-405 during peak periods suggests the presence of a strong market for a fixed-guideway transit service paralleling the freeway.
• Downtown Los Angeles serves as the regional hub of the Study Area. Downtown Los Angeles is the transportation hub of the Study Area and Los Angeles County, with both the freeway and mass transit systems feeding into the district. Downtown Los Angeles’ robust transportation connection to the rest of the region will be one of the main access points for future Harbor Subdivision riders heading to points to the north and east.

• There is a strong north-south local and regional travel market in the South Bay. More than half of trips in the South Bay district stay within the South Bay. In addition, there is a strong north-south travel market between the Palos Verdes Peninsula, the South Bay and the LAX / El Segundo / South Los Angeles area, with many of those trips fed onto north-south arterials. The Harbor Subdivision runs through the heart of this travel market, and can provide an alternative to congested South Bay arterials.

Study Area Activity Centers

Based on an examination of trip productions and attractions in the Study Area and intensity of land use, several major activity centers have been defined within or adjacent to the Harbor Subdivision Study Area. These activity centers generally consist of high concentrations of commercial and institutional uses that attract large numbers of local and regional trips. The Study Area’s major activity centers are listed below, and shown in Figure S.10.

• Downtown Los Angeles (office, entertainment, government, transportation)
• Huntington Park (commercial, residential)
• Inglewood (commercial, government, residential)
• Los Angeles International Airport (LAX) (airport, commercial, office)
• El Segundo (office)
• San Pedro (port-related, commercial)
• Long Beach (port-related, office, commercial, government, residential)

Of the activity centers described above, several stand out as regional activity centers that draw trips from wide areas of the Los Angeles region: downtown Los Angeles, the LAX / El Segundo area, and downtown Long Beach. The remainder of the activity centers draw from smaller regions, but still represent the largest concentrations of trip activity in their immediate areas.

Major Travel Markets

The travel patterns within the Study Area are strong evidence of a robust market that can be served by a new transit service along the Harbor Subdivision corridor. The major residential areas (blue) and employment centers (red) along the Harbor Subdivision are shown in Figure S.11. The travel market analysis shows that trips originate in residential areas like Palos Verdes, Harbor Cities, Redondo Beach, Manhattan Beach, Lawndale, Westchester, Baldwin Hills and South Los Angeles. These trips are destined for activity centers in downtown Los Angeles, El Segundo / LAX, Torrance, San Pedro and Long Beach.

The Harbor Subdivision corridor parallels the I-405 between the Harbor area and LAX and traverses the heart of the South Bay / El Segundo employment base. Given the current deficiencies in the existing transportation system described in sections S.2.5 and S.2.6, adding transit capacity along the Harbor Subdivision has the potential to address numerous unmet needs.
As a result of the trip markets analysis, five major travel markets have been defined along the Harbor Subdivision corridor as described below. Transit solutions along the Harbor Subdivision must be designed to serve one or more of these major markets.

- **I-405 Corridor** – Regional and semi-regional trips within the South Bay and along the I-405 corridor from Orange County through the South Bay to the Westside and San Fernando Valley.

- **South Los Angeles East – West Local Corridor** – Local trips traveling east-west between Culver City, Inglewood, South Los Angeles, Chesterfield Square, Hyde Park, Huntington Park, the Gateway Cities, and downtown Los Angeles.

- **South Bay North – South Local Corridor** – Local trips traveling north-south through the South Bay, generally traveling between Inglewood, Hawthorne, Lawndale, Redondo Beach, Torrance and Palos Verdes.

- **Los Angeles International Airport** – Regional trips to LAX from throughout the Los Angeles Basin including the South Bay, Gateway Cities, West Los Angeles and Central Los Angeles.

- **South Bay Regional** – Regional trips to and from the South Bay to LAUS and points to the north and east.

### S.2.5. Transportation System Performance

With the travel markets in the Study Area defined, this section focuses on how well they are served by the existing transportation network. The Harbor Subdivision Study Area is served by several freeways, an extensive arterial network, county and municipal bus operators, and a limited section of the region’s rail system. The largest performance issue relates to traffic congestion and its impact on fixed route bus operations. Many of the freeways and arterials...
currently operate at poor levels-of-service (LOS) during the peak commute periods, with performance expected to deteriorate further in the future. Although a variety of transportation projects are currently in the planning, design and construction phases in portions of the Study Area, such projects cannot solve the transportation problem as a whole. Fixed-guideway, high-frequency, high-capacity transit improvements along the Harbor Subdivision ROW would offer a more sustainable and reliable transportation option not subject to prevailing traffic conditions.

**Freeway System Performance**

Table S.3 summarizes current and future freeway LOS throughout the Study Area and South Los Angeles County in 2003 and 2035. As shown, freeway performance is already poor in many sections of the Study Area, with approximately 70% of the freeway mileage in the Downtown and South Los Angeles areas currently running at LOS F (gridlock) during peak periods. Travel speeds are expected to worsen on most Study Area freeways and in South Los Angeles County as a whole, with peak hour speeds expected to decrease approximately 5 mph by 2035.

Deteriorating performance on Study Area freeways has detrimental effects on surrounding communities. Low levels of service equate to lower travel speeds, increasing travel times and compounding productivity loss. Slower travel speeds mean less efficient gas consumption, increased tail pipe emissions and diminished air quality. In addition, slow freeway speeds tend to push traffic and congestion to parallel arterials as drivers look for alternate routes. High-frequency passenger service along the Harbor Subdivision has the potential to improve travel times and encourage mode shifts to transit.

<table>
<thead>
<tr>
<th>Subregion</th>
<th>Percent of Freeway Network at Given Level of Service (2003 / 2035)</th>
<th>Avg. Speed (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Downtown Los Angeles</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>South Los Angeles / Inglewood / LAX</td>
<td>19%</td>
<td>3%</td>
</tr>
<tr>
<td>South Bay</td>
<td>14%</td>
<td>6%</td>
</tr>
<tr>
<td>Harbor</td>
<td>44%</td>
<td>9%</td>
</tr>
<tr>
<td>Study Area (All)</td>
<td>20%</td>
<td>7%</td>
</tr>
<tr>
<td>South Los Angeles County (All)</td>
<td>6%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Table S.3. Study Area Freeway Performance – PM Peak Period – 2003 / 2035
Arterial System Performance

Like the Study Area freeway network, Study Area arterials operate at low levels of service in peak hours. Several arterial segments which parallel the corridor were studied as part of an existing conditions traffic assessment. As illustrated in Table S.4, corridors such as Slauson Avenue, Aviation, Hawthorne, and Crenshaw Boulevards operate at LOS C or D during off-peak periods and LOS E or F during peak periods. A parallel fixed-guideway service along the Harbor Subdivision would allow for an alternative to slow travel speeds and chronic congestion along Study Area arterials.

<table>
<thead>
<tr>
<th>Arterial Segment</th>
<th>Direction</th>
<th>Length (mi)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slauson Ave (Western to Santa Fe)</td>
<td>Eastbound</td>
<td>4.5</td>
<td>11.7 (mph)</td>
<td>15.0 (mph)</td>
</tr>
<tr>
<td></td>
<td>Westbound</td>
<td></td>
<td>10.8 (mph)</td>
<td>13.5 (mph)</td>
</tr>
<tr>
<td>Aviation Blvd (Arbor Vitae to Manhattan Beach)</td>
<td>Northbound</td>
<td>4.6</td>
<td>16.2 (mph)</td>
<td>14.5 (mph)</td>
</tr>
<tr>
<td></td>
<td>Southbound</td>
<td></td>
<td>15.3 (mph)</td>
<td>13.8 (mph)</td>
</tr>
<tr>
<td>Hawthorne Blvd (El Segundo to PCH)</td>
<td>Northbound</td>
<td>7.8</td>
<td>12.6 (mph)</td>
<td>21.3 (mph)</td>
</tr>
<tr>
<td></td>
<td>Southbound</td>
<td></td>
<td>13.4 (mph)</td>
<td>16.7 (mph)</td>
</tr>
<tr>
<td>Crenshaw Blvd (190th to Lomita)</td>
<td>Northbound</td>
<td>3.6</td>
<td>12.0 (mph)</td>
<td>14.4 (mph)</td>
</tr>
<tr>
<td></td>
<td>Southbound</td>
<td></td>
<td>12.7 (mph)</td>
<td>18.0 (mph)</td>
</tr>
</tbody>
</table>

Transit System Performance

The existing transit system in the Study Area consists primarily of a mix of Metro-operated and local municipal bus service. Fixed guideway service throughout the Study Area is limited to the downtown Los Angeles and Long Beach areas (Metro Blue Line, plus lines converging at LAUS) and El Segundo (Metro Green Line). In addition, the Harbor Transitway along the I-110 allows for express bus service on dedicated bus lanes to downtown Los Angeles from the South Bay. An overview of bus and rail lines in the Study Area is shown in Figure S.12.

Most of the bus routes in the southern portion of the Study Area operate on segments of major or medium-capacity arterial streets, often only within the city limits of the municipal operator. In these cases, the lack of connectivity along each arterial corridor impacts the potential for higher ridership, due to the lost time and inconvenience caused by required transfers. A more regional transit solution in the area would help alleviate these connectivity issues.

Transit trip times between origin and destination pairs are considerably longer than automobile trip times. This is partly because buses most often run on arterial streets rather than freeways and make frequent stops. Additionally, even though local bus service is
extensive throughout the Study Area, longer distance trips require multiple transfers between different municipal bus operators. Wait times at transfer locations connecting local bus routes are highly variable, particularly in areas with heavy traffic congestion or when headways reach 60 minutes during midday for some lines.

Examples of existing travel time differences between driving and transit in the Study Area include:

- **LAUS to South Bay Galleria (20 miles)**
  - Driving Time: 23 – 50 minutes
  - Transit Travel Time: 55 – 91 minutes (via Metro 40, Metro 440, Commuter Express 438 or Torrance Transit 2)

- **LAUS to San Pedro (25 miles)**
  - Driving Travel Time: 28 – 60 minutes
  - Transit Travel Time: 32 – 69 minutes (via Metro 445, Commuter Express 448)

- **Imperial/Aviation to San Pedro (18 miles)**
  - Driving Travel Time: 24 – 35 minutes
  - Transit Travel Time: 44 – 87 minutes (via MAX 3, MAX 3X, or Metro 445 / Metro Green Line)

A major transit improvement objective is to reduce the number of transfers needed for semi-regional and regional trips. The Harbor Subdivision corridor provides a more direct route between many origin and destination pairs.

