# TABLE OF CONTENTS

1.0 INTRODUCTION AND PLANNING CONTEXT .............................................. 1
2.0 ALTERNATIVE SCREENING FRAMEWORK ................................................ 5
3.0 ALTERNATIVE EVALUATION CRITERIA AND MEASURES .......................... 7
   3.1 SYSTEM CAPACITY (ENHANCED MOBILITY) ........................................... 7
   3.2 SYSTEM LINKAGE ................................................................................ 8
      3.2.1 Accessibility - Increased Connectivity ......................................... 8
      3.2.2 Effects on Parallel Roadways ...................................................... 9
   3.3 MODAL CONNECTIVITY ....................................................................... 9
   3.4 STUDY GOALS AND CRITERIA .............................................................. 9
      3.4.1 ENGINEERING ..............................................................................10
         3.4.1.1 Travel Performance .................................................................10
         3.4.1.2 Accessibility ...........................................................................11
         3.4.1.3 Bicycle and pedestrian accommodation ................................11
         3.4.1.4 Incident Management ...............................................................11
         3.4.1.5 Construction Impacts .................................................................11
         3.4.1.6 Border security compatibility ..................................................12
      3.4.2 COST FEASIBILITY ..........................................................................12
         3.4.2.1 Construction Cost .................................................................12
         3.4.2.2 Right-of-Way Acquisition ......................................................12
         3.4.2.3 Utilities and Infrastructure .....................................................13
         3.4.2.4 Financing Opportunities .........................................................13
         3.4.2.5 Economic Development Opportunities ....................................13
      3.4.3 MINIMAL ENVIRONMENTAL IMPACTS ..........................................13
         3.4.3.1 Community Impacts .................................................................14
         3.4.3.2 Cultural Resources Impacts .....................................................14
         3.4.3.3 Natural Resources Impacts .....................................................15
         3.4.3.4 Other Impacts .........................................................................15
      3.4.4 PUBLIC INPUT ................................................................................17
         3.4.4.1 Comments from public meetings / Resolutions of support ........17
         3.4.4.2 Compatibility with Other Studies ............................................17
   4.0 EVALUATION SCREENING MATRIX ......................................................17
LIST OF TABLES

Table 1: Purpose and Need ..................................................................................... 1
Table 2: Study Goals............................................................................................... 2
Table 3: Qualitative Rating System......................................................................... 2

LIST OF FIGURES

Figure 1: Border Highway East Study Area.............................................................. 4
Figure 2: Alternative Screening Process................................................................. 6
Figure 3: Concept Screening Process (Level 1)...................................................... 18
Figure 4: Refinement Screening Process (Level 2)............................................... 18
Figure 5: Detailed Evaluation Screening Process (Level 3).................................. 18
1.0 INTRODUCTION AND PLANNING CONTEXT

The purpose of the Border Highway East (BHE) Alternative Screening Methodology (ASM) is to provide a decision-making framework to determine how well each set of alternatives meets the Purpose and Need of the Planning and Environmental Linkages (PEL) Study as well as the BHE study area goals. The PEL Study will be used to develop and evaluate transportation alternatives that will be evaluated further in subsequent stages of project development in accordance with planning guidelines established in Moving Ahead for Progress in the 21st Century (MAP-21) and in the El Paso MPO’s Horizon 2040 Metropolitan Transportation Plan (MTP).

Transportation alternatives will be developed and evaluated for the study in a sequential process including the following screening levels: 1) Universe of Alternatives; 2) Preliminary Alternatives; and 3) Reasonable Alternatives. The ASM will be utilized to compare the advantages and disadvantages of each alternative for advancement into the succeeding set of refined alternatives and, ultimately, the recommended alternative PEL strategies for continued project development. The alternative development and screening evaluation is based upon the BHE Purpose and Need (Table 1) and Study Goals (Table 2) as referenced from the BHE Purpose and Need document:

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop conceptual transportation alternatives that would address the system capacity, system linkage, and modal connectivity issues mentioned above by:</td>
<td>Lack of direct access/connectivity to I-10 and Loop 375;</td>
</tr>
<tr>
<td>• Improving transportation facilities that connect or are parallel to I-10 and Loop 375 to provide alternate routes of travel;</td>
<td>• Congestion along east-west arterials;</td>
</tr>
<tr>
<td>• Improving the level of service (LOS) along the primary east-west transportation arterials;</td>
<td>• High volumes of truck traffic along the existing east-west arterials;</td>
</tr>
<tr>
<td>• Implementing transportation systems management (TSM), transportation demand management (TDM), and/or intelligent transportation systems (ITS) improvements;</td>
<td>• At-grade train crossings within the study area that cause delay and impede traffic movement; and</td>
</tr>
<tr>
<td>• Considering the expansion of transit, bus, and pedestrian options that are better integrated with the overall transportation system; and</td>
<td>• Increasing demand on area transportation infrastructure (roadways, railroads and ports of entry) associated with the increasing international and interregional trade and freight rail movements.</td>
</tr>
<tr>
<td>• Integrating existing transportation facilities to complement other modes of transportation.</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Purpose and Need
Table 2: Study Goals

- Enhancing east-west mobility;
- Improving local and regional access;
- Providing pedestrian and bicycle friendly facilities;
- Ensuring compliance with the MTP;
- Providing transportation solutions that help reduce delay and congestion caused by incidents on I-10 and parallel arterials;
- Ensuring an open public participation process;
- Minimizing disruption to traffic during construction;
- Maximizing cost efficiency;
- Developing a design that coexists with border security;
- Avoiding and/or minimizing impacts to the human and natural environment;
- Developing the facility utilizing context sensitive solutions;
- Optimizing opportunities for economic development, including creating Transportation Reinvestment Zones; and
- Accelerating delivery through innovative financing options.

