7.0 Evaluation of Alternatives

This chapter documents the evaluation of alternatives conducted for the Uptown-West Loop Planning Study.

7.1 Goals Attainment

Based on the needs, opportunities, and constraints outlined in Chapter 1, Purpose and Need, the following goals and objectives were developed for the Uptown-West Loop Planning Study. The specific evaluation criteria used to screen the alternatives developed for the Uptown-West Loop Planning Study are based on the overall goals defined for the project. This process allows the METRO Board of Directors to assess the degree to which each alternative 1) addresses specific problems or deficiencies identified in the Purpose and Need, and 2) satisfies project goals. The transportation goals and objectives for the Uptown-West Loop Planning Study include the following:

Goals

- Increase ridership and improve mobility and access for existing and future transit riders, local residents, commuters, and travelers who have origins and/or destinations in the Uptown-West Loop area;
  
  a. Improve access to/from and within the study area by providing additional, faster and more reliable transit service
  
  b. Provide integrated, seamless transit connections to residential areas and major activity centers throughout the region
  
  c. Improve multi-modal access to the study area by better integrating the area’s transit and highway systems, including important METRO facilities
  
  d. Support pedestrian linkages both within the study area and to adjacent communities

- Promote the operating efficiency of METRO services in the Uptown-West Loop area;
  
  a. Reduce delay for transit services within and through the study area
  
  b. Provide highway and street priority to transit services to the maximum extent possible without compromising the performance of the general traffic system
c. Optimize the integration of transit services internal to the study area with other regional transit services

- Develop cost-effective transportation improvements in the corridor;
  
  a. Design transit services and facilities to be consistent with expected transit markets
  b. Make maximum use of existing highway, street and transit resources
  c. Minimize project capital and operating costs by using innovative technologies and implementation and operating strategies (e.g. physical and service improvements that minimize human, material and financial resource requirements)

- Provide transportation improvements that enhance the urban environment and support the urban design initiatives of the Uptown/Galleria area;
  
  a. Identify transit alternatives that minimize impacts on immediate residential, recreational, commercial, shopping and other land uses and contribute to regional environmental goals (e.g., air quality improvement) and preserve ecologically sensitive areas, historic and cultural resources
  b. Improve transit in ways that will encourage and support transit-friendly, pedestrian-oriented development
  c. Provide transit service that supports and is consistent with the character of existing and future land use and development throughout the corridor
  d. Provide stops/stations that encourage transit use and are compatible with and enhance the character of their surroundings
  e. Integrate transit facility designs with urban design initiatives within the public ROW
  f. Lay out and design alternatives to maximize the potential for joint development opportunities

Goals and objectives established for the Uptown-West Loop Planning Study reflect a wide variety of interests and perspectives, which assist in effective screening and evaluation. The goals and objectives developed for this study reflect the objectives of METRO, as well as input received during the initial public outreach efforts. They encompass such items as mobility and transit improvements, fostering more livable communities, economic development, and preserving or improving the environment and the quality of life in the study area. It is important to note that the goals encompass more than transportation issues, they also reflect quality of life related needs of the study area. The goals and objectives address specific issues identified
in previous studies related to the corridor as well as the integration of the goals and objectives developed as part of the Uptown-West Loop Planning Study. The goals and objectives also conform to METRO’s Mobility 2025 Plan and the 2022 MTP.

The initial long-list of conceptual alternatives developed for the Uptown-West Loop Planning Study were designed to incorporate and integrate as many elements outlined in the goals and objectives as possible. The conceptual alternatives were developed and refined to include competing alignments and modes deemed reasonable and appropriate for consideration. Based on the screening of Uptown-West Loop Conceptual Alternatives described in Section 2.3, all Build Alternatives moving forward into the detailed evaluation phase satisfied project goals and objectives developed for the study. Those alternatives that did not perform well relative to the project goals were eliminated from further consideration. Evaluation criteria developed for this analysis were based on the goals and objectives. The assessment of environmental, traffic, transit, economic development and community impacts are summarized in the following sections.

