5. COMPARATIVE (STAGE II) ANALYSIS METHODOLOGY

The Stage II Evaluation consists of a comparative performance evaluation of the four Build Alternatives defined in Chapters 3 and 4. As described in Chapter 4, the Build Alternatives are broken into smaller segments to allow for a more detailed and thorough evaluation. These minimum operable segments are illustrated in Table 5.1 and Figure 5.1.

Table 5.1. Build Alternatives – Further Definition & Stage II Analysis Segments

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Segment(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local North</td>
<td>Little Tokyo/Arts District – Slauson Ave</td>
</tr>
<tr>
<td></td>
<td>Metro Blue Line – Crenshaw Blvd</td>
</tr>
<tr>
<td>Local South</td>
<td>Metro Green Line – Redondo Beach Regional Transit Center (RTC)</td>
</tr>
<tr>
<td></td>
<td>Redondo Beach RTC – Torrance RTC</td>
</tr>
<tr>
<td></td>
<td>Torrance RTC – Normandie Ave</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – San Pedro via Normandie / Gaffey</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – San Pedro via I-110</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – Metro Blue Line via Sepulveda / Willow</td>
</tr>
<tr>
<td></td>
<td>Normandie Ave – Metro Blue Line via PCH</td>
</tr>
<tr>
<td>Regional</td>
<td>LAUS – Century/Aviation</td>
</tr>
<tr>
<td></td>
<td>Century/Aviation – Vermont Ave</td>
</tr>
<tr>
<td></td>
<td>Vermont Ave – San Pedro via I-110</td>
</tr>
<tr>
<td>Express</td>
<td>LAUS – LAX</td>
</tr>
</tbody>
</table>

Build Alternatives and their operable segments are compared against one another using a pre-defined set of evaluation criteria. Like the evaluation criteria used in the Stage I Evaluation, the Stage II Evaluation Criteria are reflective of the overall Purpose and Need Statement and measures the Build Alternatives’ ability to address project goals.

Stage II criteria are organized into four broad categories: Transportation System Performance, Cost Effectiveness, Environmental Benefits and Impacts and Community Acceptability. The Build Alternatives are evaluated according to each of these categories in Chapters 6 through 9. These categories and related criteria are described in the following sections.
Figure 5.1. Build Alternatives – Further Definition & 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

Local South / Regional Alternatives: Normandie Ave to San Pedro

Regional Alternative: Century/Aviation to Normandie Ave

Source: AE LLC, STV Incorporated
5.1.  **TRANSPORTATION SYSTEM PERFORMANCE**

Transportation system performance measures potential improvements to the transportation system. These criteria essentially measure the ability of the Build Alternatives and their operable segments to accomplish some or all of the Harbor Subdivision Transit Corridor objectives. The criteria are as follows:

- Travel Time / Reliability
- System Connectivity
- Intermodal Compatibility
- Accessibility / Passenger Convenience
- Vehicle Efficiency

5.2.  **COST EFFECTIVENESS**

Cost effectiveness measures and compares the relative costs and benefits of each Build Alternative. The Federal Transit Administration (FTA) uses cost effectiveness (most easily understood as the annual cost incurred to save a transit rider an hour) as one of its key measures of the viability of a transit project. The discussion of cost effectiveness includes an evaluation of each Build Alternative and its operable segments in terms of the following four criteria:

- Capital Cost
- Operations & Maintenance Cost
- Ridership & User Benefits
- Financial Feasibility

5.3.  **ENVIRONMENTAL BENEFITS / IMPACTS**

Environmental benefits and impacts measure the potential impacts, both positive and negative, associated implementing a new transit service. The Build Alternatives and segments are evaluated based on the following criteria:

- Economic Development
- Transit Supportive Land Use
- Acquisitions / Relocations
- Construction Impacts
- Traffic Intersection / Operations
- Air Quality
- Visual & Aesthetics
- Noise & Vibration
- Cultural Resources
5.4. **COMMUNITY ACCEPTABILITY**

The community acceptability criterion measures the degree of public and stakeholder acceptance of an alternative, including both preferences and concerns. Each Build Alternative and its operable segments are evaluated with consideration for service attractiveness, community integration and public meeting input.

5.5. **RATING SYSTEM**

In each chapter, the Build Alternatives and their segments are rated according to each major and sub-criterion on a one to five scale, 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 analysis of the four Build Alternatives and their operable segments. For the Stage II Screening Evaluation, an aggregate rating of “3” was generally the minimum level of performance required for consideration in the Phased Implementation Strategy outlined in Chapter 11. The ratings are represented using Harvey balls, as shown in Table 5.2.