The BHE ASM is established before any detailed alternatives are developed to ensure that each alternative is examined consistently and evaluations are unbiased. Each of the alternatives, including the “no-build” alternative, will be evaluated using this methodology. The “no-build” alternative represents the baseline condition in the BHE study area as if no additional improvements are implemented other than those already programmed (fiscally constrained Horizon 2040 MTP). The three screening levels that comprise the ASM include: (1) the Purpose and Need for the first level (fatal flaw) screening of the Universe of Alternatives, (2) the study goals at a qualitative level for the second level screening of the Preliminary Alternatives, and (3) the study goals at a quantitative level for the third level screening of the Reasonable Alternatives.

The effectiveness of each alternative (universe, preliminary, reasonable) in terms of meeting the needs of the study area will be measured by a wide range of criteria, defined by the Purpose and Need and study goals, as discussed in the subsequent sections. The potential impacts of each alternative will be quantified and documented by the evaluation criteria (e.g. irrigation canals crossed, order of magnitude cost estimates, displacements, etc.) To compare the advantages and disadvantages of each of the alternatives in the public involvement process, both the qualitative and quantitative analysis of each alternative will be summarized in a five-level rating system defined in Table 3.

Table 3: Qualitative Rating System

<table>
<thead>
<tr>
<th>Rating</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>++</td>
<td>Substantial positive effects</td>
</tr>
<tr>
<td>+</td>
<td>Some positive effects</td>
</tr>
<tr>
<td>O</td>
<td>Neutral</td>
</tr>
<tr>
<td>–</td>
<td>Some negative effects</td>
</tr>
</tbody>
</table>
The qualitative rating system will allow the advantages and disadvantages of each alternative (universe, preliminary) to be compared using the evaluation criteria described in the following sections. This system will be utilized as a tool to assist in determining the refined sets of preliminary alternatives and ultimately a set of reasonable alternatives or projects for future development during the National Environmental Policy Act (NEPA) process. As the preliminary alternatives are refined to a greater level of detail as reasonable alternatives, the rating system will be supplemented with quantifiable data to validate the ratings for each reasonable alternative against each evaluation criteria and measure.
Figure 1: Border Highway East Study Area
2.0 ALTERNATIVE SCREENING FRAMEWORK

The alternative screening process is similar to a funnel with multiple levels of screening blending a varied group of strategies, corridor needs and goals, into a set of refined transportation alternatives through an elaborate “filtering”, or evaluation, process. Definitions of the various screening stages follow below and are shown graphically in Figure 2 (page 6).

- Level 1, the Concept or Fatal Flaw Screening, involves the development and evaluation of the universe of alternatives across a spectrum of modes and strategies. Of the potential roadway alternatives, a future BHE alignment (as identified in the previous 1997 Border Highway Extension Feasibility Study and as shown in the Horizon 2040 MTP) will be evaluated along with potential connections from the new alignment to potential I-10 and Loop 375 connections. In addition to the potential roadway connections and alternatives, the universe of alternatives shall consist of alternatives from a variety of modes and strategies including the preferred alignment from the 1997 Feasibility Study, as well as those identified by stakeholders at the Technical Work Group (TWG), from input received at Early Coordination Meetings and others developed by the project team. Fatal flaw criteria will be utilized to evaluate and screen the universe of alternatives against the Purpose and Need as depicted in Figure 3 (page 18). Based on the fatal flaw criteria analysis, alternatives which meet the purpose and need shall be carried through to the next development phase of the project for preliminary alternatives development and evaluation.

- Level 2, the Refinement Process, will include input received from the TWG and Early Coordination Meetings, fatal flaw screening, previous engineering studies, developed methodologies, and screening criteria to identify preliminary alternatives for BHE and connections to I-10 and Loop 375 that are suitable for further evaluation. Each preliminary alternative shall be developed to a level of detail to define the corridor's general location and basic right-of-way (ROW) requirements. The level of alternative development needs to be sufficient to allow for a qualitative evaluation of a range of evaluation criteria and measures including engineering, environmental, cost and public input, which correlate to the study goals as shown in Figure 4 (page 19). This level of screening may qualitatively assess land use, parcel boundaries, major structures, utility impacts, natural terrain and other constraints. Based on the Refinement Process analysis, alternatives shall be carried through to the next development phase of the project for reasonable alternatives development and evaluation.

- Finally, in Level 3, a Detailed Evaluation, or short list of reasonable alternatives or projects resulting from the Refinement Process screening will be developed to a higher level of detail and evaluated using more detailed quantitative measures as shown in Figure 5 (page 20), based on the same range of criteria and measures as the Level 2 Refinement Process (Engineering, Environmental, Cost Effectiveness, and Public Input). This level of screening may quantitatively
assess land use, parcel boundaries, major structures, utility impacts, natural terrain and other constraints. The alignments shall be designed to a level of detail to define the alternative’s general location and basic ROW needs. The result of this final phase of the process will be the identification of alternatives or projects to be carried forward to the next phase of project development.