Another project goal is to reduce travel time variability, which is especially problematic for longer transit trips that require multiple transfers and run on congested arterials and freeways. An off-street service along the Harbor Subdivision provides more reliable travel times than the existing Study Area transit network.
Figure S.12. Study Area Bus and Rail Lines
S.2.6. **Study Area Transportation Problem**

Deficiencies with the Study Area’s transportation network described in the previous sections can generally be attributed to one or more of the four major issues described below. The goal of the Harbor Subdivision study is to develop transit solutions that address these transportation problems.

**Heavy Traffic Congestion**

In the Study Area and the rest of Los Angeles County, increases in travel demand have outpaced highway and roadway capacity. Congestion has worsened along the I-405, I-110, and I-105 freeways, and in most cases, has spread from the peak commute hours to the midday period. Several of these facilities already operate at LOS F during peak hours, with the LOS expected to deteriorate even further in the future despite planned roadway improvements. The performance of Study Area arterials is little better than that of the freeways. Many arterials, such as Slauson Avenue and Aviation, Hawthorne, and Crenshaw Boulevards perform at LOS E or worse during peak periods with average speeds generally ranging between 15 and 20 mph. Due to heavy congestion limiting mobility throughout the Study Area for both local and regional travel, transit solutions that bypass the congested roadway network will allow for faster travel times for Study Area residents and employees.

**Poor Transit Travel Times and Schedule Reliability**

Travel times for mid- and long-distance trips via transit are often twice as long as comparable trips via automobile. The challenge facing local bus service expansion is that while frequencies can be improved, average speeds are constrained by prevailing traffic conditions. This has an impact on transit operations and, in particular, schedule reliability and efforts to better coordinate transfers. With arterial and freeway performance expected to deteriorate in the future, transit travel times and reliability will only worsen. Off-street solutions utilizing the Harbor Subdivision will not be tied to the performance of roadways and allow for faster and more reliable service than the existing system.

**Poor Transit Connections**

With the large number of transit hubs served by many different operators in the Study Area, schedule and fare coordination issues make transferring between different services a challenge. While the Transit Access Pass (TAP) program aims to solve many of the fare coordination issues between operators, passengers will likely still experience long wait times when transferring, especially at locations where headways are 30 to 60 minutes. Additionally, some parts of the Study Area such as Harbor Gateway and Wilmington are not currently served by major transportation hubs. Fixed guideway transit along the Harbor Subdivision would connect these areas to the regional transit network and provide new, high-quality transit access to presently underserved neighborhoods.
Lack of Regional Connections

Although the Harbor Transitway and Metro Blue and Green Lines offer regional service and connection opportunities in limited sections of the Study Area, other areas such as the South Bay and South Los Angeles have limited regional transit options. Existing bus lines in the Study Area are operated by a mix of local bus operators with limited service areas and few long distance lines providing regional connections. The absence of dedicated fixed guideway transit service providing more direct access between the county’s major subregions limits the ability of transit to encourage more usage of the transportation system. The Harbor Subdivision, which can provide off-street connections to regional destinations, would open a new regional travel market for residents and employees of the Study Area.

S.2.7. Harbor Subdivision Project Objectives

As described throughout this chapter, the Harbor Subdivision corridor provides an excellent opportunity to provide new system connectivity in Southwestern Los Angeles County. Its C-shaped orientation parallels major interstates in the region, and provides a link between several key activity centers such as downtown Los Angeles, LAX, the South Bay, and the Harbor. To address transportation problems laid out in this chapter, solutions along the Harbor Subdivision will seek to fulfill the following five objectives:

• **Improve mobility in southwestern Los Angeles County by introducing high-frequency transit service options.** The Harbor Subdivision presents the opportunity to introduce fixed-guideway, high-frequency, high-reliability transit options from the Harbor and South Bay areas to the existing transit lines in the El Segundo / LAX area and from the LAX area to downtown Los Angeles. This investment will present new options for residents who currently drive or take local bus lines and will introduce an overall improvement in mobility for the entire Study Area and surrounding region.

• **Enhance the regional transit network by interconnecting existing and planned rapid transit lines.** The Harbor Subdivision corridor crosses a number of existing and planned transit lines, and has the ability to bind a number of individual lines into an integrated system which can serve a large number of trip patterns. Lines and hubs that a Harbor Subdivision project can tie together include the Metro Red, Purple, and Gold Lines, Metrolink, and El Monte Busway at LAUS, the Metro Blue Line and Harbor Transitway in South Los Angeles, the Metro Green Line, future Crenshaw Transit Corridor, and LAX People Mover being planned by LAWA in the LAX area, planned regional transit centers in Redondo Beach and Torrance, and the San Pedro and Long Beach areas. With these connections, the Harbor Subdivision can facilitate interoperability between multiple branch lines and enhance the regional rapid transit system.

• **Provide an alternative mode of transportation for commuters who currently use the congested I-405 and I-110 corridors.** The Harbor Subdivision corridor provides an alternative to these congested corridors for much of their length. The corridor parallels I-405 from Long Beach to the LAX / Inglewood area, providing access to the major employment centers of the South Bay area. From LAX north, it can provide an alternative to the I-105 / I-110 corridors that connect LAX to downtown Los Angeles, as well as more
direct access to neighborhoods and businesses near the I-110 in South Los Angeles. Although the Harbor Transitway offers some travel times savings for carpoolers and bus riders along the I-110 corridor, service is focused primarily on downtown Los Angeles and is less effective in serving the South Bay area.

- **Improve transit accessibility for residents of communities along the corridor.** The Harbor Subdivision Study Area has a high rate of transit dependence, especially in the South Los Angeles and downtown Los Angeles areas of the corridor. A new fixed guideway service along the Harbor Subdivision has the potential to improve transit accessibility to many areas, including the Slauson Avenue corridor, Inglewood, LAX / El Segundo and the communities of the South Bay.

- **Encourage a mode shift to transit, reducing air pollution and greenhouse gas emissions.** Transit plays a significant role in the region’s overall efforts to lower vehicle miles of travel (VMT) and thus emissions, especially during congested hours of the day. Encouraging drivers to switch to transit, thereby reducing congestion and the amount of time vehicles idle in severe traffic, is just one example of how the provision of competitive mass transit service can lower mobile source emissions and improve air quality.

### S.3. ALTERNATIVES

The Alternatives Chapter introduces a preliminary set of alternatives, screens these alternatives using specified criteria, and introduces a revised set of alternatives that are examined in more detail in the second stage of the AA process. From a large number of routing, mode, and travel market options, a total of four Build Alternatives are brought forward for the detailed Stage II analysis.

#### S.3.1. Stage I Initial Screening Criteria

The alternatives evaluation process for the Harbor Subdivision has been divided into two stages: the Stage I Initial Screening and a later Stage II Comparative Evaluation. The Stage I Initial Screening evaluates a comprehensive set of preliminary routing / terminus and modal options against a set of defined criteria to eliminate those with significant flaws. The Stage II Evaluation consists of a comparative performance evaluation of the remaining alternatives. Stage I criteria are listed below, while Stage II evaluation criteria are summarized in Section S.5.

- Travel Time
- Transit Accessibility
- Regional Connectivity
- Environmental Effects / Safety
- Physical Fit
- Community Acceptability

#### S.3.2. No Build Alternative

Federal and State Laws require that Build Alternatives are evaluated against a No Build Alternative in a project’s Environmental Impact Statement (EIS) / Environmental Impact Report (EIR). The No Build Alternative represents the existing conditions in the Study Area in
addition to the funded transportation improvements specified in the financially constrained portion of Metro's 2001 Long Range Transportation Plan (LRTP). Major projects included in the No Build Alternative include the Metro Gold Line Eastside Extension (LRT), Expo Line (LRT) Phase 1, and Metro Crenshaw Transit Corridor Project (BRT or LRT).

Overview maps of the No Build Alternative and these additional fixed guideway projects are shown in Figure S.1 and Figure S.12.

S.3.3. Transportation Systems Management (TSM) / Baseline Alternative

The TSM / Baseline Alternatives consist of low cost operational improvements to current transit facilities and services that extract the greatest benefits from existing infrastructure. The TSM / Baseline Alternatives provide the basis for comparison with the higher capital investment Build Alternatives. The low-cost TSM Alternatives include Metro Rapid, Metro Rapid Express, and LAWA FlyAway express bus routes that correspond to the Build Alternatives proposed for operation in the Harbor Subdivision ROW. The TSM Alternatives follow on-street routes similar to the alignment of their respective Build Alternatives and serve identical station locations.

S.3.4. Build Alternatives

Build Alternatives are composed of three components: travel markets served (discussed in Section S.2.4), modal options and routing / terminus options, as shown in Figure S.13.
S.3.5. Modal Options

Six modal options were investigated for the Harbor Subdivision corridor during the Stage I screening process. These modes include BRT, LRT, LRT-compatible and freight-compatible SPR, Electric Multiple Units (EMU) and CRT. Examples of the modal options investigated for the Harbor Subdivision study are shown in Figure S.14.

Modal options generally fall into two categories: smaller LRT-compatible vehicles which typically serve local trips and larger freight rail-compatible vehicles that serve regional trips. LRT-compatible vehicles travel at moderate speeds and stop frequently at stations located in close proximity (approximately every mile). Freight-compatible vehicles travel at high speeds and stop relatively infrequently, allowing stations to be located farther apart (approximately every four miles).

Under existing Federal Railroad Administration (FRA) regulations, LRT-compatible modal technologies cannot operate on the same track as freight trains or the freight-compatible modal options. This means that LRT-compatible and freight-compatible vehicles cannot operate over the same tracks at the same time. In areas of the ROW that are wider than 50 feet, both LRT-compatible and freight-compatible guideways can be built with a physical barrier to allow joint operations. In areas narrower than 50 feet, temporal separation will be needed to operate LRT-compatible transit vehicles while also allowing for freight operations during off-peak periods.
Modal Options – Stage I Screening

Only the BRT mode did not meet the Stage I screening criteria and was eliminated from further analysis. The remaining modes were carried forward, as shown in Table S.5. A BRT
running way would create safety and operational issues and conflict with freight trains and their customers. The preliminary analysis also showed that BRT would not offer significant travel time benefits relative to the high capital cost investment needed due to the slow speeds required when crossing a number of the Corridor’s 96 grade crossings. In addition, where narrow segments of the Corridor cannot accommodate the width of BRT lanes or the clearances required between BRT lanes and freight tracks, BRT vehicles would be required to leave the ROW and operate in mixed flow traffic on arterials.