7.2 Summary of Potential Environmental Impacts

Chapter 3 of this report presented the environmental screening of project alternatives. The alternatives were assessed for their potential to affect urban and natural elements, and cultural resources in the Uptown-West Loop Corridor. They were also evaluated for potential construction impacts, cumulative impacts and environmental justice issues. A qualitative and comparative summary of potential effects is presented in Table 7.1. Potential effects are shown for each of the project alternatives within each of the geographic segments. The description of potential effects is based on the impact quantities and analysis presented in the previous chapters. The two technologies considered, BRT and LRT, would only produce minor variations in the environmental screening based on analysis conducted to date. Accordingly, the summary of the potential environmental impacts is discussed by alignment. This section provides a rationale for the evaluation of each alternative.

As the selected conceptual alternatives moved forward in the detailed analysis phase, the alignments were divided into analysis segments for evaluating their performance in terms of engineering, operations, traffic impacts, relative cost and environmental and community impacts. The analysis segments are divided along major thoroughfares that intersect the alignments at points where major distinctions in the conceptual alternatives occur. The segments are as follows:

Segment 1 - NWTC to Memorial Dr.
Segment 2 - Memorial Dr. to San Felipe
  via S. Post Oak Ln.
  via IH-610W elevated facility
  via IH-610W frontage road (with variations)
Segment 3 - San Felipe to Richmond Ave.
Segment 4 - Richmond Ave to Proposed Southern Transit Center
Table 7.1
Summary of Potential Environmental Impacts

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MBUILD</td>
<td>Yes</td>
<td>None</td>
<td>Low</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Low</td>
<td>None</td>
<td>Moderate</td>
<td>None</td>
<td>None</td>
<td>Moderately Beneficial</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>Low</td>
<td>Law</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>High</td>
<td>Law</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

Note: Please refer to Chapter 3 of this report for a full description of the environmental screening conducted for the detailed alternatives in the Uptown-West Loop Planning Study.
**Consistency with Area Growth Plans & Policies.** The No Build Alternative is inconsistent with the Uptown Houston District's transportation infrastructure development plans, while the Build Alternatives -- intended to improve transportation access and circulation -- are generally consistent. The local resident's opposition to new elevated transportation facilities in Segment 1 makes Alternatives 2 and 2A less desirable. Alternative 3 uses S. Post Oak Ln. and is seen by the public and residents as incompatible with the residential character of that street. Alternative 1 is the most consistent with local growth plans and policies. However, Alternatives 1 and 3 have the potential to impact Memorial Park, which runs counter to the preferences of local park preservationists. These alternatives require additional evaluation and special approvals under federal law.

**Noise Impacts.** The noise screening procedure used the general screening distance found in the FTA Transit Noise and Vibration Impact Assessment Guidance Manual and was refined to include light rail and bus source reference levels, vehicle headways, and speeds. The analysis was based on projected future traffic volumes with the project as well as forecasted background growth, and programmed transportation improvements. Noise and vibration impacts from the project alternatives could be intensified in locations where (1) future sensitive receptors would be built near the transitway, and/or (2) where future noise-producing uses would be developed near sensitive receptors that would be impacted by the Build Alternatives' noise and vibration. Generally, technologies considered produced discernable differences in noise impacts, but not the alignments.

It is projected that no noise impacts will occur for any of the Build Alternatives using LRT as the AHCT technology. The LRT source level came from the specifications of the vehicle expected to be used in Houston.

The BRT option has a higher potential to create noise impacts. The bus noise source level was assumed to be that of a diesel articulated bus, as the data for a hybrid bus was not available. This assumption is representative of the existing technology and represents a worst-case scenario. For Alternative 1, 29 noise impacts are projected with 27 at residential buildings and two at parks. 28 noise impacts are projected for Alternative 2, one of which is at a park and the other 27 are at residential buildings. Alternative 2A has the least projected noise impacts, 11, all of which are at residential buildings.
It should be noted that at the time the noise and vibration analysis was conducted, Alternative 3 had already been eliminated from further consideration. However, other environmental impact analysis was performed for Alternative 3 and has been enumerated in detail in Chapter 3 of this report.

**Visual Impacts.** The No Build Alternative would not directly introduce new visual barriers into the Uptown-West Loop Corridor, although the visual quality of the corridor could diminish over time as traffic congestion worsens and more of the landscape becomes devoted to automobile parking. The visual impact of the Build Alternatives is generally considered to be "low," except for Alternatives 2 and 2A which both involve the construction of new elevated structures along IH-610W. All Build Alternatives introduce new at-grade facilities including, but not limited to, catenary poles, overhead trolley wire or catenary systems, open-ballast track, electric sub-stations, new transit stations, and vehicle storage areas. All Build Alternatives also involve the removal of the landscaped median along Post Oak Blvd. These aspects of the Build Alternatives could negatively affect visual quality, with the overall effect heavily dependent on project design details, aesthetic treatments and landscaping.