Figure 2: Alternative Screening Process
3.0 ALTERNATIVE EVALUATION CRITERIA AND MEASURES

Alternative Evaluation Criteria and Measures for the BHE study are based upon both the Purpose and Need (Sections 3.1, 3.2, 3.3) and the established study goals (Section 3.4). The following sections provide detailed definitions for each of the evaluation criterion and measures as well as the evaluation matrix process to be utilized during the screening process.

The primary Alternative Evaluation Criteria and Measures are derived from both the Purpose and Need and Study Goals and are summarized below.

3.1 SYSTEM CAPACITY (ENHANCED MOBILITY)

Enhanced mobility through additional system capacity and improved traffic operations is a key purpose of this study. The major roadways within and encompassing the study area (I-10, FM 76, SH 20, and FM 258) primarily serve east-west mobility and are currently heavily utilized with truck traffic exceeding 10 percent of the total traffic in several segments of these corridors. Study alternatives must address improvements to east-west capacity and operational efficiency.

The key BHE system capacity needs include improving the level of service (LOS) along the primary east-west transportation arterials. LOS is an overall measure of congestion and travel performance within a corridor or roadway facility and it provides a way of quantifying less tangible attributes of congestion such as freedom to maneuver in the travel stream, traffic interruptions, comfort and convenience. Generally, alternatives which provide the largest improvement to the LOS along the primary east-west regional roadways (I-10, SH 20, FM 76, FM 258) will have the highest ratings.

Bus transit (through Sun Metro and El Paso County Rural Transit), bicycle and pedestrian pathways and trails currently supplement the existing roadway infrastructure capacity in providing a transportation mobility alternative to roadways for those populations without access to a vehicle. The El Paso MPO does show a future Bus Rapid Transit (BRT) corridor running along Alameda Avenue, which extends from El Paso into the north end of the study area to Horizon Blvd. The MPO also shows several Bicycle and Pedestrian trail linkages throughout the study area. For this study, improvements to these alternative transportation strategies will be evaluated for Modal Connectivity (Section 3.3) on their ability to connect customers from the proposed transportation Horizon 2040 MTP network to major facilities and activity centers within the study area.

While they may not be able to solve the entirety of the future transportation system demand, lower cost strategies which can improve the efficiency of the transportation system outside of capacity investments (e.g. TSM, TDM, ITS) should also be considered as a baseline strategy as part of the overall transportation set of solutions.
3.2 SYSTEM LINKAGE

As noted in the BHE Purpose and Need document, system linkage within the study area is limited by the following:

- The lack of direct access/connectivity to I-10 and Loop 375; and
- The prevalence of at-grade train crossings within the study area that cause delay and impede traffic movement.

The need for improved system linkage includes improving transportation facilities that connect or are parallel to I-10 and Loop 375 to provide alternate routes of travel. Future BHE alternative(s) including alternate connections to I-10 for travel through the study area, paralleling FM 258, SH 20, and FM 76 would help manage congestion on these parallel facilities and provide a more direct route for vehicles traveling southeast from Loop 375 and northwest from the future Tornillo-Guadalupe International Port of Entry (POE). In addition to these roadway oriented links, alternatives need to consider closing the gaps between connections to major activity centers and potential modal connections.

3.2.1 Accessibility - Increased Connectivity

The alternatives for the future BHE project(s) and connections to I-10 and Loop 375 must be compatible with both existing and proposed transportation networks in the study area to be efficiently utilized. Potential interchange/intersection locations for each alternative will be identified. In addition, the alternatives must accommodate emergency vehicle access. Alternatives that integrate with the existing and proposed transportation network and accommodate access to emergency facilities will be ranked higher than those that are not compatible with the existing and proposed transportation network.

Alternatives will be evaluated that:

- Accommodate the establishment of a transportation link between the Tornillo-Guadalupe International POE, the existing regional transportation system, and future BHE projects by improving the trans-continental trade network by providing an alternate route to I-10.
- Accommodate a potential direct connection (interchange) with Loop 375 near the Zaragoza International POE in the City of El Paso.
- Complement and accommodate local city initiatives such as the City of Socorro’s plan to improve connections to I-10, through the widening of FM 1281 (Horizon Boulevard), Eastlake Boulevard, and Tiwa Boulevard.

Generally alternatives which provide or accommodate uninterrupted direct connections between major transportation facilities and activity centers will be rated higher than those with more circuitous connections.
3.2.2 Effects on Parallel Roadways

The study would consider an alternative alignment to several parallel roadways in the study area, such as FM 258 (Socorro Road), State Highway 20 (Alameda Avenue), FM 76 (North Loop Road), and I-10. Therefore, alternatives should improve LOS on these parallel facilities by providing an additional route for southeast-northwest trips. The effect that each alternative has on these parallel roadways will be compared and evaluated. Those alternatives which most positively impact the traffic operations on these parallel facilities will be ranked higher than alternatives with less positive impacts.