Table S.5. Harbor Subdivision Modal Options Carried Forward and Eliminated

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Options Carried Forward</th>
<th>Options Eliminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRT-Compatible</td>
<td>• Light Rail Transit</td>
<td>• Bus Rapid Transit</td>
</tr>
<tr>
<td></td>
<td>• Self-Propelled Railcar</td>
<td></td>
</tr>
<tr>
<td>Freight-Compatible</td>
<td>• Self-Propelled Railcar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Electric Multiple Unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Commuter Rail Transit</td>
<td></td>
</tr>
</tbody>
</table>

S.3.6. Routing / Terminus Options

The lack of major activity centers at either end of the Metro-owned ROW necessitates an examination of off-corridor routing and terminus options in the northern, central, and southern areas of the Corridor that tie into major activity centers. Many of the routing options require on-street operations, which are generally suited for only the LRT-compatible modes. Off-corridor routing and terminus options are summarized in Table S.6 through Table S.9 and shown in Figure S.15.

Table S.6. Northern Routing / Terminus Options

<table>
<thead>
<tr>
<th>Terminus Option</th>
<th>Routing Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles Union Station</td>
<td>Alameda Street</td>
<td>Washington Boulevard &gt; Alameda Street &gt; Metro Gold Line</td>
</tr>
<tr>
<td></td>
<td>Metro Blue Line / Alameda Street</td>
<td>Metro Blue Line &gt; Union Pacific Tracks &gt; Alameda Street &gt; Metro Gold Line</td>
</tr>
<tr>
<td></td>
<td>Santa Fe Avenue</td>
<td>Washington Boulevard &gt; Santa Fe Avenue &gt; Metro Gold Line</td>
</tr>
<tr>
<td></td>
<td>Los Angeles River</td>
<td>Los Angeles to San Diego Rail (LOSSAN) Corridor</td>
</tr>
<tr>
<td></td>
<td>Metro Blue Line / Alameda Corridor / Los Angeles River</td>
<td>Metro Blue Line &gt; Alameda Corridor &gt; LOSSAN Corridor</td>
</tr>
<tr>
<td>7th Street / Metro Center</td>
<td>Metro Blue Line to 7th Street / Metro Center</td>
<td>Metro Blue Line</td>
</tr>
<tr>
<td>Metro Blue Line Slauson Station</td>
<td>Terminate at Metro Blue Line Slauson Station</td>
<td>Terminate at Slauson/Long Beach</td>
</tr>
<tr>
<td>Downtown Huntington Park</td>
<td>Slauson Avenue / Pacific Boulevard</td>
<td>Slauson Boulevard &gt; Pacific Boulevard</td>
</tr>
<tr>
<td></td>
<td>Union Pacific / Randolph Avenue</td>
<td>Union Pacific Tracks / Randolph Avenue &gt; Pacific Boulevard</td>
</tr>
</tbody>
</table>
### Table S.7. LAX Routing / Terminus Options

<table>
<thead>
<tr>
<th>Terminus Option</th>
<th>Routing Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Century/Aviation</td>
<td>Station on ROW at Century/Aviation</td>
<td>Station on ROW at Century/Aviation (Potential LAX transportation center)</td>
</tr>
<tr>
<td>LAX Central Terminal Area</td>
<td>Century Boulevard</td>
<td>Century Boulevard</td>
</tr>
<tr>
<td></td>
<td>98th Street</td>
<td>98th Street</td>
</tr>
<tr>
<td></td>
<td>Arbor Vitae Street</td>
<td>Arbor Vitae Street</td>
</tr>
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</table>

### Table S.8. Central Routing / Terminus Options

<table>
<thead>
<tr>
<th>Terminus Option</th>
<th>Routing Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbor Area</td>
<td>Harbor Subdivision ROW</td>
<td>Through service along Harbor Subdivision to Harbor area</td>
</tr>
<tr>
<td>Central Torrance</td>
<td>Hawthorne Boulevard</td>
<td>Manhattan Beach Boulevard &gt; Hawthorne Boulevard &gt; Del Amo Fashion Center</td>
</tr>
<tr>
<td></td>
<td>Madrona Avenue</td>
<td>Madrona Avenue &gt; Madrona Marsh Nature Preserve vicinity</td>
</tr>
</tbody>
</table>

### Table S.9. Southern Routing / Terminus Options

<table>
<thead>
<tr>
<th>Terminus Option</th>
<th>Routing Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Pedro</td>
<td>Gaffey Street / 7th Street</td>
<td>Normandie Avenue &gt; Gaffey Street &gt; 7th Street</td>
</tr>
<tr>
<td></td>
<td>Gaffey Street / Harbor Boulevard</td>
<td>Normandie Avenue &gt; Gaffey Street &gt; Gibson Boulevard &gt; Harbor Boulevard</td>
</tr>
<tr>
<td></td>
<td>I-110</td>
<td>I-110 &gt; Harbor Transitway</td>
</tr>
<tr>
<td></td>
<td>Avalon Boulevard</td>
<td>Avalon Boulevard</td>
</tr>
<tr>
<td></td>
<td>MacFarland Avenue</td>
<td>MacFarland Avenue &gt; BNSF</td>
</tr>
<tr>
<td>Long Beach</td>
<td>Sepulveda Boulevard / Willow Street</td>
<td>Sepulveda Boulevard &gt; Willow Street &gt; Metro Blue Line</td>
</tr>
<tr>
<td></td>
<td>Pacific Coast Highway</td>
<td>BNSF Tracks &gt; Pacific Coast Highway &gt; Metro Blue Line</td>
</tr>
<tr>
<td></td>
<td>Anaheim Street</td>
<td>Anaheim Street &gt; Metro Blue Line</td>
</tr>
<tr>
<td></td>
<td>Alameda Corridor / Shoreline Drive</td>
<td>Alameda Corridor &gt; Shoreline Drive &gt; Ocean Boulevard</td>
</tr>
</tbody>
</table>
Figure S.15. Harbor Subdivision – All Routing / Terminus Options

[Map showing various routes and terminus options for the Harbor Subdivision transit corridor.]
Routing / Terminus Options – Stage I Screening

Many of the preliminary routing / terminus options were eliminated from further analysis during the Stage I evaluation on the basis of limited ridership potential, the inability to provide through service, physical fit, community impacts, and the difficulty of obtaining operating rights on select non Metro-owned ROW. Table S.10 summarizes options carried forward and those eliminated, with more detail provided on the screening process in the Alternatives Chapter (Section 3). Some options were carried forward with minor modifications due to operational and urban design constraints.

### Table S.10. Harbor Subdivision Routing Options Carried Forward and Eliminated

<table>
<thead>
<tr>
<th>Area</th>
<th>Options Carried Forward</th>
<th>Options Eliminated</th>
</tr>
</thead>
</table>
| North    | • Metro Blue Line / Alameda Street to LAUS with modified terminus at 1st St / Alameda St (Local)  
            • Los Angeles River to LAUS (Regional / Express)  
            • Harbor Subdivision ROW with terminus at Metro Blue Line as an initial minimum operable segment | • Alameda Street to LAUS  
            • Santa Fe Avenue to LAUS  
            • Metro Blue Line / Alameda Corridor / Los Angeles River to LAUS  
            • Metro Blue Line to 7th Street/Metro Center  
            • Slauson Avenue / Pacific Boulevard to Huntington Park  
            • Union Pacific / Randolph Avenue to Huntington Park |
| LAX      | • Harbor Subdivision ROW with station at Century/Aviation (Local / Regional)  
            • Century Boulevard to CTA (Express)* | • 98th Street to CTA*  
            • Arbor Vitae Street to CTA* |
| Central  | • Harbor Subdivision ROW to South Bay (Local / Regional)  
            | • Hawthorne Boulevard to Del Amo Fashion Center  
            • Madrona Avenue to Madrona Marsh Nature Preserve vicinity | |
| South    | • Gaffey Street / Harbor Boulevard to San Pedro with modified terminus at Cruise Ship Terminal (Local)  
            • I-110 to San Pedro with modified terminus at Cruise Ship Terminal (Local / Regional)  
            • Sepulveda Boulevard / Willow Street to Long Beach with modified terminus at Metro Blue Line (Local)  
            • Pacific Coast Highway to Long Beach with modified terminus at Metro Blue Line (Local) | • Gaffey Street / 7th Street to San Pedro  
            • Avalon Boulevard to San Pedro  
            • McFarland Avenue to San Pedro  
            • Anaheim Street to Long Beach  
            • Alameda Corridor / Shoreline Drive to Long Beach |

* Final alignment into LAX CTA pending further progress on LAX Master Planning activities

### S.3.7. Build Alternatives Carried Forward

The Stage I Initial Screening identified a number of routing / terminus and modal options potentially feasible for implementation in the Harbor Subdivision Corridor. These routing / terminus and modal options have been tailored to the travel markets within the Study Area to form a revised set of four Build Alternatives for the Harbor Subdivision Corridor as shown in Figure S.16.
Figure S.16. Harbor Subdivision – Build Alternatives Carried Forward for Stage II Analysis
Local North Alternative (Slauson / Alameda Local)

The Local North Alternative provides service along the northern portion of the alignment from downtown Los Angeles to the LAX area. This alternative is more suited to LRT-compatible modes because of its potential connection with the Crenshaw Transit Corridor (if LRT is chosen as the Locally Preferred Alternative (LPA)) and its need for on-street operation in the northern sections. The main market served by this alternative is the South Los Angeles East-West Local Corridor, while the LAX travel market is also served, but to a lesser degree. The Local North alternative is shown in orange in Figure S.16.

The Local North Alternative has a northern terminus underneath the Little Tokyo/Arts District Metro Gold Line station, and runs along Alameda Street, the Metro Blue Line Corridor, and the Harbor Subdivision to Crenshaw Boulevard. There, it will transition to the planned Crenshaw Transit Corridor tracks (if LRT is LPA) for the remainder of the route to the LAX area. If BRT is selected as the preferred alternative for the Crenshaw Corridor project, the Local North Alternative would likely have a western terminus in the Crenshaw Blvd area. The corridor is generally at-grade along the Harbor Subdivision and Metro Blue Line corridor, with an aerial structure along much of Alameda Street. Freight conflicts would be addressed along the Harbor Subdivision by shifting freight service to non-passenger service hours. The northern terminus station at 1st/Alameda is underground because of a large number of physical constraints in the area. The alignment runs adjacent to the Metro Blue Line in the footprint of the existing freight tracks, as operational constraints do not allow a Harbor Subdivision service to utilize the existing Metro Blue Line tracks. Stations are located approximately every mile along the alternative.