**Impacts to Local Business Access (after construction).** In the long run, access to local businesses in the corridor is expected to be slightly worse than today, regardless of which action is taken. Under the No Build Alternative, traffic congestion will worsen, but would probably be partially (and incrementally) addressed through low-cost improvements to intersection geometry, signal timing and other traffic control measures (i.e., Transportation Systems Management). The Build Alternatives will improve access to the corridor for transit passengers. The motoring public, however may experience turning-movement restrictions and more circuitous routes due to operational safety requirements along streets that feature a transitway. For these reasons, the degree of adverse effect on business access is considered "low" for all project alternatives.

**Land Use Displacement.** All Build Alternatives will displace privately owned land, especially in Segments 2 and 3. Alternatives 1 and 3 have the highest potential to impact publicly owned park land in Segment 2 and 3, thus triggering Section 4(f) of the Department of Transportation Act of 1966 (as amended). Alternatives 2 and 2A convert the least amount of private property to public use and utilize existing public transportation ROW where applicable.

**Impacts to Known Hazardous Materials Sites.** All Build Alternatives would potentially encounter known hazardous materials sites, especially in Segment 3.
Vegetation Impacts. Aerial photography and field observations were used to identify and verify areas of native vegetation within the project area. Memorial Park consists of a large, contiguous area containing a substantial amount of native vegetation. Alternatives 1 and 3 would require some ROW from Memorial Park. All Build Alternatives will require removal of the landscaped median in Post Oak Blvd. As defined, the Build Alternatives will generally have only minor effects on vegetation.

Wildlife Impacts. Adverse effects in this category are expected to be low due to the predominantly urban character of the corridor.

Water Resource Impacts. Alternative 1 and 3 will require a new structure for crossing Buffalo Bayou that could potentially result in adverse effects to water quality both during and after construction. Alternatives 2 and 2A would cross the bayou within the existing IH-610W facility.

Impacts to Wetlands/Waters of the U.S. Adverse effects in this category are considered "moderate" for Alternatives 1 and 3 for the same reasons as cited in the preceding paragraph.

Impacts to Cultural Resources. No significant adverse impacts to architecturally and/or historically significant structures are anticipated. An archival search and field survey of the corridor area revealed only a handful of structures near potential alignments that were both 50 years old and/or that appeared to be architecturally or historically significant. In several other instances there are documented historic resources within one-quarter mile of alignments but due to the distance away from the roadways, and due to intervening development that serves to buffer the buildings, no adverse effect on those resources or their settings would be anticipated. No formal determination of effects per the Criteria of Effect (the measures specified for assessing impacts for Federally-assisted projects) has been made at this point in project planning, nor should a property being included in this section be considered as a determination.

Potential impacts by the alternatives on significant publicly owned public parks and recreational land as cultural resources have also been identified. Alternatives 1 and 3 have the highest potential to impact publicly owned parks. Preliminary investigations indicate that Alternative 2 is constructible without infringement on Weiss Park. However, further analysis is necessary for a final determination.
**Construction Impacts.** Moderate adverse construction impacts are anticipated for all Build Alternatives. The actual severity of these impacts will depend on the construction approach and duration. Final project design, construction techniques and construction phasing will determine construction impacts. Careful planning and design will mitigate construction impacts to minimize the construction effects on the surrounding neighborhoods, businesses, infrastructure, and natural environment. Though relatively short, construction impacts may have the potential to be disruptive to normal, daily activities. Measures to minimize or mitigate construction impacts will be assessed during further detailed analysis.

**Cumulative Impacts.** No significant unavoidable adverse impacts to the Uptown-West Loop Corridor are expected to occur. A "moderate" level of adverse effects could occur where other public and private projects are constructed near (spatially and temporally) the proposed Build Alternatives.

**Disproportionately High and Adverse Impacts to Low-Income and Minority Communities.** Although low-income and minority communities are present within the Uptown-West Loop Corridor in percentages greater than the national average, project effects are not expected to fall disproportionately on these communities.