3.3 MODAL CONNECTIVITY

The El Paso metropolitan area faces unique challenges as a border city with six POE’s within the metropolitan planning boundaries. Within the BHE study area, are the Ysleta-Zaragoza POE and the Fabens International POE which attract a significant amount of multimodal traffic including: vehicular, truck, and pedestrian traffic. As noted in the BHE Purpose and Need there is currently a limited integration of the existing transportation network with other existing and planned transportation modes. Consequently there is a need to address increasing demand on area transportation infrastructure (roadways, railroads and ports of entry) associated with the increasing international and interregional trade and freight rail movements.

The study must address modal interrelationship improvements which include the following:

- Consideration of the expansion of transit, bus, and pedestrian options that are better integrated with the overall transportation system; and
- Integration of the existing transportation facilities to complement other modes of transportation.

Alternatives that contribute to seamless accommodation of the transport of people (vehicular travel, transit via bus service, walking, and bicycling) and goods (through trucking and freight rail) through improved modal connections will receive higher ratings. Those alternatives that do not incorporate multiple transportation modal connections will be given a lower rating. Measures of seamless modal accommodation include:

- Alternatives which provide or accommodate improved transit linkages from El Paso County Rural Transit Bus Routes, pedestrian traffic from the POE’s, and identified major activity centers with the study area will rate higher than those that do not;
- Alternatives which provide or accommodate improved modal connections for truck and rail freight traffic to/from distribution facilities will rate higher than those that do not; and
- Alternatives that provide for or accommodate alternative transportation modes such as bicycles and pedestrians will rate higher than those that do not.

3.4 STUDY GOALS AND CRITERIA
Additional or secondary Alternative Evaluation Criteria and Measures are derived from the study goals and are summarized below. The study goals and associated criteria have been categorized by engineering, environmental, cost and public input.

### 3.4.1 ENGINEERING

Engineering criteria include traffic operational and design measures such as mobility, accessibility, safety, design standards, and constructability.

#### 3.4.1.1 Travel Performance

*(Goal: Enhancing east-west mobility; providing transportation solutions that help reduce delay and congestion caused by incidents on I-10 and parallel arterials)*

**Capacity and LOS**

Capacity reflects the ability of a roadway to accommodate traffic volume and is a measure of the roadway’s ability to handle traffic loads at a given point in time (travel demand) under specific traffic control and geometric conditions. Capacity is typically determined for the peak hour (or rush hour) and is measured in passenger cars per hour; this metric is also known as average peak hourly volume. Alternatives with greater roadway capacity are able to manage a higher peak hourly volume and will be rated higher.

LOS is an overall measure of congestion and travel performance within a corridor or roadway facility and it provides a way of quantifying less tangible attributes of congestion such as freedom to maneuver in the travel stream, traffic interruptions, comfort and convenience. Generally, alternatives which provide the largest improvement to the LOS along the primary east-west regional roadways (I-10, SH 20, FM 76, FM 528) will have the highest ratings.

**Transportation Efficiency (Travel Times and Average Speed)**

Transportation Efficiency is measured by an assessment of changes in travel times and average speeds through the study area transportation network resulting from the implementation of an alternative. Those alternatives which result in the largest improvement in reduced travel times and in increased average corridor speeds in comparison to the no-build alternative along the primary east-west regional roadways (I-10, SH 20, FM 76, FM 528) will have the highest ratings.
3.4.1.2 Accessibility

*(Goal: Improve local and regional access)*

Local Access

Alternatives which provide more direct connections to major regional transportation arteries such as I-10 (from the border) and Loop 375, as well as more direct access to heavy traffic areas (such as the Tornillo-Guadalupe International POE and Zaragoza International POE) as an alternative to I-10 for longer regional east-west trips will be evaluated more favorably than those alternatives which do not. Additionally alternatives which provide improved access to alternative modes such as transit, bicycle, and pedestrian will rate higher than those that do not provide accessibility to different modes.

Regional Access

Alternatives which provide an alternate to I-10 for longer regional east-west trips will be evaluated more favorably than those alternatives which do not.

3.4.1.3 Bicycle and pedestrian accommodation

*(Goal: Provide pedestrian and bicycle friendly facilities)*

Bicycle and pedestrian accommodation is measured by how well an alternative accommodates bicycle and pedestrian users through provision of shared use or dedicated bicycle lanes/sidewalks. Alternatives that accommodate bicycle and pedestrian users will be ranked higher than those that do not.

3.4.1.4 Incident Management

*(Goal: Providing transportation solutions that help reduce delay and congestion caused by incidents on I-10 and parallel arterials)*

This criterion addresses the impacts of alternatives on the occurrence of incidents in the study area. A higher rating will be given to an alternative that potentially reduces the occurrence of accidents within the study area. The lowest rating will be given to an alternative that does not address safety or that may contribute to the occurrence of accidents within the study area. A neutral rating will be given to an alternative that has little or no effect on safety on existing facilities within the study area.

3.4.1.5 Construction Impacts

*(Goal: Minimizing disruption to traffic during construction)*

Construction generally requires temporary lane closures and detours, which may affect nearby residences and businesses and the transportation users. It is important that the alternatives minimize disruption to neighborhood businesses and residential neighborhoods during construction. An alternative that has little or no effect during construction will generally have a neutral rating. An alternative that is likely to cause greater inconvenience to the public during construction, because of its proximity to more intense development, or in areas where ROW is limited, will be given a more negative rating. Measures of inconvenience will be number of potential street crossings, or
driveway crossings caused by the construction of an alternative impacting existing mobility and access.