Local South Alternative (Metro Green Line Extension)

The Local South Alternative provides service along the southern section of the Harbor Subdivision from the LAX area through Lawndale, Redondo Beach and Torrance in the South Bay to San Pedro, Wilmington and Long Beach in the Harbor area. Like the Local North Alternative, this alternative is more suited to LRT-compatible modes because of the potential off-corridor alignments requiring extensive on-street operation. The main markets served by this alternative are the South Bay North-South Local Corridor and the I-405 Corridor. The Local South Alternative is shown in green in Figure S.16.

The northern terminus of the Local South Alternative is the current terminus of the Metro Green Line at Marine/Redondo Beach. Local South service would be able to continue northward via the Metro Green Line and planned Crenshaw Transit Corridor (if LRT is selected as the preferred mode) allowing for one-seat rides to a large number of destinations along the Metro Green Line and Crenshaw Corridor. From Marine/Redondo Beach south, the Local South Alternative would generally run at-grade adjacent to the existing freight track in the Harbor Subdivision ROW (structures would be needed in several areas for physical constraints or grade separations that are likely required by Metro’s Grade Crossing Policy for
Light Rail Transit). In the Normandie Avenue / Vermont Avenue / I-110 area, the alternative splits into four potential alignment options to serve San Pedro and/or Long Beach:

- Normandie Avenue / Gaffey Street to Cruise Terminal (San Pedro)
- I-110 to Cruise Terminal (San Pedro)
- Sepulveda Boulevard / Willow Street to Metro Blue Line (Long Beach)
- PCH to Metro Blue Line (Long Beach)

These four options require extensive structures and on-street operation due to constrained ROW and busy intersections. Stations are located approximately every mile along the alternative.

**Regional Alternative (South Bay Commuter)**

The Regional Alternative spans the entire length of the Harbor Subdivision Study Area. Freight-compatible modes are best suited for this regional service because they are designed to serve longer distance trips, travel at higher speeds, and stop at more widely-spaced stations. LRT-compatible modes, however, were also examined for this alternative to determine if their ability to connect with the existing Metro Light Rail System outweighs their smaller size and lower operating speeds. The Regional Alternative serves three major travel markets including the I-405 Corridor, LAX, and the South Bay to downtown Los Angeles markets. The Regional Alternative is shown in yellow in Figure S.16.

The northern terminus of the Regional Alternative is located at LAUS. From there, it exits via the existing Metrolink / Amtrak tracks or a new southern alignment known as the Run Through Tracks project (which is currently planned as a Caltrans project, but could be implemented on a limited basis as part of the Harbor Subdivision project, if not yet completed). Along the west bank of the Los Angeles River, the alternative follows the Los Angeles to San Diego (LOSSAN) corridor with freight-compatible modes able to run on existing tracks (separate tracks are required for the LRT-compatible modes). At Redondo Junction, a new aerial structure will connect the LOSSAN Corridor to the Harbor Subdivision. From Redondo Junction to the Harbor Area, the alternative follows the Harbor Subdivision at-grade, with passing sidings added as operations dictate. In the Harbor Area, the alternative leaves the Harbor Subdivision ROW at I-110, following the freeway for the remainder of the route to a southern terminus at the San Pedro Cruise Terminal. Stations are located approximately every four miles along the Regional Alternative.

**Express Alternative (LAX Express)**

The Express Alternative is similar to the Regional Alternative in the northern portion of the Corridor, except that it runs non-stop between LAUS and LAX and terminates in the LAX Central Terminal Area (CTA). This alternative focuses on providing the highest possible level of service to the LAX travel market, which will require long sections of trench and/or aerial structure through South Los Angeles and Inglewood to allow for high-speed operations. A new aerial structure would be constructed along Century Boulevard between the Harbor Subdivision and the LAX CTA to allow for direct transit access to the airport (this alignment is
contingent upon the completion of the LAX Master Plan and permission to enter the LAX CTA). Stations would only be located at LAUS and LAX. The Express Alternative is shown in blue in Figure S.16.

Summary of Build Alternatives

Table S.11 lists the four Harbor Subdivision alternatives along with the appropriate modes and routes. There are a total of 18 combinations of markets, modes and routes for the four Build Alternatives.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Modal Options</th>
<th>Routing Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local North</td>
<td>LRT, SPR</td>
<td>Metro Blue Line / Alameda (North)</td>
</tr>
<tr>
<td>Local South</td>
<td>LRT, SPR</td>
<td>Normandie / Gaffey (South)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I-110 (South)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sepulveda / Willow (South)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pacific Coast Highway (South)</td>
</tr>
<tr>
<td>Regional</td>
<td>LRT, SPR, EMU, CRT</td>
<td>I-110 (South)</td>
</tr>
<tr>
<td>Express</td>
<td>LRT, SPR, EMU, CRT</td>
<td>Los Angeles River (North) / Century (LAX)</td>
</tr>
</tbody>
</table>

LRT: Light Rail Transit. SPR: Self-Propelled Railcar. EMU: Electric Multiple Unit. CRT: Commuter Rail Transit

S.4. PROJECT DEFINITION: ENGINEERING AND URBAN DESIGN ISSUES

This section further defines the operations, engineering, and urban design issues for the four Build Alternatives in preparation for the Stage II Evaluation.

S.4.1. Operations

Travel times for the Build Alternatives are significantly shorter than travel times for the TSM Alternatives, confirming the strong operational advantages of fixed guideway transit service over street running express bus service. This is especially true of the Regional Alternative, which extends from the South Bay to Union Station and is the longest of the four alternatives. These travel time benefits are expected to increase over time, as congestion on Study Area arterials worsens and average bus speeds deteriorate. Travel times for the four alternatives are detailed below (within each alternative, there are only minor travel time variances between modes):

- **Local North Alternative:**
  - TSM Travel Time: 44 minutes
  - Build Alt. Travel Time: 21 minutes
  - Improvement over TSM: 23 min.

- **Local South Alternative:**
  - TSM Travel Time: 60 – 68 minutes
  - Build Alt. Travel Time: 22–29 min.
  - Improvement over TSM: 38 min.
• **Regional Alternative:**
  ○ TSM Travel Time: 118 minutes
  ○ Build Alt. Travel Time: 47 minutes
  ○ Improvement over TSM: 71 min.

• **Express Alternative:**
  ○ TSM Travel Time: 34 minutes
  ○ Build Alt. Travel Time: 20 minutes
  ○ Improvement over TSM: 14 min.

### S.4.2. Storage and Maintenance

The operation of transit service along the Harbor Subdivision will require off-corridor facilities where transit vehicles can be serviced, maintained and stored overnight. There are several potential sites for maintenance and storage facilities located near the ROW that can support the needs of the Harbor Subdivision Alternatives, both for the near term and future build-out. The assessment of maintenance and storage requirements for the Harbor Subdivision alternatives considered opportunities to leverage both existing and planned maintenance facilities, particularly those options identified for the Crenshaw Transit Corridor. Maintenance and storage sites were identified in downtown Los Angeles, Westchester, El Segundo, Redondo Beach, Torrance, Wilmington and San Pedro, several of which are expansions of existing or proposed maintenance facilities in the Study Area. All Harbor Subdivision alternatives require approximately 10 – 20 new vehicles for initial operations.

### S.4.3. Crenshaw Transit Corridor Coordination

The proposed Metro Crenshaw Transit Corridor Project is currently considering two transit service alternatives along Crenshaw Boulevard through Los Angeles and Inglewood: BRT and LRT. Both alternatives use the Harbor Subdivision corridor for approximately five miles from Crenshaw Boulevard in the north to the existing Metro Green Line Aviation/LAX station in the south. The selection and implementation of a Crenshaw Corridor Locally Preferred Alternative (LPA) will guide the improvements recommended for the Harbor Subdivision project.

The benefit of the Crenshaw Corridor project to the Harbor Subdivision alternatives under study is that the Crenshaw project will reconstruct and improve approximately five miles of railroad infrastructure at no cost to the Harbor Subdivision project.

Table S.12 provides a summary of the considerations for a Crenshaw BRT alternative on the Harbor Subdivision alternatives. If BRT is chosen as the LPA, a new busway will be constructed along the north and west side of the Harbor Subdivision ROW between Crenshaw Boulevard and Century/Aviation. Given this new BRT guideway, the Regional or Express Alternatives using SPR, EMU, or CRT vehicles on the relocated freight track would be the more viable options for the Harbor Subdivision through this area.
### Table S.12. Key Harbor Subdivision Decisions – BRT Chosen as Crenshaw Corridor LPA

<table>
<thead>
<tr>
<th>Harbor Modal Option(s)</th>
<th>Decisions</th>
</tr>
</thead>
</table>
| LRT- or Freight-Compatible SPR, EMU, CRT | • Services would run on relocated freight track (may need temporal separation with freight)  
• ROW takes may be needed to accommodate passing siding (siding likely not needed for Harbor Subdivision headways greater than 15 minutes). |

If LRT is chosen as the Crenshaw Corridor LPA, a new double-tracked rail line would be constructed along the north and west side of the Harbor Subdivision ROW, necessitating a shift of the existing freight track to the south side of the ROW. The LRT tracks in this section could be made available for a Harbor Subdivision Alternative connecting the Slauson Corridor to LAX at little or no cost to the Harbor Subdivision project. Also, through this section, the Harbor Subdivision ROW can host both Crenshaw LRT and a Regional or Express service operating on the relocated freight track. Table S.13 provides a summary of the key decisions of the Crenshaw LRT alternative on the Harbor Subdivision alternatives.