**Economic Development Potential.** The amount of vacant land and surface parking lots within the station vicinities of all Build Alternatives suggests the potential for substantial land development oriented to improved, high-capacity transit access. The majority of developable land within the corridor occurs along Post Oak Blvd. All Build Alternatives have Post Oak Blvd. in common. For this analysis, only minor development advantages accrue to at-grade and partially at-grade alternatives versus those on aerial or elevated structure. Assumptions can be drawn regarding Alternatives 2 and 2A and their lessened potential to induce development resulting from fewer stations along the alignments. With Post Oak Blvd. in common, and only minor differences in development potential along the northern segments, all alternatives perform equally well since they are in close proximity of parcels that are candidates for development.

### 7.3 Summary of Potential Transportation Impacts

Although Alignment 3 performed well initially, several elements compromised the alignment’s capacity for potential implementation. Sufficient engineering was performed that identified significant potential operational and engineering
constraints. As the alignment was evaluated against project criteria, several other potential adverse impacts were identified, thus meriting the alternative’s elimination. Alternative 3 was eliminated for the following reasons:

- Limited ROW to accommodate transit and traffic operations along Woodway Dr. and S. Post Oak Ln.
- Significant traffic impacts due to reduced capacity on Woodway Dr. and S. Post Oak Ln. required to integrate transit operations
- Limited operating speeds due to tight turns at S. Post Oak Ln., Woodway Dr. and San Felipe
- Potential noise impact and higher operating costs due to tight turns
- Reduced demand potential due to low density character of the neighborhood
- Negative community input

Traffic analysis was conducted for all alternatives under consideration. With the elimination of Alternative 3, only Alternatives 1, 2 and 2A are discussed in this section. Due to their similarities, traffic impacts are not a distinguishing characteristic among the alternatives. At-grade, in-street transit operation in Segment 1 by Alternatives 1 and 2 does not appear to significantly reduce LOS or increase delay in the existing or a 2025 build condition for Segment 1 intersections. An introduction of transit in the 2025 build condition does not appear to impact Segment 2 intersections. Alternatives 2 and 2A use preserved ROW within IH-610W and are removed from normal traffic operation except where they return to grade at Uptown Park Blvd. in the median of Post Oak Blvd. Decreases in LOS and corresponding increases in delay attributable to transit are not anticipated for that intersection. Alternative 1 traverses intersections at Woodway Dr., Post Oak Blvd., and Uptown Park Blvd.; no adverse impacts are anticipated. (Please see Section 4.2 – Roadway Impacts)

Though not a distinguishing characteristic among the alternatives, due to the fact that all Uptown-West Loop alternatives share Post Oak Blvd. as a conceptual alignment, minor impacts are associated with Segment 3 intersections at Westheimer and San Felipe. Changes in intersection LOS and delay are generally attributable to increases in trip volumes between the current condition and the 2025 No-Build condition. Only minor increases in delay are expected with the introduction of AHCT between the 2025 No Build and the 2025 build condition.
7.4 Community and Political Positions

Comments received during the preparation and presentation of the short list of conceptual alternatives shared many commonalities. Residents generally favored improving mobility and access in the Uptown-West Loop study area and believe there is a real need for AHCT in the Houston region. The community also felt that METRO must address the larger context of the region when considering transit by providing regional connectivity and that transit investment should be examined in the broader context of the region. Detailed descriptions of public involvement activities are provided in Chapter 10 of this report.

Concerns voiced at meetings or by correspondence also included impacts of the project on traffic in the Uptown-West Loop Corridor, increased traffic congestion near intersections, pedestrian access and safety, impacts on property value, ridership analysis, and environmental impacts on Memorial Park. Numerous questions were asked regarding BRT and LRT technologies. BRT technologies were not viewed favorably by the community.

Segment Specific Comments:

Segment 1: Meeting participants voiced an overwhelming opposition to any alignment using aerial/elevated structures in the vicinity of residential neighborhoods. Especially in the northern segment (Segment 1), residents felt that elevated structures eliminate any transit benefit for the community while forcing neighborhoods to absorb all negative impacts associated with the project, such as noise, visual, construction, and safety impacts. Generally, meeting attendees were in favor of the typical sections depicting an alternative running at-grade in the median of N. Post Oak Rd.