3.4.1.6 Border security compatibility

(Goal: Developing a design that coexists with border security)

The key border security focus for the alternatives evaluation centers around alternative compatibility with border security infrastructure while simultaneously facilitating improved access to and from the POEs within or adjacent to the study area (Ysleta-Zaragoza POE, and Fabens International POE, and the future Tornillo-Guadalupe International POE). While the Horizon MTP examines issues of concern for all crossing modes (pedestrian, passenger vehicle, commercial trucks, and bus crossings), recent historical trends show that there are more pedestrian mode crossings and less privately owned vehicular crossings at these POEs. This criterion will focus on alternatives which are compatible with existing and planned border security infrastructure while providing improved POE access for all crossing modes consistent with the Horizon MTP’s Border Delay Reduction Strategies.

3.4.2 COST FEASIBILITY

There is limited transportation funding available for transportation studies and improvements; therefore, the alternatives must be viable, cost-effective and maintained to ensure that they remain a valuable resource to the community. The following criteria have been identified to ensure alternatives are cost effective.

3.4.2.1 Construction Cost

(Goal: Maximizing cost efficiency)

Conceptual-level cost estimates will be developed for the alternatives using estimated quantities and unit costs of major construction items, including pavement, structures and ROW. A contingency will be added to the conceptual assessment to account for items not listed in the conceptual assessment. Alternatives with lower construction costs will be ranked higher than alternatives with high construction costs.

3.4.2.2 Right-of-Way Acquisition

(Goal: Maximizing cost efficiency)

ROW acquisition will be a major component of the study because future projects may be new-location roadways. ROW acquisition costs consist of acquiring land (parcels) and the cost of displacements. The ROW footprint of each alternative will be determined and compared. In addition, potential displacements that could result from ROW requirements can be classified as community, residential, commercial, or industrial. Those alternatives that have substantial ROW requirements and potential displacements, in terms of amount or severity, will be ranked lower than alternatives with less substantial ROW requirements and potential displacements.
3.4.2.3 Utilities and Infrastructure  
*(Goal: Maximizing cost efficiency)*

Because future projects in the study area may be on new location, there are anticipated utility and infrastructure impacts. These include, but are not limited to, electric, sewer, water, telephone, gas, fiber optic, and cable TV lines in addition to drainage easements for existing surface roads and streets. The existing utilities and infrastructure information will be obtained by contacting utility companies and conducting field investigations. Each alternative’s impact to major utilities and infrastructure will be documented and compared. Alternatives with substantial impacts to major utilities and infrastructure will be ranked lower than alternatives with minor impacts to major utilities and infrastructure.

3.4.2.4 Financing Opportunities  
*(Goal: Accelerating delivery through innovative financing options)*

This criterion addresses how well an alternative accommodates innovative financing and accelerated project delivery. Alternatives which promote and accommodate innovative financing opportunities such as partnerships with local governments and private entities will be rated more favorably. Measures include a qualitative assessment of how well an alternative accommodates alternative financing mechanisms such as toll revenue and demonstrations of local government support (*Y=+*; *N =-*).

3.4.2.5 Economic Development Opportunities  
*(Goal: Optimizing opportunities for economic development)*

This criterion addresses how well an alternative provides a supportive climate for economic development and how well an alternative accommodates economic development through the following strategies: provision of direct roadway links to the POEs within the study area (Yslete-Zaragosa POE and proposed Tornillo POE) to maintain unimpeded truck freight movement, provision of alternatives which connect to but do not adversely impact historic resources (thereby supporting economic growth through increased tourism), as well as through the accommodation of Transportation Reinvestment Zones.

3.4.3 MINIMAL ENVIRONMENTAL IMPACTS

Environmental impacts are evaluated to ensure that the alternatives blend with and complement the resources of the communities within the study area. The environmental impacts are subdivided into the following classifications:

- Community Impacts;
- Cultural Resources Impacts;
- Natural Resources Impacts; and
- Other Impacts.
3.4.3.1 Community Impacts

(Goals: Avoiding and/or minimizing impacts to the human and natural environment; developing the facility utilizing context sensitive solutions)

Community impacts are evaluated to ensure that the alternatives complement the study area community and enhance community qualities. The community impacts that will be evaluated in this category include neighborhood character, context sensitive solutions (CSS), and socio-economic environment.

**Neighborhood Character**

The alternatives should avoid impacts to existing and proposed neighborhoods, have minimal effect on community cohesion, and should enhance the neighborhoods’ qualities. Alternatives with substantial impacts to neighborhoods, school districts and other community features will be ranked lower than other alternatives.

**Context Sensitive Solutions**

The alternatives should incorporate the principles of CSS, address the needs of the community, recognize the character of the region, balance the planning considerations of the study area, and utilize a team based approach to environmental, public involvement and engineering. Alternatives that result in a mutually agreed upon project visions/goals and that also have greater maximizes public/agency support shall be ranked higher than other alternatives.

**Socio-Economic Environment**

Potential impacts to the social and economic environment of the study area will be identified. Environmental justice issues will be analyzed in order to prevent the potential for discrimination and disproportionately high and adverse effects to minority and low-income populations. Demographics regarding environmental justice populations will be documented and compared. Alternatives which traverse environmental justice populations will be ranked lower than alternatives which do not potentially impact environmental justice populations.