### Table S.13. Key Harbor Subdivision Decisions – LRT Chosen as Crenshaw Corridor LPA

<table>
<thead>
<tr>
<th>Harbor Modal Option(s)</th>
<th>Decisions</th>
</tr>
</thead>
</table>
| LRT & LRT-Compatible SPR | • Approximately 5 miles of LRT tracks (plus connection to Metro Green Line and additional existing shared infrastructure to Marine/Redondo Beach) would be available for use at no cost to Harbor Subdivision Project.  
• Street crossings would need to be examined to determine if additional Harbor Subdivision LRT or SPR vehicles could be accommodated without the need for additional grade separations. |
| Freight-Compatible SPR, EMU, CRT | • Services would run on relocated freight track.  
• ROW takes may be needed to accommodate passing siding (siding not needed for Harbor Subdivision headways greater than 15 minutes). |

### S.4.4. Urban Design

The AA includes preliminary urban designs for proposed station locations and portions of the Harbor Subdivision alignment. Urban design concepts used for the Harbor Subdivision Transit Corridor are based on the following principles:

- Support the integration of transit and community
- Provide a foundation for the alignment’s identity
- Promote economic development consistent with local planning goals

#### Station Types

Three basic station types were developed for application during the AA and reflect assumptions on how to best serve specific areas and the potential ridership along the Harbor Subdivision transit corridor. The three station types are:

- **Neighborhood Station.** This station is designed to fit into existing residential neighborhoods and serve residents without introducing large amounts of new activity.
• **Transfer Station.** Medium-sized station designed for transit riders to make efficient inter-modal connections between transit systems or routes.

• **Transit Center Station.** Large station designed for major activity centers, transferring between multiple mode choices and representing the greatest potential for transit-oriented development.

**Station Design Concepts**

Preliminary station locations were selected for the four build alternatives using a variety of criteria, including freeway, arterial, and transit connections, land use compatibility, and consultation with stakeholders and the public. Preliminary urban design concepts were developed for approximately 20 stations along the corridor, along with alignment designs between stations in key sections. These preliminary concepts were presented at TAC workshops in July and August 2009, with selected concepts shown at the October 2009 Public Meetings and in the AA report. An example of proposed improvements is shown in the rendering in Figure S.17 and an example of a station concept is shown in Figure S.18.

*Figure S.17. Preliminary Alignment Design Concept*
The Harbor Subdivision AA Report evaluates the four build alternatives using the Stage II Evaluation Criteria divided into four main categories:

- **Transportation System Performance**
  - Travel Time / Reliability
  - System Connectivity
  - Intermodal Compatibility
  - Accessibility / Passenger Comfort
  - Vehicle Efficiency

- **Cost Effectiveness**
  - Capital Cost
  - Operations and Maintenance Cost
  - Ridership & User Benefits
  - Financial Feasibility

- **Community Acceptability**
  - Service Attractiveness
  - Community Integration
  - Public Meeting Input
  - Environmental Benefits / Impacts
  - Economic Development
  - Transit Supportive Land Use
  - Acquisitions / Relocations
  - Construction Impacts
  - Traffic / Intersection Operations
  - Air Quality
  - Visual and Aesthetics
  - Noise & Vibration
  - Cultural Resources
  - Parklands
  - Equity & Environmental Justice
  - Safety & Security

Each alternative and segment is graded on a scale of one to five, with one being the least desirable performance and five being the best. The scores are then aggregated across the sub-
criteria and major criteria to enable a qualitative comparative of the four Build Alternatives. The ratings are represented using Harvey balls, as shown in Table S.14.

### Table S.14. Stage II Evaluation – Rating System

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
</tbody>
</table>

Worst Performance (Lowest Benefits / Highest Impacts) | Best Performance (Highest Benefits / Lowest Impacts)

In order to facilitate a comparison of segments that could be developed in a phased implementation strategy, the alternatives were broken into smaller segments, as shown in Figure S.19. The results of the Phase II evaluation described in the following sections are presented by alternative and by segment.

The results of the Stage II Comparatives Analysis are presented in the following four sections.
Figure S.19. Build Alternatives – Stage II Analysis Segments

Regional / Express Alternatives: Union Station to LAX (Century/Aviation or CTA)

Local North Alternative: Little Tokyo/Arts District to Slauson Ave

Local North Alternative: Metro Blue Line to Crenshaw Blvd

Local South Alternative: Marine/Redondo Beach to Redondo Beach RTC

Local South Alternative: Redondo Beach RTC to Torrance RTC

Local South Alternative: Torrance RTC to Normandie Ave

Local South Alternative: Normandie Ave to Metro Blue Line

Regional Alternative: Century/Aviation to Normandie Ave

Harbor Subdivision
- Local North Alternative
- Local South Alternative
- Regional Alternative
- Express Alternative

Existing
- Metro Red Line
- Metro Purple Line
- Metro Blue Line
- Metro Green Line
- Metro Gold Line
- El Monte Busway
- Harbor Transitway
- Metrolink
- Waterfront Red Car

Under Construction
- Expo Line - Phase I

Under Study
- Expo Line - Phase II
- Metro Crenshaw Transit Corridor
- Metro Westside Subway Extension
- Metro Regional Connector Transit Corridor
- LAX People Mover (Study by LAWA)

Legend:
- Local North - Station
- Local South - Station
- Transfer Station
- Transfer Station (Other)
S.6. TRANSPORTATION SYSTEM PERFORMANCE

The first major evaluation of the Harbor Subdivision alternatives is of their ability to improve the region's transportation system. Table S.15 summarizes performance of the alternatives against the following criteria, with key issues described on the following pages:

- Travel Time Reliability
- System Connectivity
- Intermodal Compatibility
- Accessibility / Passenger Comfort.

Table S.15. Stage II Evaluation Summary – Transportation System Performance

<table>
<thead>
<tr>
<th>Alternative / Segment</th>
<th>Travel Time Reliability</th>
<th>System Connectivity</th>
<th>Intermodal Compatibility</th>
<th>Accessibility / Passenger Comfort</th>
<th>Transport. System Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local North</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
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<tr>
<td>Little Tokyo/Arts District – Slauson Ave</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Metro Blue Line – Crenshaw Blvd</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Local South</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Metro Green Line – Redondo Beach RTC</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Redondo Beach RTC – Torrance RTC</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Torrance RTC – Normandie Ave</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via I-110</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via PCH</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Regional</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>LAUS – Century/Aviation</td>
<td>⬤</td>
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<td>⬤</td>
<td>⬤</td>
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<tr>
<td>Century/Aviation – Vermont Ave</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Vermont Ave – San Pedro via I-110</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
<tr>
<td>Express: LAUS – LAX</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
<td>⬤</td>
</tr>
</tbody>
</table>

Travel Time Reliability

All Build Alternatives have good travel time reliability given that they operate on dedicated running ways with minimal automobile traffic conflicts. In addition, conflicts with other transit lines have been minimized by eliminating most interlining capability with existing and planned lines. The Local South segment between the proposed Redondo Beach RTC and the Torrance RTC and the Express Alternative scored the highest, due to their near complete grade separation. The segments of the Local Alternatives that operate on-street generally have lower reliability than sections with a higher degree of grade separation.

System Connectivity

Most alternatives have excellent system connectivity because of the new connections they provide between key transit hubs and existing and planned transit lines. The alternatives which connect Union Station to LAX and the Metro Green Line to the Metro Blue Line in the South Bay score highest, while the connection of the Local North alternative to Little Tokyo/Arts District scores low because of the lack of a connection to LAUS. Passengers on a Local North train would be forced to transfer to the Metro Gold Line to complete their trip to LAUS.

Intermodal Compatibility

The Local South Alternative scores highest for Intermodal Compatibility because of its extension of the Metro Green Line and Crenshaw Corridor (if LRT is selected as the Crenshaw LPA) into the South Bay and the large number of destinations it can serve with a one-seat ride. A passenger in the South Bay would have the ability to take a Metro Green Line train east to Norwalk or take the Crenshaw Line (if LRT is LPA) to LAX or the Expo Line. The ability of a train to operate on multiple branch lines from a South Bay station is the largest factor making a Local South alternative so effective from a system performance standpoint. The Local Alternative connections at Little Tokyo/Arts District and to the Metro Blue Line in Long Beach score low because of their requirement to transfer to other lines to reach the major destinations of LAUS and downtown Long Beach (forced by operational constraints).

Accessibility / Passenger Comfort

The Local Alternatives both score well on accessibility given their introduction of new high-quality transit service into the underserved communities in South Los Angeles and the South Bay. The Regional and Express alternatives score low for this measure because of their limited station access points.

S.7. Cost Effectiveness

Cost Effectiveness (most easily understood as the annual cost incurred to save a transit rider an hour) is one of the key measures used by many agencies to judge the viability of a transit
The Local South and Regional Alternatives score the best for Cost Effectiveness, while the Express Alternative scores low because of lesser travel time savings compared to the No Build / TSM Alternatives. Table S.16 summarizes performance of the alternatives against the criteria listed below, with key issues described on the following pages. Cost effectiveness can only be calculated by Build Alternative, instead of by segment, due to ridership modeling constraints.

- Capital and Operations and Maintenance (O&M) Costs
- Ridership and User Benefits
- Financial Feasibility

**Table S.16. Stage II Evaluation Summary – Cost Effectiveness**

<table>
<thead>
<tr>
<th>Alternative / Segment</th>
<th>Capital Cost</th>
<th>Ridership and User Benefits</th>
<th>Financial Feasibility</th>
<th>Cost Effectiveness – Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local North</td>
<td>ptune</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Little Tokyo/Arts District – Slauson Ave</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Metro Blue Line – Crenshaw Blvd</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Local South</td>
<td>ptune</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Metro Green Line – Redondo Beach RTC</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Redondo Beach RTC – Torrance RTC</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Torrance RTC – Normandie Ave</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via I-110</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Normandie Ave – Metro Blue Line via PCH</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Regional</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>LAUS – Century/Aviation</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Century/Aviation – Vermont Ave</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Vermont Ave – San Pedro via I-110</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Express: LAUS – LAX</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Ratings:**
1 (Worst) – ○  2 – ○  3 – ○  4 – ○  5 (Best) – ●
S.7.1. Capital Costs

Capital costs, including the implementation of major elements such as guideways, vehicles, and support system facilities, comprise a large portion of the project’s overall cost. Capital costs have been calculated for each alternative in 2009, 2030 and annualized dollars. In general, the alternatives that follow the Harbor Subdivision ROW at-grade such as the Local North between the Metro Blue Line and the Crenshaw Corridor, the Local South between the Metro Green Line and Normandie Avenue, and the Regional Alternative north of Vermont/I-110 have lower capital costs – approximately $100 million per mile, with some exceptions. Off-corridor alignments and alternatives that require extensive grade separation (such the Express Alternative) have higher costs – approximately $130 million per mile. Costs in 2009 dollars by alternative, segment and mode are shown in Table S.17 and Table S.18. For simplicity, Table S.18 shows capital cost estimates for the freight-compatible modes only. Chapter 7 further details capital cost estimates.