**Table 5.2. 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></td>
<td>○</td>
<td>⊙</td>
<td>⊙w</td>
<td>⊙s</td>
<td>●</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worst Performance</th>
<th>Best Performance</th>
</tr>
</thead>
</table>
5.6. Evaluation Criteria & Performance Measures

Table 5.3 lists the Stage II evaluation criteria and performance measures by category. These performance measures will be discussed in a qualitative manner when evaluating the various Build Alternatives and operable segments.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Performance Measure</th>
</tr>
</thead>
</table>
| **Travel Time / Reliability** | • Offers lower travel times than existing No Build and Transportation Systems Management (TSM) alternatives  
• Provides consistency in day-to-day trip times  
• Offers reliable headways between vehicles  
• Minimizes number of transfers for majority of travelers |
| **System Connectivity** | • Provides potential connections with other lines and to major transit hubs  
• Provides potential high quality and attractive service connections (e.g. continuity of service to downtown, availability for express routes, number of transfers, etc.) |
| **Intermodal Compatibility** | • Allows for interoperability (multiple services sharing track) on existing and planned lines in Metro system  
• Facilitates one-seat trips / minimizes forced transfers required due to modal incompatibility |
| **Accessibility / Passenger Convenience** | • Minimizes walking distances to access stop locations  
• Maximizes number of stop locations  
• Serves population and employment within 1/4 mile of transit service  
• Provides for safe and comfortable passenger experience  
• Maximizes access of existing public institutional, cultural and recreational facilities and services (e.g. Community Centre)  
• Maximizes access for low-income and transit dependent populations |
| **Vehicle Efficiency** | • Optimizes number of vehicles required to address demand  
• Matches vehicle type to appropriate service pattern (local vs. express)  
• Utilizes vehicle types that are already in operation (and maintained) in the Los Angeles region |
| **Capital Cost** | • Minimizes overall project capital cost  
• Minimizes cost per mile by utilizing existing right-of-way (ROW), at-grade operation as much as possible |
| **Operations & Maintenance (O&M) Cost** | • Minimizes overall project Operations & Maintenance (O&M) cost  
• Minimizes operating cost per mile by utilizing modal options best suited for each service type. |
| **Ridership & User Benefits** | • Meets existing and forecast transit demands to 2030  
• Maximizes share of trips by transit (i.e. new transit riders)  
• Provides travel time savings user benefits above No Build and TSM alternatives |
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Performance Measure</th>
</tr>
</thead>
</table>
| **Cost Effectiveness** | Financial Feasibility | • Maximizes cost effectiveness of construction costs and costs for vehicle acquisition and vehicle maintenance facilities  
• Minimizes capital and operating costs over a 20 year lifecycle  
• Minimizes additional utility costs (upgrading, relocation, etc.) |
| Economic Development | • Maximizes station area access  
• Maximizes potential to serve communities that could benefit from economic development (i.e. low-income or those with unfavorable land uses)  
• Maximizes potential to integrate with local redevelopment plans and policies  
• Provides opportunities to facilitate mixed use transit oriented development |
| Transit Supportive Land Use | • Maximizes station area access  
• Serves areas where there are transit supportive land uses – such as commercial with adjacent medium to high density residential  
• Provides opportunities to facilitate new mixed-use and/or transit oriented development |
| Acquisitions / Relocations | • Minimizes the number of partial and full property takes and relocations  
• Minimizes impacts to property access |
| Construction Impacts | • Minimizes long-term traffic, visual, noise impacts during project construction |
| Traffic / Intersection Operations | • Maintains or improves overall level of service (LOS) (on road segments and at key intersections)  
• Minimizes additional delays to traffic in primary study area (average and/or overall delay)  
• Maximizes non-auto use (transit, cycling, pedestrian) for trips to and within the study area  
• Minimizes number of major intersections operating with critical movements (e.g. less than ten percent of capacity unused)  
• Maintains connections to adjacent areas/transportation facilities at boundaries of study area  
• Minimizes adverse effects on overall level of service on parallel routes  
• Minimizes adverse effects at grade crossing locations |
| Air Quality | • Minimizes adverse effects on air quality  
• Minimizes potential vehicle exhaust emissions and the relative impact of the emissions that contribute to climate change  
• Maximizes opportunities to reduce harmful emissions |
| Visual & Aesthetics | • Minimizes visual impact to sensitive receptors  
• Minimizes impacts to the character of the community |
| Noise & Vibration | • Minimizes adverse effects on ambient noise levels (after construction) as per measure of effectiveness (MOE) criteria |
| Cultural Resources | • Minimizes impacts on sensitive and protected historical, archeological and paleontological resources |
| Parklands | • Minimizes interaction with public parklands or green space  
• Maximizes potential to provide landscaping or green space |
<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Performance Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity &amp; Environmental Justice</td>
<td>• Ability to distribute both economic and environmental costs and benefits fairly across different population groups</td>
</tr>
</tbody>
</table>
| Safety & Security | • Minimizes risk of vehicular collisions  
• Minimizes risk of pedestrian incidents at grade crossings and along ROW  
• Minimizes conflicts with other train service in high-volume sections of corridor  
• Includes safety measures that maximize train, vehicular and pedestrian safety |
| Community Acceptability | • Attractiveness of service  
• Integration into community  
• Public / stakeholder input  
• Minimizes ROW takes along the Corridor  
• Maximizes safety and security  
• Minimizes noise and visual impacts |