3.4.3.2 Cultural Resources Impacts

(Goal: Avoiding and/or minimizing impacts to the human and natural environment)

The study should avoid impacts to existing cultural resources because they preserve the rich history of the Lower Valley community. The cultural resource properties evaluated include archaeological sites and historic resources.

**Archaeological Sites**

Alternatives should avoid or minimize impacts to archaeological sites. Recorded archaeological sites will be determined through record searches. High probability areas will also be identified. The number of recorded archaeological sites and high probability areas impacted by each alternative will be documented. Alternatives with impacts to recorded archeological sites and high probability areas will be ranked lower than alternatives that do not impact recorded archeological sites or high probability areas.
**Historic Resources**
Alternatives should avoid or minimize impacts to historic resources. For screening purposes, historic resources are considered to be historic-age properties (45 years or older) and those listed on or eligible for the National Register of Historic Places (NRHP) as determined through record searches. The number of historic resources located within the area of potential effect of each alternative will be documented. Alternatives with impacts to historic-age or NRHP listed or eligible properties (as determined through other studies) will be ranked lower than alternatives that do not potentially impact these resources.

**3.4.3.3 Natural Resources Impacts**
*(Goal: Avoiding and/or minimizing impacts to the human and natural environment)*

The alternatives should have minimal effects on the study area’s natural resources, including parkland, water resources (wetlands, drainage, and floodplains), irrigation canals, biological resources, and agricultural resources.

**Parkland**
The alternatives should avoid or minimize impacts to parkland. Parkland will be identified through field reconnaissance and coordination with the cities/county on proposed parks. The potential impact of each alternative will be documented and compared. Alternatives that potentially impact parkland will receive a negative rating, while the alternatives that do not potentially impact parkland will receive a neutral rating.

**Water Resources**
Alternatives should avoid or minimize impacts to jurisdictional waters of the U.S., including wetlands, drainage, and floodplains. The number of surface water crossings and acres of jurisdictional features potentially affected by each of the alternatives should be identified and compared. Alternatives that potentially have substantial potential impacts to water resources will be ranked lower than alternatives with minor potential impacts to water resources.

**Drainage/Irrigation Features**
Irrigation canals are a vital component for the success of the agricultural properties in the Lower Valley. The alternatives should avoid or minimize negative impacts to existing drainage and irrigation features. These features will be identified through coordination with the El Paso County Water Improvement District No. 1 and research. The potential impact of each alternative to drainage and irrigation features will be documented and compared. Alternatives which do not potentially impact the functionality of drainage/irrigation features will be ranked higher than alternatives that potentially negatively impact these features.

**Biological Resources**
Biologically sensitive areas will be identified such as state and federally listed threatened and endangered species and their habitat, as well as locally important species and rare vegetation series. The potential for occurrence of impacts to
threatened, endangered and rare species and their habitat, as well as, other wildlife
habitat areas will be evaluated and compared for each alternative. The alternatives that
do not impact biological resources will be ranked higher than alternatives that may
potentially impact biological resources.

**Agricultural Resources**
The acreage of prime farmland converted to transportation use will be evaluated for
each alternative. Alternatives with minimal potential impacts to agricultural resources
will be ranked higher than alternatives with potential substantial negative impacts to
these resources.

### 3.4.3.4 Other Impacts
*(Goal: Avoiding and/or minimizing impacts to the human and natural
environment)*

The alternatives will be assessed to determine the impacts to the existing environment
and constraints such as hazardous materials, air quality and traffic noise.

**Hazardous Materials**
A list of existing known hazardous materials sites, including petroleum storage tanks
and closed municipal landfills, will be obtained from database searches. The number of
hazardous material sites located adjacent to each alternative will be compiled and
compared. Alternatives which avoid any known hazardous materials sites will be
ranked higher than alternatives that impact hazardous material sites.

**Air Quality**
The study area is partially located in the part of El Paso County (City of El Paso) that is
in moderate non-attainment for Particulate Matter 10 (PM$_{10}$) but outside of the
maintenance area for the carbon monoxide standard. Alternatives should reduce
emissions of volatile organic compounds, nitrogen oxides, carbon monoxide, and PM$_{10}$
levels by increasing travel speeds and reducing idle times. Air quality impacts are
related to traffic volumes, capacity, and speeds. Alternatives with acceptable LOS
would increase speeds, reduce idle times, and lower mobile source air emissions, which
would result in less traffic congestion. Therefore, alternatives that provide acceptable
LOS compared to other roadways in the study area will be ranked higher than
alternatives with unacceptable LOS, which will result in reduced air quality.

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics emitted from
highway vehicles and non-road equipment. For each alternative, the amount of MSATs
emitted will be assumed to be proportional to the amount of vehicle miles traveled
(VMT), assuming that other variables are the same for each alternative. Therefore, an
alternative with lower VMT will be ranked higher than an alternative with higher VMT.
Another factor that will be considered is the location of sensitive receptors near each
alternative. Sensitive receptors include day care facilities, elder care facilities, churches
(with associated day cares), schools, and hospitals. An alternative in proximity to a
higher number of sensitive receptors will be ranked lower than alternatives in proximity to a lower number of sensitive receptors.