### Table S.17. Capital Costs – Local North & South Alternatives (2009 Dollars)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Segment</th>
<th>Length (mi)</th>
<th>Cost (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>LRT</td>
</tr>
<tr>
<td>Local North</td>
<td>Little Tokyo/Arts District – Slauson Ave</td>
<td>4.4</td>
<td>$599</td>
</tr>
<tr>
<td>Alternative</td>
<td>Metro Blue Line – Crenshaw Blvd</td>
<td>5.4</td>
<td>$554</td>
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<tr>
<td>Total</td>
<td></td>
<td>9.8</td>
<td>$1,153</td>
</tr>
<tr>
<td>Local South</td>
<td>Metro Green Line – Redondo Beach RTC</td>
<td>2.1</td>
<td>$284</td>
</tr>
<tr>
<td>Alternative</td>
<td>Redondo Beach RTC – Torrance RTC</td>
<td>2.5</td>
<td>$211</td>
</tr>
<tr>
<td></td>
<td>Torrance RTC – Normandie Ave</td>
<td>3.1</td>
<td>$359</td>
</tr>
<tr>
<td>On-Corridor Total</td>
<td></td>
<td>7.7</td>
<td>$854</td>
</tr>
<tr>
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<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
<td>4.5</td>
<td>$604</td>
</tr>
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<td></td>
<td>Normandie Ave – San Pedro via I-110</td>
<td>5.2</td>
<td>$725</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
<td>7.0</td>
<td>$785</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – Metro Blue Line via PCH</td>
<td>7.0</td>
<td>$837</td>
</tr>
</tbody>
</table>

Assuming the LRT mode, the cost of the Local South Alternative between the Metro Green Line Marine Station and the Torrance RTC is estimated to be approximately $495M, with the section from the Metro Green Line to the Redondo Beach RTC costing $284M and the section from the Redondo Beach RTC to the Torrance RTC costing $211M. Overall, the average per mile cost of the Local North and Local South Alternatives are roughly comparable. The Regional Alternative has the lowest capital cost per mile of the four alternatives.
(approximately $50 million / mile), primarily because the Regional Service can operate on a single track alignment (plus sidings), including the relocated track built as part of the Crenshaw Transit Corridor Project. In addition, the overall infrastructure requirements for a regional service are less than for an LRT system.

### Table S.18. Capital Costs – Regional & Express Alternatives (2009 Dollars)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Segment</th>
<th>Length (mi)</th>
<th>Cost (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>SPR (Freight-Compat)</td>
</tr>
<tr>
<td>Regional Alternative</td>
<td>LAUS – Century/Aviation</td>
<td>15.0</td>
<td>$622</td>
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<tr>
<td></td>
<td>Century/Aviation – Vermont Ave</td>
<td>12.7</td>
<td>$602</td>
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<tr>
<td></td>
<td>Vermont Ave – San Pedro via I-110</td>
<td>4.6</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
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<tr>
<td>Express Alternative</td>
<td>LAUS to Century/Aviation (low investment)</td>
<td>15.0</td>
<td>$491</td>
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<tr>
<td></td>
<td>LAUS to Century/Aviation (grade separated)</td>
<td>15.0</td>
<td>-</td>
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<tr>
<td></td>
<td>Century/Aviation to LAX CTA</td>
<td>1.9</td>
<td>$532</td>
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<tr>
<td></td>
<td>Total</td>
<td>16.9</td>
<td>$1,023</td>
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</table>

### S.7.2. Operations and Maintenance Costs

Operations and Maintenance (O&M) costs are associated with the day-to-day operations of the transit system including labor, vehicle maintenance, fuel and parts / supplies. Annual O&M costs have been estimated for each alternative by mode using O&M cost data from similar systems in the Los Angeles area. For modes not operating in Los Angeles County, such as SPR and EMU, data was obtained from similar systems across the country. Table S.19 and Table S.20 show O&M estimates in 2009 dollars. For simplicity, Table S.20 shows O&M cost estimates for the freight-compatible modes only. Chapter 7 further details O&M cost estimates.

Generally, LRT and SPR have similar O&M costs for the Local Alternatives. SPR is slightly more expensive to operate for shorter distance trips given the high cost of fuel compared to electric power. For the Regional and Express Alternatives, the freight compatible modes have similar operating and maintenance costs. As is detailed further in Chapter 7, the LRT-compatible modes cost substantially more to operate than the freight-compatible modes (approximately double the annual O&M cost). This is due to the high ROW maintenance and operations costs to support higher frequencies for the local service options, and the lower administrative costs of most commuter railroads compared to bus and urban rail.
Table S.19. Annual O&M Cost Estimates by Mode and Alternative / Operable Segments

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Segment</th>
<th>Length (mi)</th>
<th>Cost (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>4.4</td>
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<td>5.4</td>
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<td><strong>Total</strong></td>
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<td>2.5</td>
<td>$3.6</td>
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<td>Normandie Ave – Metro Blue Line via PCH</td>
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Table S.20. Annual O&M Cost Estimates by Mode and Alternative / Operable Segments

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<tr>
<th>Alternative</th>
<th>Segment</th>
<th>Length (mi)</th>
<th>Cost (million)</th>
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<tr>
<td></td>
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<td>SPR (Freight-Compat)</td>
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<td>Century/Aviation – Vermont Ave</td>
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<td>Vermont Ave – San Pedro via I-110</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>Express Alternative</td>
<td>Total</td>
<td>16.2</td>
<td>$7.1</td>
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S.7.3. Ridership and User Benefits

Ridership for each alternative was estimated using the Metro Travel Demand Forecasting Model used for all Metro projects. The ridership model that was used for the project did not include projects authorized and funded as part of Measure R, as Metro is in the process of updating the model to account for these new elements of the Metro system.
Overall ridership for each alternative is listed below:

- **Local North Alternative**: 16,200 riders per day
- **Local South Alternative**: 12,000 – 14,700 boardings per day
- **Regional Alternative**: 12,800 boardings per day
- **Express Alternative**: 640 riders per day (heavily dependent on LAX traveler market which is not accounted for by the current Metro Travel Demand Forecasting Model)

The Local North Alternative scores highest for ridership and user benefits, while the Local South Alternative scores slightly lower. Given the deficiencies in the current South Bay bus network described in the Purpose and Need section, strengthening connections to the Local South alternative should also increase ridership and user benefits. The Regional Alternative has slightly lower ridership than the Local Alternatives, but yields good user benefits given its longer-distance trips. The Express Alternative serves a small number of riders for the traditional travel markets (home to work), but the Metro ridership model does not currently estimate the number of riders that would take the line for airport trips (which would likely be substantially more than the current FlyAway ridership from LAUS to LAX of approximately 1,200 riders per day). When the CHSTP station is added at LAUS, the Express Alternative may gain additional utility and riders, but detailed forecasts on the effect of the CHSTP on the Metro system’s ridership have yet to be been completed.

**S.7.4. Financial Feasibility**

Only certain sections of the Harbor Subdivision corridor have been identified for partial funding. The most relevant for this Study is a Metro Green Line Extension to the South Bay which has funding programmed as part of the recently passed Measure R sales tax measure. Other than funding associated with the Crenshaw Transit Corridor segment which utilizes the Harbor Subdivision, no other segment of the Harbor Subdivision Corridor has funding currently assigned.

**S.8. Environmental Benefits / Impacts**

Environmental Benefits and Impacts are measured using the 14 identified criteria. The key points of the ratings are discussed in the following pages and summarized in Table S.21 and Table S.22.
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Ratings: 1 (Worst) – ○  2 – ○○  3 – ○○○  4 – ○○○○  5 (Best) – ○○○○○
Table S.22. Summary of Environmental Benefits & Impacts (2 of 2)

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Ratings: 1 (Worst) – ○  2 – ○  3 – ●  4 – ○  5 (Best) – ●

S.8.1. Economic Development / Transit Supportive Land Use

The Local North and Regional Alternatives, which run through several low-income neighborhoods in South Los Angeles, are best positioned to spur economic development with their implementation. The Local South Alternative is also well positioned to act as a catalyst for transit-oriented development in station areas. Cities such as Redondo Beach and Torrance are already focusing new development plans around new/expanded transit centers.
that are adjacent to the Harbor Subdivision ROW. The Regional and Express Alternatives, with widely spaced stations, provide opportunities to focus Economic Development along the corridor and at intermodal transfer stations.

S.8.2. Acquisitions / Relocations

Sections of the Build Alternatives which utilize the existing Metro ROW generally have smaller ROW acquisition needs (mainly focused in station and junction areas). Off-corridor alignments into downtown Los Angeles, LAX, San Pedro, and Long Beach require large amounts of temporary and permanent ROW acquisitions, especially in station areas and at intersections.

S.8.3. Construction Impacts

Potential Construction Impacts generally track closely with where off-corridor alignments are located. For segments along the Harbor Subdivision ROW, there is generally enough space to accommodate construction without large impacts to the surrounding community. Off the Harbor Subdivision ROW or in constricted sections such as along Slauson Ave, larger impacts should be expected during the construction phase.

S.8.4. Traffic Intersection / Operations

With 96 at-grade crossings, new transit service along the Harbor Subdivision corridor is likely to have significant impacts to the operation of surrounding streets. On-street options such as the two Local South options in Long Beach will have the largest impacts to traffic operations. In addition, the constricted ROW paralleling Slauson Avenue will require modifications to the adjacent street and intersections. Segments of the Local South and Regional Alternatives in the South Bay will likely have the fewest traffic impacts, as much of the route is already grade separated in this area.

A preliminary grade crossing analysis has been undertaken to allow for the identification of crossings that may be in need of grade separations, crossing closures, or enhancements of existing at-grade crossings. The initial classification of crossing treatments recommended for the Harbor Subdivision is shown in Table S.23, Figure S.20, and Figure S.21.

Table S.23. Summary of Initial Crossing Analysis Classifications

<table>
<thead>
<tr>
<th>Classification</th>
<th>Regional/Express</th>
<th>Local Alternative</th>
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<tbody>
<tr>
<td>Probable At-Grade</td>
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<td>Possible At-Grade – Further Study Needed</td>
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<td>Probable Grade Separation</td>
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<td>Total</td>
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<td>58</td>
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</table>
Figure S.20. Initial Crossing Analysis Classifications – Regional / Express Alternatives (CRT)
Figure S.21. Initial Crossing Analysis Classifications – Local Alternatives (LRT)
S.8.5.  Air Quality

Air quality issues are most notable in the southern study area, an area already heavily affected by emissions from port-related activities. The implementation of a non-electric vehicle would likely face challenges in this area. In general, the LRT and EMU modes should face fewer air quality issues than the SPR and CRT modes.