Three individual stakeholder meetings were held with the civic association leaders from the five sections of Lafayette Place. The meetings were held for the benefit of the leadership to convey to the project team their issues, concerns and any consensus among those they represented. General consensus was reached regarding a preference for an at-grade alignment for the northern segment. The visual intrusion of an additional elevated element, regardless of shared ROW within the IH-610W configuration and the potential to mask additional structures within the IH-10 and IH-610W interchange, was viewed as unacceptable. Several residents in these neighborhoods have lobbied TxDOT to change the ramp design and have filed a lawsuit to enjoin TxDOT from moving forward on their planned improvements. Stakeholders attending these meetings have voiced
concern about additional noise being generated from any transit improvement and requested that any plans moving forward include screening as a mitigation for noise and visual impacts. A sufficient buffer between transit and residential structures should also be preserved.

**Segment 2:** The vast majority of comments received regarding Segment 2 were from S. Post Oak Ln. area residents who felt that the Woodway Dr./S. Post Oak Ln. segment of Alternative 3 was flawed. Potential impacts to their neighborhood included the deterioration of traffic level of service due to a reduction in capacity because of minimal ROW. Other potential impacts to S. Post Oak Ln. included visual and noise impacts, which would be a detriment to the low-density character of the neighborhood. The elimination of an alignment using S. Post Oak Ln. was announced at a public meeting held on October 24, 2002.

In addition to regularly scheduled SAC meetings, several individual meetings were held with agencies and advocates serving Uptown Houston District, Memorial Park and other Segment 2 areas. The City of Houston Parks and Recreation Department, Memorial Park Conservancy, community members and the Park People voiced strong concern regarding the potential for park impacts associated with alternatives 1 and 3. They expressed strong support for transit and enhanced access to the park. They favored alternatives that minimize the potential for park impacts and reduce the amount of aerial structure in the vicinity of Memorial Park.

The Uptown Development Authority, working cooperatively with property owners in the study area, has collectively presented comments on the alternatives under review. Uptown Development Authority favors an alignment that uses the preserved portal in the median of IH-610W transitioning to the median of Post Oak Blvd.

**Segment 3:** The Uptown Houston District, representing area businesses, has provided comment regarding the use of Post Oak Blvd. as a transit corridor. Uptown Houston District supports an at-grade LRT alignment in the median of Post Oak Blvd. that will provide and support reliable, convenient, attractive, cost-effective internal circulation and regional mobility. The Uptown Houston District supports the station locations provided in the Uptown-West Loop Alternatives and feels that they are consistent with their future plans. They feel strongly that the project should not sacrifice vehicular capacity at the expense of transit and that every effort should be taken to reduce conflicts between pedestrians, transit and vehicular traffic. AHCT should function as an internal circulator within the
corridor and provide connections to the NWTC and proposed southern transit center at Westpark. The District has committed funding for the design and construction of the transit portal passing under U.S. 59. In addition, they have stated a commitment to use TIRZ #16 programmed funds to enhance the pedestrian amenities along the corridor in support of transit and a pedestrian network.

Segment 4: All comments support the utilization of the preserved portal being constructed as part of the Westpark Toll Road project and a proposed transit center with parking facilities in the Westpark Corridor.

7.5 Study Findings

The purpose of the Uptown-West Loop Planning Study was to examine a comprehensive range of transit improvements within the study area following TEA-21 guidelines, relative to major transportation investments. The entire planning exercise was predicated on a cooperative and collaborative process whereby public agencies and the community assist in the development of a definition, general scope of potential solutions and the foundation for evaluation criteria. The planning study provides an analysis regarding the potential benefits, costs and consequences (economic, social and environmental) of alternative transportation investment strategies in the study area.

Planning studies were conducted in the other METRO Mobility 2025 corridors. Findings from all studies were used to assemble the draft system plan. Widespread outreach will solicit community feedback on the draft plan. In July 2003, METRO adopted a final transit system plan, which will include the selection of a LPIS in the Uptown-West Loop corridor.

The Alternatives Analysis – Findings Report documents the process that led to the findings submitted to METRO for assembly and inclusion in the Transit System Plan that included the selection of the LPIS in the Uptown-West Loop corridor. As required by federal project development processes, the LPIS must be included in the MTP and TIP, which are developed by H-GAC, the regional MPO. In addition, once the LPIS is documented in the Final Report, a DEIS will be prepared to fulfill the NEPA requirements for transportation improvements that require federal funds.