**Traffic Noise Receivers**
The number of traffic noise receivers (schools, hospitals, parks, residences, daycares, etc.) directly adjacent to each alternative will be determined. Alternatives which are adjacent to a higher number of traffic noise receivers will be ranked lower than alternatives which are not located adjacent to sensitive traffic noise receivers.

### 3.4.4 PUBLIC INPUT

Public input addresses the public perception of an alternative's overall benefit. Methods to gauge public input include written or verbal comments received at public meetings, resolutions of local agency support, and the compatibility of an alternative with regional transportation plans.

#### 3.4.4.1 Comments from public meetings / Resolutions of support
*(Goal: Ensuring an open public participation process)*

All verbal and written comments received through the public involvement process, including stakeholder meetings and TWG meetings, will be reviewed during the alternatives evaluation process. Alternatives that are not generally supported by the TWG and the public in a consensus manner will be ranked lower than those alternatives that are supported.

#### 3.4.4.2 Compatibility with Other Studies
*(Goal: Ensuring compliance with the MTP)*

This criterion addresses how an alternative relates to adjacent studies, as well as with local and regional plans. Items considered in this criterion are local land use, community, and thoroughfare plans and the MTP. A higher rating will be given to an alternative that is consistent with these plans. Conversely, an alternative that is not mentioned in local or regional plans or for which there is a record of or current demonstration of community non-support would receive a lower rating.

### 4.0 EVALUATION SCREENING MATRIX

The methodology described in this document will be followed to evaluate the various alternatives, including connections to I-10 and Loop 375, to determine their comparative advantages and disadvantages. The alternative screening process depicted in Figures 3, 4, and 5 contains the primary evaluation categories as well as the individual criteria within those categories. Units of measure for the criteria are also provided, where applicable. Utilizing this screening process and decision making framework will ultimately lead to the selection of reasonable PEL alternatives or projects for continued development during the NEPA process.
**First Level Screening for Purpose and Need**  
*Universe of Alternatives (qualitative - fatal flaw analysis)*

<table>
<thead>
<tr>
<th>Need</th>
<th>Purpose</th>
<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No-Build</td>
</tr>
<tr>
<td><strong>System Capacity</strong></td>
<td>Improving the level of service (LOS) along the primary east-west</td>
<td>LOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>transportation arterials; and high volumes of truck traffic along the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>existing east-west arterials;</td>
<td></td>
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<tr>
<td></td>
<td>Implementing transportation systems management (TSM), transportation</td>
<td></td>
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<tr>
<td></td>
<td>demand management (TDM), and/or intelligent transportation systems (ITS)</td>
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</tr>
<tr>
<td></td>
<td>improvements</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Does alternative include or accommodate congestion management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>strategies such as TDM, TSM, ITS (Y/N)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Linkage</strong></td>
<td>Improving transportation facilities that connect or are parallel to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I-10 and Loop 375 to provide alternate routes of travel;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does alternative include or accommodate connections from the border</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>communities and future POE to I-10 through the addition of RR grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>separations (Y/N)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Modal Connectivity</strong></td>
<td>Considering the expansion of transit, bus, and pedestrian options that</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>are better integrated with the overall transportation system; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does alternative improve or accommodate expansion of transit, bus, and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>pedestrian options that are better integrated with the overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>transportation system (Y/N)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integrating existing transportation facilities to complement other</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>modes of transportation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does alternative improve or accommodate existing transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>facilities that complement other modes of transportation (Y/N)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meets Project Purpose</strong></td>
<td>Y or N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Decision</strong></td>
<td>Carried Forward or Dropped from Consideration</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reasons</strong></td>
<td>(For comparison purposes)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 3: Concept Screening Process (Level 1)**
### Figure 4: Refinement Screening Process (Level 2)