S.8.6.  Visual and Aesthetics

The largest visual and aesthetic issues will be encountered where aerial structures are required. This includes Alameda Street, Century Boulevard, Normandie Avenue, and the I-110 through the Harbor City / Wilmington area. In addition, electrically powered modes such as LRT and EMU will likely face aesthetic issues due to the need to include an overhead contact system and traction power substations for propulsion.

S.8.7.  Noise & Vibration

Noise and vibration impacts are most closely tied to engine noise and grade crossing devices. Non-electrical modes such as SPR will likely have larger noise and vibration impacts than the LRT and EMU modes. Alternatives with large numbers of grade crossings near sensitive receptors, such as the Local North along Slauson Avenue or the Local South through Lawndale will likely also face noise and vibration issues.

S.8.8.  Parklands

Several parks lie along the Harbor Subdivision corridor. These include Augustus Hawkins Park in South Los Angeles, several parks and cemeteries in eastern Inglewood, Redondo Beach, and eastern Torrance, and the Harbor Gateway area of Los Angeles. New parks are proposed along the Los Angeles River and the San Pedro waterfront.

S.8.9.  Equity and Environmental Justice

The Local North Alternative, which serves a large low-income and transit-dependent population, has the fewest environmental justice issues. The Regional/Express Alternatives, which pass through the same neighborhood with few or no stops, will likely face more substantial environmental justice issues.

S.8.10.  Safety and Security

The large number of at-grade crossings in the northern and southern sections of the study area likely present safety and security concerns due to extensive interactions with autos and bicyclists/pedestrians. The central sections of the corridor and the Express Alternative have fewer interactions with other modes and should therefore have fewer security concerns.
S.9. Community Acceptability

The Harbor Subdivision AA Study featured an extensive outreach program to both stakeholder agencies and the general public to disseminate information about the Study and to obtain feedback on the alternatives under consideration. Stakeholders were invited to be a part of the Technical Advisory Committee (TAC) while Early Scoping and public meetings were organized primarily to reach the general public. All feedback was taken into consideration throughout the AA process. Community acceptability for each alternative is rated in Table S.24. This rating is based on several factors, including attractiveness of service, integration into the community, and environmental impacts.

See Section S.11 for further discussion of the community/stakeholder outreach process.

Table S.24. Stage II Evaluation – Community Acceptability

<table>
<thead>
<tr>
<th>Alternative / Segment</th>
<th>Community Acceptability</th>
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<tbody>
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<tr>
<td>Little Tokyo/Arts District – Slauson Ave</td>
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<tr>
<td>Metro Blue Line – Crenshaw Blvd</td>
<td>●</td>
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<tr>
<td>Local South</td>
<td>●</td>
</tr>
<tr>
<td>Metro Green Line – Redondo Beach RTC</td>
<td>●</td>
</tr>
<tr>
<td>Redondo Beach RTC – Torrance RTC</td>
<td>●</td>
</tr>
<tr>
<td>Torrance RTC – Normandie Ave</td>
<td>●</td>
</tr>
<tr>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
<td>●</td>
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<tr>
<td>Normandie Ave – San Pedro via I-110</td>
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<tr>
<td>Express: LAUS – LAX</td>
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Ratings: 1 (Worst) – ○, 2 – ●, 3 – ○, 4 – ●, 5 (Best) – ●

S.10. Comparative Analysis of AA Alternatives

S.10.1. Evaluation of Build Alternatives

Table S.25 summarizes all Stage II evaluation categories for the four Build Alternatives.
Table S.25. Stage II Analysis Results – Build Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Transportation System Performance</th>
<th>Cost Effectiveness</th>
<th>Environmental Benefits / Impacts</th>
<th>Community Acceptability</th>
<th>Overall</th>
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<tr>
<td>Express</td>
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</table>

Ratings: 1 (Worst) – ○  2 – ○  3 – ○  4 – ○  5 (Best) – ●

The Local South Alternative scores highest, with the Local North and Regional Alternatives a step below and the Express Alternative ranking last. The Local South Alternative scored highest because of strong system connectivity and travel time benefits relating to an extension of the Metro Green Line to the South Bay, which is not currently served by a viable express transit option that parallels the I-405 corridor. The ability of trains from the South Bay to connect with other branches of the regional rail system also represents a major system performance benefit. A southward extension of the Metro Green Line would also support local investments in planned regional transportation centers and strengthen associated transit-oriented development opportunities in station areas.

The Regional Alternative is considered a viable project as well, given the presence of a strong regional travel market between the South Bay, LAX and Union Station. One of the advantages of the Regional Alternatives is its lower capital cost in comparison to the other Build Alternatives. The introduction of regional transit service on the preserved freight track may be a relatively cost effective solution, although there are some grade separations that may increase the overall project cost. The Regional Option also integrates well with existing freight and passenger rail services in the Study Area, and fits more easily into the constrained ROW found in the northern section of the corridor.

The Local North Alternative – as originally defined – serves a strong local transit market, particularly along the Slauson corridor. However, the northern segment along Alameda would have to operate on an elevated guideway for much of its length, with an underground northern terminus at 1st/Alameda, raising the capital cost of the Local North alternative significantly. Such an alternative may have been more cost-effective with a direct connection to Union Station. However, the design of the Metro Regional Connector project and the station planned at 1st/Alameda would make the tie-in necessary to connect Harbor Subdivision trains to LAUS extremely expensive. Additionally, there are major operational challenges associated with adding tracks next to the Metro Blue Line north of the Slauson Metro Blue Line station. For these reasons, the Local North Alternative is recommended to be truncated to serve an eastern terminal at the Slauson Metro Blue Line station. Given the
shortening of the Local North alternative, further consideration should be given to an improvement strategy along the Slauson corridor that does not preclude a regional alternative that could connect directly to Union Station.

S.10.2. Evaluation of Alternative Segments

Table S.26 summarizes the evaluation scores for these segments against the Stage II Analysis.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Segment</th>
<th>Transportation System Performance</th>
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<th>Environmental Benefits / Impacts</th>
<th>Community Acceptability</th>
<th>Overall</th>
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<td><strong>Local South</strong></td>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
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<td>Normandie Ave – San Pedro via I-110</td>
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<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
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<td>Normandie Ave – Metro Blue Line via PCH</td>
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<td><strong>Regional</strong></td>
<td>LAUS – Century/Aviation</td>
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<td>Century/Aviation – Vermont Ave</td>
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<td>Vermont Ave – San Pedro via I-110</td>
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<td><strong>Express</strong></td>
<td>LAUS – LAX</td>
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Ratings: 1 (Worst) – ○  2 – ○  3 – ○  4 – ○  5 (Best) – ●

The segments of the Local South Alternative from the Metro Green Line to the Redondo Beach RTC and from the Redondo Beach RTC to the Torrance RTC score highest of all the segments. In addition, the Regional Alternative scores well from Union Station to Vermont/I-
110. The Off-Corridor alignments in the North and South do not score as well as the on-corridor segments, due largely to the higher capital cost and the impacts associated with off-corridor operations. The Express Alternative scored lower than the Local and Regional Alternatives, due to its very high capital cost.

S.11. COMMUNITY / STAKEHOLDER OUTREACH

The Harbor Subdivision AA Study featured an extensive outreach program to both stakeholder agencies and the general public to disseminate information about the Harbor Subdivision Transit Corridor and obtain feedback on the study alternatives. While the Technical Advisory Committee (TAC) was formed to obtain feedback from key technical stakeholders, the Early Scoping and public meetings were organized primarily to reach the general public. All feedback was taken into consideration throughout the AA process, and was used to gauge the Community Acceptability ratings for each Build Alternative.

S.11.1. Early Scoping Meetings

Early Scoping Meetings were held in September and October 2008 to inform stakeholders and the public about the Harbor Subdivision Transit Corridor Project and solicit feedback on what transit improvements should be studied and how the alternatives should be evaluated. An Early Scoping Notice was published in the Federal Register for five Early Scoping Meetings (4 public, 1 interagency) held at locations selected based on equitable geographic coverage, proximity to public transportation and minimal overlap with other meetings scheduled in the Study Area:

- September 23, 2008 – Torrance Cultural Arts Center in Torrance
- September 24, 2008 – Banning’s Landing Community Center in Wilmington
- September 25, 2008 – Westside Park Community Center in Huntington Park
- September 30, 2008 – El Segundo Public Library in El Segundo
- September 30, 2008 – Metro Headquarters in Los Angeles (Interagency Meeting)

Early Scoping Meeting participants were asked to provide comments in four main areas:

- **Study Area Needs & Problems**
  - What issues in the study area do you think a new transit line can address?

- **Route / Stations / Destinations / Mode**
  - Where do you want the Harbor Subdivision project to go?
  - Where are good locations for stations?
  - What type of transit vehicle do you want to see?

- **Evaluation Criteria**
  - How do you want us to judge which alternatives to carry forward and which to eliminate?

- **Environmental Issues**
  - What environmental issues concern you the most?
The majority of comments received in the Early Scoping Meetings expressed support for transit improvements in the South Bay and Harbor areas. A potential South Bay alignment would assist in providing transit options to the residents of the area, and improve mobility for commuters along the I-405 and I-110. Moreover, there was a recurring theme at the meetings calling for a connection to LAX either from Union Station or from the Harbor area to address a major gap in the regional transit system.

Of the modes presented, Light Rail received the largest amount of support, followed by CRT, or Metrolink, type of service. The public also provided many suggestions for station locations and how the alignment could connect to areas such as San Pedro, Long Beach, downtown Los Angeles, as well as more regional destinations such as Orange County and the San Fernando Valley. Of the concerns received, the public indicated that environmental impacts and air quality issues were of utmost importance. Also significant were safety concerns, especially near grade crossings.

Stakeholder and public comments were used to inform the project purpose & need, develop alternatives, establish evaluation criteria, and identify special environmental concerns.