Four alternatives were defined in the Uptown-West Loop Definition of Alternatives and carried forward for detailed evaluation. Through the intermediate
evaluation, Alternative 3 was eliminated. Table 7.2 provides a comparative summary of the alternatives that are presented for analysis in the draft system plan assembly phase. The summary is intended to articulate discernable characteristics and the trade-offs required by each alternative for minimizing impacts, creating operational efficiencies, and satisfying project goals and objectives. Table 7.3 describes the differences in the physical characteristics of each alternative. Reviewing the physical characteristics required by each alternative provides an understanding and context for the criteria listed in the evaluation matrix. It also begins to discern the relationship between the physical characteristics and alternative performance and cost.

Common trade-offs occur between the absolute effectiveness of an alternative as determined by such measures as environmental impacts, the amount of grade separation, demand potential, viable technologies, community impacts and the overall cost-effectiveness or financial feasibility. For instance, while one alternative might be particularly effective in meeting the transportation and land use goals of the area, the benefits it provides may be small when compared to the costs. At the same time, a different conceptual alternative might be more cost-effective, but may significantly increase the impacts to cultural resources. Community support also plays a large role when looking at the trade-offs among conceptual alternatives and will become increasingly important role in system plan assembly.

The Uptown-West Loop alternatives share many common features and attributes. Each conceptual alternative accesses and uses Post Oak Blvd. as an at-grade, in-street alignment providing access to the main activity center located in the study area. All alternatives also follow the same alignment on the southern end of the corridor, utilizing preserved ROW within a depressed section under U.S. 59 to access a proposed transit center providing connections within the U.S. 59 and Westpark corridors – where significant increases in person trips to the Uptown-West Loop area are expected. The potential transit investment along Post Oak Blvd. in terms of the quantity and location of stations and other facilities are shared among the alternatives under consideration. The proposed southern transit center, parking facilities, and other required amenities for efficient operation are also equal among the alternatives. A light maintenance/inspection facility is also required for all alternatives and included in the costs estimate. Though minor cost
### Table 7.2
#### Evaluation Matrix

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 2a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Capital Cost (M)</td>
<td>$189 M</td>
<td>$244 M</td>
<td>$297 M</td>
</tr>
<tr>
<td>Operating &amp; Maintenance Cost Index</td>
<td>0.84</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>Demand Potential Index</td>
<td>100</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td>Estimated Average Speed (mph)</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Access Impacts to Adjacent Property</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Potential Traffic Impacts</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Potential Visual Impacts</td>
<td>Low</td>
<td>Med</td>
<td>High</td>
</tr>
<tr>
<td>Potential Noise Impacts</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Potential Cultural Resource Impacts</td>
<td>High</td>
<td>Med</td>
<td>Med</td>
</tr>
<tr>
<td>System Connectivity**</td>
<td><strong>addressed during system plan assembly</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 7.3
#### Key Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 2a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment Length (miles)</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Number of Stations</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Estimated ROW Requirement (acres)</td>
<td>28.9</td>
<td>28</td>
<td>27.4</td>
</tr>
<tr>
<td>Length of Aerial Segments (feet)</td>
<td>950</td>
<td>5544</td>
<td>9926</td>
</tr>
<tr>
<td>Length of Depressed Segments (feet)</td>
<td>0</td>
<td>2429</td>
<td>2429</td>
</tr>
<tr>
<td>Maintenance and Inspection Facilities</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Future Transit Center</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
differences among the alternatives are realized for this facility, they are similar in terms of operation. The variations in costs for the facility reflect the differences in the alternatives’ proposed fleet sizes, which are a function of the length and technology used. BRT and LRT technologies have distinctly different capacities, resulting in the need for approximately twice the number of BRT vehicles to provide similar levels of service and consistent operations.

While the conceptual alternatives share many commonalities, they differ greatly in the northern section in Segments 1 and 2. These segments use different alignments to reach Post Oak Blvd. from the NWTC. The alignments differ in terms of environmental impacts, access and transfer opportunities, community impacts and relative cost. There are no significant differences in alternative speeds, construction or traffic impacts and only minor gains in demand potential for each alternative. And, as determined through the screening process, each of the alternatives moving forward into detailed analysis and the system planning phase performs well in terms of future system connectivity, project goals and objectives.