#### Second Level Screening for Benefits and Impacts - Preliminary Alternatives (qualitative)

<table>
<thead>
<tr>
<th>Study Goals</th>
<th>Criteria</th>
<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engineering</td>
<td></td>
<td>No-Build</td>
</tr>
<tr>
<td>Enhancing east-west mobility</td>
<td>Level of Service</td>
<td>LOS along East/West Roadways</td>
<td></td>
</tr>
<tr>
<td>Improve local and regional access</td>
<td>Travel Times / Avg. Spd.</td>
<td>Average Speeds along Major Roadways</td>
<td></td>
</tr>
<tr>
<td>Provide pedestrian and bicycle friendly facilities</td>
<td>Bicycle and pedestrian accommodation</td>
<td>Qualitative assessment of bike/ped accom users through shared use or dedicated lanes/ sidewalks</td>
<td></td>
</tr>
<tr>
<td>Reduce incidents delay / congestion on I-10 / parallel roadways</td>
<td>Incident management</td>
<td>Reduces occurrence of incidents in study area</td>
<td></td>
</tr>
<tr>
<td>Minimizing disruption to traffic during construction</td>
<td>Construction Impacts</td>
<td>Impacts to motorists - amount of lane closures / detours</td>
<td></td>
</tr>
<tr>
<td>Developing a design that coexists with border security</td>
<td>Border security compatibility</td>
<td>Compliments and supports border security initiatives</td>
<td></td>
</tr>
<tr>
<td>Cost Feasibility</td>
<td>Construction Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximizing cost efficiency</td>
<td>ROW Acquisition</td>
<td>Number/severity of ROW Acquisition and Displacements</td>
<td></td>
</tr>
<tr>
<td>Utilities and Infrastructure</td>
<td>Impact to major utilities and infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accelerating delivery through innovative financing options</td>
<td>Financing Opportunities</td>
<td>Accommodates innovative financing and accelerated project delivery</td>
<td></td>
</tr>
<tr>
<td>Optimizing opportunities for economic development</td>
<td>Economic Development Opportunities</td>
<td>Accommodates / supports development of TRZ</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing the facility utilizing context sensitive solutions</td>
<td>Neighborhood Char.</td>
<td>Impact to existing and proposed neighborhoods</td>
<td></td>
</tr>
<tr>
<td>Community Impacts</td>
<td>Context Sensitive Solutions (CSS)</td>
<td>Design incorporates CSS principles (community needs and regional character), while also balancing system goals</td>
<td></td>
</tr>
<tr>
<td>SEE</td>
<td>Design incorporates CSS principles (community needs and regional character), while also balancing system goals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Resource Impacts</td>
<td>Archaeological Sites</td>
<td>Number of recorded archaeological sites and high probability areas potentially impacted</td>
<td></td>
</tr>
<tr>
<td>Historic Resources</td>
<td>Number of NRHP, NRHP-eligible, historic-age properties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Resource Impacts</td>
<td>Park Land</td>
<td>Acreage of park impacts</td>
<td></td>
</tr>
<tr>
<td>Water Resources</td>
<td>Natural Resources</td>
<td>LF# of surface water crossings, acreage of wetlands</td>
<td></td>
</tr>
<tr>
<td>Drainage Features</td>
<td>Functionality impacts of irrigation channels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological Resources</td>
<td>Potential to impact threatened/endangered, rare locally important species, Agnese of habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Resources</td>
<td>Acreage of prime farmland converted to transportation use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Impacts</td>
<td>Hazardous Materials</td>
<td>Number of hazardous material sites impacted</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>LOIS, VMT, and number of sensitive receptors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Noise Receivers</td>
<td>Number of noise receivers directly adjacent</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Measure Key

- Substantial Negative Effect
- Some Negative Effect
- No Effect, Neutral
- Some Positive Effect
- Substantial Positive Effect

#### Use Measure Key

- ( - , , 0, + , ++ )

#### Decision

- Carried Forward
- Dropped from Consideration

#### Third Level Screening Reasonable Alternatives

- For comparison purposes
### Third Level Screening for Benefits and Impacts - Reasonable Alternatives (quantitative)

#### Study Goals

<table>
<thead>
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<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhancing east-west mobility.</td>
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<td>Level of Service</td>
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<td>Impacts to motorists - amount of lane closures / deburs</td>
</tr>
<tr>
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<td>Border Security Compatibility</td>
<td>Complements and supports border security initiatives</td>
</tr>
</tbody>
</table>

#### Cost Feasibility

<table>
<thead>
<tr>
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<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximizing cost efficiency</td>
<td>Construction Cost</td>
<td>Conceptual Estimate ($)</td>
</tr>
<tr>
<td>Utilities and Infrastructure</td>
<td>Number/Severity of ROW Acquisition and Displacements</td>
<td>Impact to major utilities and infrastructure</td>
</tr>
</tbody>
</table>

#### Environmental

<table>
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<tr>
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<th>Alternatives</th>
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</thead>
<tbody>
<tr>
<td>Developing the facility utilizing context sensitive solutions.</td>
<td>Neighborhood Char.</td>
<td>Design incorporates CSS principles (community needs and regional character), while also balancing system goals</td>
</tr>
<tr>
<td>Avoiding and/or minimizing impacts to the human and natural environment</td>
<td>SEE</td>
<td>Impact to environmental justice populations</td>
</tr>
<tr>
<td>Cultural Resource Impacts</td>
<td>Archaeological Sites</td>
<td>Number of recorded archaeological sites and high probability areas potentially impacted</td>
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<td>No-Build</td>
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<tr>
<td>Hazardous Materials</td>
<td>Number of hazardous material sites impacted</td>
<td>No-Build</td>
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<td>Air Quality</td>
<td>LOS, VMT, and number of sensitive receptors</td>
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<td>Number of noise receivers directly adjacent</td>
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</tr>
</tbody>
</table>

#### Public Involvement

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensuring an open public participation process.</td>
<td>Public Input</td>
<td>Meeting comments and local resolutions of support</td>
</tr>
<tr>
<td>Ensuring compliance with the MTP</td>
<td>Compatibility with programmed improvements</td>
<td>No-Build</td>
</tr>
</tbody>
</table>

#### Decision

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision</td>
<td>Carried Forward or Dropped from Consideration</td>
<td>No-Build</td>
</tr>
</tbody>
</table>

#### Reasons

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For comparison purposes)</td>
<td>No-Build</td>
<td>All 1</td>
</tr>
</tbody>
</table>

### Measure Key

- Substantial Positive Effect: ++
- Some Positive Effect: +
- No Effect, Neutral: 0
- Some Negative Effect: -
- Substantial Negative Effect: --