S.11.2. Public Meetings – Round 2

Building on the input received from the Early Scoping Meetings, Metro returned to the community in April and May 2009 to provide updates on the refined alternatives, including alignment configurations, screening criteria and next steps. Locations for the five meetings were selected to reflect equitable geographic coverage, proximity to public transportation and to avoid duplicating those areas previously visited during the Early Scoping meetings:

- April 21, 2009 – Boys and Girls Club in San Pedro
- April 22, 2009 – Main Library in Redondo Beach
- April 27, 2009 – Inglewood City Hall in Inglewood
- April 30, 2009 – Metropolitan Water District in downtown Los Angeles
- May 2, 2009 – Augustus Hawkins Nature Park in South Los Angeles

The majority of comments received from the public expressed support for transit improvements in the South Bay and Harbor areas, as current transit options are perceived as inadequate. Some of the key takeaways drawn from stakeholder comments are as follows:

- Rail service along the Harbor Subdivision corridor could facilitate a one-seat ride between downtown Los Angeles and San Pedro. Otherwise, this is a multiple-transfer trip.
- There is a need for both local and regional service and a connection to LAX from both Union Station and the Harbor area.
- Connectivity between transit lines is very important. Transferring between trains and buses should be quick and easy. The transit system should be an integrative one.
- Trains and station areas should be bike-accessible, with wide walkways at stations for both pedestrians and bicyclists.
Of the modes presented, light rail received the highest support due to its ease of integration with the current rail system and its perceived environmental benefits (lower emissions, quieter operation, etc). An extension of the Metro Green Line south towards the Harbor area received significant support. The public also provided many ideas about station locations and how transit services could connect to areas such as downtown Los Angeles, LAX, San Pedro and Long Beach.

Of the concerns received, the public indicated that environmental impacts and air quality issues were of utmost importance. Many participants indicated they wanted a “green” transit mode with as little environmental impact to the surrounding neighborhoods as possible. Also significant were safety concerns. Some of the participants brought up grade crossings and the speeds at which trains would travel through their neighborhoods.

S.11.3. Public Meetings – Round III

A final round of public meetings was held in October 2009 to present the results of the AA study and solicit final comments on project recommendations. Meeting locations were chosen to avoid duplication with the previous two rounds of meetings as listed below.

- October 19, 2009 – Metropolitan Water District in downtown Los Angeles
- October 19, 2009 – Lawndale Community Center in Lawndale
- October 20, 2009 – Carson Community Center in Carson
- October 21, 2009 – Jackie Robinson Academy in Long Beach
- October 22, 2009 – Miriam Matthews Library in Hyde Park

S.11.4. Technical Advisory Committee

During the AA study, Metro consulted regularly with the Harbor Subdivision TAC, which consisted of representatives from stakeholder agencies with technical experience relevant to the project. The purpose of the TAC was to solicit feedback and recommendations from stakeholders at key milestones during the AA Study. Representatives from the following agencies were invited to be members of the TAC:

**Federal:**
- Federal Railroad Administration
- Federal Aviation Administration
- Federal Transit Administration

**State:**
- California Department of Transportation (Caltrans) District 7
- California Public Utilities Commission

**Region / County:**
- Southern California Association of Governments (SCAG)
- Southern California Regional Rail Authority
- South Bay Cities Council of Governments
- Gateway Cities Council of Governments
• Alameda Corridor Transportation Agency
• Burlington Northern Santa Fe Railway
• Los Angeles County Department of Public Works
• Los Angeles County Department of Regional Planning
• Los Angeles County Sheriff's Department
• Los Angeles County Fire Department

Cities:
• Los Angeles Department of Transportation (LADOT)
• Los Angeles Department of Public Works – Bureau of Engineering
• Los Angeles Community Redevelopment Agency
• Los Angeles City Planning Department
• Los Angeles World Airports (LAWA)
• Port of Los Angeles
• Los Angeles Fire Department
• City of Vernon
• City of Huntington Park
• City of Inglewood
• City of El Segundo
• City of Hawthorne
• City of Manhattan Beach
• City of Redondo Beach
• City of Lawndale
• City of Torrance
• City of Carson
• City of Long Beach

TAC Meetings

The TAC was briefed at four meetings held on the following dates:
• August 20, 2008
• November 19, 2008
• March 16, 2009
• October 7, 2009

Some members of the TAC also sponsored workshops that focused discussion on specific technical issues. Two sets of workshops were organized – one to discuss off-corridor alignments and another to discuss urban design concepts. All TAC members were invited to participate.

Off-Corridor Alignment Workshops

Four Off-Corridor Alignment Workshops were held for TAC members in January 2009 to discuss the viability of leaving the Metro-owned ROW to connect to various off-corridor activity centers. Each meeting listed below focused on a particular area of the corridor:
• Central Area – January 22, 2009 at the Torrance Airport in Torrance
• Northern Area – January 27, 2009 at LADOT in downtown Los Angeles
• Southern Area – January 28, 2009 at the Port of Los Angeles in San Pedro
• LAX Area – January 29, 2009 at LAWA at LAX

The comments and suggestions received at the workshops were valuable inputs to the Stage I Screening process.

Urban Design Concept Workshops

Three Urban Design Concept Workshops were held in July and August 2009. Similar to the Off-Corridor Alignment Workshops, the meetings were spread throughout the Corridor and focused the TAC’s discussion on station area design concepts.

• Southern Area – July 28, 2009 at the Port of Los Angeles in San Pedro
• Northern Area – July 30, 2009 at SCAG in downtown Los Angeles
• Central Area – August 4, 2009 at the Torrance Airport in Torrance

S.12. CONCLUSIONS OF AA STUDY

There is not a single project along the Harbor Subdivision that meets all of the diverse travel market needs existing throughout the Study Area. From the outset of the Harbor Subdivision AA Study, there has been a collective recognition – validated through extensive discussions with stakeholders and the public – that Harbor Subdivision is best suited for a program of alternatives that serves multiple markets throughout the Study Area. The recommended strategy reflects this programmatic orientation and also addresses how specific projects (and minimum operating segments) could be phased over time.

The Stage II Evaluation of the alternatives resulted in the following major conclusions:

• The **Local South Alternative** has the highest overall rating with the segments from the existing Metro Green Line terminus at Marine/Redondo Beach to the proposed Torrance Regional Transit Center (RTC). This alternative provides significant transportation system benefits with fewer environmental impacts and solid community support.

• Segments of the **Regional and Local North Alternatives** along the Slauson Corridor score slightly lower than the Local South Alternative. The dense, transit-dependent neighborhood along Slauson Avenue is a very attractive transit market, but the constrained ROW and large number of at-grade crossings have a negative effect on the cost effectiveness and environmental impacts criteria.

• The **Regional Alternative** between LAUS and LAX is the Build Alternative that can best utilize existing/proposed infrastructure improvements in the corridor. With the implementation of the Crenshaw Transit Corridor Project, nearly 5 miles of parallel freight track would be reconstructed between Inglewood and Imperial Highway providing the backbone for an LAX-centered Regional service. In addition, should the CHSTP and/or the California Department of Transportation implement improvements along the Los Angeles River prior to a Regional Harbor Subdivision Alternative, these projects could improve service into LAUS and allow for lower incremental capital costs for the Regional/Express service.
• **The Express Alternative** has an overall rating high enough to merit potential future study, but the capital costs incurred by grade separating the alignment through Los Angeles and Inglewood along with the non-stop operation between LAUS and LAX lowers the ratings for cost-effectiveness and community acceptability. The inclusion of rail service between LAUS and LAX has merit, especially once the CHSTP is running with LAUS as its Southern California hub. Lower-cost options such as ones that are not fully grade separated or which utilize the planned LAX Automated People Mover to access the LAX Central Terminal Area are alternative strategies for implementation.

• **Off-corridor Alternatives / Options** generally scored lowest in the Stage II Evaluation. Once leaving the Harbor Subdivision ROW, the cost per mile generally increases and cost effectiveness and environmental impacts worsen. Some off-corridor options, such as the Local North along the Metro Blue Line / Alameda Street and Local South along Normandie / Gaffey or Pacific Coast Highway have ratings low enough to recommend their elimination from future consideration. However, several off-corridor options are recommended for further study, including the Local South and Regional Alternatives to San Pedro via I-110 and the Local South Alternative to Long Beach via Sepulveda / Willow.

Based on the Stage II Evaluation, alternatives and segments are organized into a Phased Implementation Strategy listed below and shown in Figure S.22.

**S.12.1. Phased Implementation Strategy**

**Priority I:**
- **Local South Alternative** – Metro Green Line to Torrance RTC

**Priority II (not in rank order):**
- **Regional Alternative** – LAUS to Vermont/I-110
- **Local North Alternative** – Metro Blue Line to Crenshaw Blvd

**Priority III (not in rank order):**
- **Local South Alternative:** Torrance RTC to San Pedro via I-110
- **Local South Alternative:** Torrance RTC to Long Beach via Sepulveda / Willow
- **Regional Alternative:** Vermont/I-110 to San Pedro
- **Express Alternative:** LAUS to LAX

Again, implementation of Priority II and or Priority III projects is largely dependent upon the availability of funding and the prior or potential implementation of other transportation-related investments.
Alternatives to Consider for Environmental Phase

As stated earlier in this Executive Summary, results of this Alternatives Analysis Study support consideration of the following alternatives for future study in a Draft EIS/EIR phase:

- No Build (required)
- Transportation System Management (required)
- Metro Green Line to Torrance RTC
List of Acronyms

AA...............Alternatives Analysis
BNSF..............Burlington Northern Santa Fe Railway
BRT.................Bus Rapid Transit
Caltrans..........California Department of Transportation
CHSTP ...........California High Speed Train Project
CRT...............Commuter Rail Transit
CTA.................Central Terminal Area
EIR...............Environmental Impact Report
EIS ...............Environmental Impact Statement
EMU ..............Electric Multiple Unit
FRA...............Federal Railroad Administration
LACTC ..........Los Angeles County Transportation Commission
LADOT ..........Los Angeles Department of Transportation
LAUS ............Los Angeles Union Station
LAWA ..........Los Angeles World Airports
LAX ............Los Angeles International Airport
LOS ............Level-of-Service
LOSSAN ..........Los Angeles to San Diego Passenger Rail Corridor
LPA ............Locally Preferred Alternative
LRT ..............Light Rail Transit
LRTP ............Long Range Transportation Plan
Metro ..........Los Angeles County Metropolitan Transportation Authority
O&M ...............Operations and Maintenance
PCH ..............Pacific Coast Highway
ROW ..............Right-of-Way
RTC .............Regional Transit Center
SCAG ............Southern California Association of Governments
SPR ..............Self-Propelled Railcar
TAC ..............Technical Advisory Committee
TAP ..............Transit Access Pass
TSM ............Transportation Systems Management
VMT ............Vehicle-Miles Traveled