Traffic analysis has been conducted for all three alternatives under consideration relative to alignment, operational characteristics, safety standards and transit technology in a 2025 Build and No Build condition. Generally speaking, traffic impacts were not a distinguishing characteristic among the alternatives. This is mainly due to the fact that all Uptown-West Loop alternatives share Post Oak Blvd. as a conceptual alignment where minor impacts associated with Segment 3 intersections at Westheimer and San Felipe are anticipated.

### 7.5.1 Alternative Technologies

The conceptual alternatives have been designed to accommodate either exclusive BRT or LRT technologies. In terms of operations, it anticipated that both technologies will have similar performance characteristics and would operate equally through the corridor relative to the alignments and system design. Major differences in the two transit technologies relative to system operating characteristics should not be significant. As defined, BRT must be convertible to LRT. Therefore, for this evaluation, guideways, alignment geometry, ROW, utility relocation, platform placement and design have been conceptually developed to accommodate a minimum requirement for the introduction of an LRT technology. Relative costs estimates for alternative comparisons have been based on these assumptions.
7.5.2 Alternative 1 – Comparative Evaluation

Conceptual Alternative 1 accommodates either BRT or LRT technologies. The attributes of Alternative 1 are characterized by at-grade in-street operation. The relative capital costs assigned to this alternative are $189 million and $245 million for BRT and LRT respectively. This alternative requires a fleet size of 13 LRT vehicles or 26 BRT vehicles (see Section 6.1.2). Alternative 1 has lower relative costs for both BRT and LRT than Alternatives 2 and 2A.

The primary difference in the cost estimate indicated for Alternative 1, when compared to the other alternatives, is reflected in the smaller quantity of grade separation required. The other alternatives being examined require significant quantities of aerial structure within the IH-610W ROW and a depressed section connecting the segment from IH-610W to Post Oak Blvd. This alternative also requires approximately one more acre of ROW be converted to transportation use. The ROW requirement includes 13 acres for a light maintenance/inspection facility and 9.9 acres for the proposed southern transit center in the Westpark corridor (common to each alternative); the balance of the ROW, 6.04 acres, is related to requirements along the exclusive guideway in Segments 2 and 3. As described in the previous section, trade-offs occur between alternatives and in-street operation presenting both positive and negative impacts. An at-grade alternative allows greater opportunity for station placement and access, potentially attracting stronger ridership. At nine stations, this alternative has the highest number of potential stations. This alignment is also overwhelmingly preferred among northern area neighborhoods. These neighborhoods have been very involved in the planning process and are sharply opposed to any aerial facilities within the vicinity of this residential area citing potential visual and noise impacts. However, a significant potential for environmental impacts, 4(f) issues, or incursions into publicly owned park properties has been identified with this alternative, posing the prospect of significant mitigation measures that may be required for the current design if a prudent alternative is available – regardless of cost. Additionally, park advocates have strongly opposed any alignment impacting park property. While supporting this transit study, they prefer an alternative that minimizes any potential for impact while maintaining future park access.
7.5.3 Alternative 2 – Comparative Evaluation

Conceptual Alternative 2 accommodates either BRT or LRT technologies. The attributes of Alternative 2 are characterized by at-grade in-street operation in Segment 1, 3 and 4, and aerial structures and a depressed section in Segment 2. The relative capital costs assigned to this alternative are $244 million and $297 million for BRT and LRT respectively. This alternative requires a fleet size of 13 LRT vehicles or 26 BRT vehicles (see Section 6.1.2). Alternative 2 has higher relative costs for both BRT and LRT than Alternative 1, but lower than 2A.

As with all the alternatives, the primary difference in the cost estimate, when compared to the other alternatives, is reflected in the quantity of grade separation required. This alternative uses some aerial structure within the IH-610W ROW between Memorial Dr. and Post Oak Blvd. A depressed section is also required linking the segment from IH-610W to Post Oak Blvd. This alternative consumes approximately one acre less of ROW than Alternative 1. Because this alignment transitions to the center of IH-610W via an aerial structure after Memorial Dr., additional ROW for Segment 2 is not required. The ROW requirement includes 13 acres for a light maintenance/inspection facility and 9.9 acres for the proposed southern transit center in the Westpark corridor (common to each alternative); the majority of the remaining ROW required is along Post Oak Blvd. for the accommodation of transit. As described in the previous section, trade-offs occur between alternatives. Alternative 2 remains at-grade along N. Post Oak Rd., avoiding aerial structures in the vicinity of residential neighborhoods. The alignment allows for a station location and access to Memorial Park. The alignment begins transitioning to the center of IH-610W on an elevated structure south of Memorial, precluding the possibility for a station until Post Oak Blvd. in the vicinity of Uptown Park Blvd. and San Felipe. At eight stations, this alternative has the second highest number of potential stations, providing access to Memorial Park and surrounding neighborhoods in the northern section of the corridor. Though not overwhelmingly preferred among northern area neighborhoods, this alternative does remain at-grade in Segment 1, running parallel to the residential neighborhood. These neighborhoods have been very involved in the planning process and are sharply opposed to any aerial facilities within the vicinity of this residential area, citing potential visual and noise impacts. This alternative remains at-grade where feasible and incorporates elevated elements when potentially advantageous. The elevated section of Alternative 2 avoids the potential for significant environmental impacts, 4(f) issues, or incursions into publicly owned park properties along the western IH-610W frontage roads. Park advocates have strongly opposed any alignment impacting
park property and this alternative minimizes the potential for impact while maintaining park access. However, segments of aerial structure may have potential visual and noise impacts to the park and surrounding neighborhoods.

7.5.4 Alternative 2A – Comparative Evaluation

Conceptual Alternative 2A was conceived as a variation to Alternative 2, connecting the NWTC on a plus-two elevated platform configuration via an aerial structure to the center of IH-610W, as opposed to an at-grade platform at the NWTC. The alternative provided a variation to mitigate any potential traffic, future system connectivity or engineering constraints that might be encountered with the at-grade options.

Conceptual Alternative 2A accommodates either BRT or LRT technologies. The attributes of Alternative 2A are characterized by elevated/aerial structures in Segment 1 and 2, and a depressed section providing a connection from the IH-610W facility to the median of Post Oak Blvd. The relative capital costs assigned to this alternative are $259 million and $313 million for BRT and LRT respectively. This alternative necessitates a fleet size of 11 LRT vehicles or 22 BRT vehicles, smaller than the other alternatives (see Section 6.1.2). Alternative 2A has the highest relative costs for both BRT and LRT of the alternatives under consideration.

Due to the configuration of Alternative 2A, significant quantities of grade separation are required, reflecting the primary cost difference when compared to the other alternatives. This alternative uses significant quantities of aerial structure within the IH-610W ROW between the NWTC and Post Oak Blvd. Additional grade separation (depressed section) is also required linking the segment from IH-610W to Post Oak Blvd. This alternative consumes slightly less ROW than Alternative 1 or 2. Because this alignment uses existing ROW in the center of IH-610W on an aerial structure beginning at the NWTC and running to Post Oak Blvd., additional ROW along Segment 1 and 2 is not required. The ROW requirement includes 13 acres for a light maintenance/inspection facility and 9.9 acres for the proposed southern transit center in the Westpark corridor (common to each alternative); the remaining ROW, 4.5 acres, is required for the accommodation of transit along Post Oak Blvd. This alignment avoids the potential for any traffic conflicts in the northern section of the corridor, and as a function of this attribute, has minor speed advantages. As with the other alternatives, this alignment has certain trade-offs. There are only seven stations incorporated into the design of this alignment. Due to the longer aerial segments
of Alternative 2A, there are no stations between the NWTC and Post Oak Blvd. Speed advantages are realized and potential traffic impacts are lessened with this alternative, however, service to northern area neighborhoods and transfer opportunities, as well as service to Memorial Park, are precluded.

This alternative is not preferred by northern area neighborhood groups, Memorial Park advocates or park planners, or from other area groups wanting some benefit that a station in the northern segment would offer. Park advocates have strongly opposed any alignment impacting park property, but prefer maintaining some limited park access. Northern area neighborhoods have been very involved in the planning process and are sharply opposed to any aerial facilities within the vicinity of this residential area citing potential visual and noise impacts. These groups have been embroiled in debate with TxDOT and their plans to construct several elevated ramps impacting this area. This alternative does require an elevated facility running parallel in close proximity to residential neighborhoods. Aerial structures have potential visual impacts to the park and surrounding neighborhoods. The elevated section of Alternative 2A avoids all potential for significant environmental impacts, 4(f) issues, or incursions into publicly owned park properties along the western IH-610W frontage roads.