Alternatives Analysis
Technical Memorandum

183 North Mobility Project, Travis and Williamson Counties
From SH 45/RM 620 to Loop 1 (MoPac)
Austin District
CSJs: 0151-05-100 & 3136-01-185
April 2016

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT
1.0 Introduction

As part of the planning process and in accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA), and Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT) guidelines, reasonable alternatives for the proposed 183 North Mobility Project were developed and evaluated. Preliminary alternatives were identified through Capital Area Metropolitan Planning Organization (CAMPO) long range plans and public and agency input. The preliminary alternatives were evaluated and those that were unable to meet the project’s purpose and need were eliminated from further consideration. The remaining reasonable alternatives were evaluated based on additional evaluation criteria including maximizing use of the existing infrastructure, environmental effects, implementation ability, and projected impacts on mobility. Although the northern limit for the proposed project is the State Highway (SH) 45 North/Ranch-to-Market Road (RM) 620 intersection, providing a reliable link between 183A and the MoPac express lanes was included as an additional evaluation criterion because project partners recognized the opportunity to connect these two managed lane facilities with the proposed project. This section explains the alternatives analysis process and the development of the recommended alternative.

1.1 Background

Several plans indicate the need for improvements to the section of the US 183 corridor under consideration in this study, including the CAMPO 2035 Regional Transportation Plan (RTP), Fiscal Year 2013-2016 Transportation Improvement Program, and the Fiscal Year 2015-2018 Transportation Improvement Program. Within these plans, suggested improvements to the corridor include studies to assess the environmental impacts of constructing managed lanes within the corridor. Projects included in these plans were selected based on extensive public involvement and reflect the wishes of public officials, civic leaders, and the overall regional population.

1.2 Existing Facility

US 183 is a major north-south thoroughfare in the Austin area that extends across the state, from Refugio to Vernon, and beyond, terminating at Interstate 90 in South Dakota. Within Austin, it is one of the most heavily traveled thoroughfares by commuters (CAMPO, 2005), traversing the city of Austin from the northwest to the southeast.

Within the project limits from SH 45N to MoPac, the existing facility is a six- to eight-lane freeway with one-way, two- to three-lane frontage roads. The existing right-of-way (ROW) in this section varies from 330 to 350 feet.
Traffic modeling for the US 183 corridor within the project limits shows that the average daily speed for vehicles traveling on the roadway in 2013 was 52 miles per hour (mph) during the AM peak period (7:00 am to 9:00 am) and 48 mph during the PM peak period (4:00 pm to 6:30 pm) (CDM Smith, 2014). The posted speed limit throughout the project limits is 65 mph on the freeway’s main lanes.

1.3 Preliminary Alternatives

The preliminary alternatives discussed below were developed as a result of previous plans and public and agency input. These alternatives were evaluated based on their ability to meet the purpose and need of the proposed project. Information regarding each preliminary alternative and the purpose and need has been shared with the public through open houses in February and July 2014 and other small group and stakeholder meetings throughout the project development process.

The purpose and need for the 183 North Mobility Project is detailed in the Purpose and Need Technical Memorandum (TxDOT 2015) and is summarized below.

The purpose, or desired outcome, of the proposed project is to:

- Facilitate congestion management in the corridor;
- Provide a reliable route for transit; and
- Facilitate reliable emergency response.

The proposed project’s need, or condition to be addressed, is that increasing congestion caused by high existing and projected traffic volumes is causing unreliable operations on the facility.

The preliminary alternatives that meet each criterion were determined to meet the proposed project’s purpose and need and were identified as “reasonable alternatives” for further evaluation along with the No Build Alternative.

1.3.1 No Build Alternative

The No Build Alternative represents the case in which the proposed project is not constructed. However, this alternative assumes all other improvements contained in the CAMPO 2035 RTP are implemented. Within the project limits, no improvements other than normal pavement and structure maintenance and repair are planned.

Although the No Build Alternative would not result in construction impacts, the problems associated with a congested roadway facility would worsen. The projected growth in traffic demand would increase the length of peak traffic periods, leading to longer periods of congestion. Rather than facilitate congestion management in the corridor, the No Build Alternative would result in even longer travel times and decreasing reliability in the future for
both public transit and emergency responders traveling the corridor due to increased congestion. However, although the No Build Alternative does not meet any of the purpose and need criteria for the proposed project, it is still carried forward for further evaluation.

1.3.2 Transportation System Management Alternative

Transportation System Management (TSM) is a collection of low-cost strategies to enhance safety, reduce congestion, and improve traffic flow. Specific strategies could include traffic signal synchronization, freeway operations improvements (such as changeable message signs and ramp metering), and incident management (clearing accidents and breakdowns quickly to allow traffic to move more smoothly). Other methods could include bus pullouts (to remove stopped buses from the traffic stream), intersection improvements (signal priority for transit vehicles), and queue jumper lanes (to get transit vehicles to the front of the line at intersections).

Under the TSM Alternative, the existing transportation system would be improved to include TSM strategies, rather than through increasing the overall capacity of US 183. While TSM strategies may improve traffic flow and operations in specific locations where they are implemented, they would not provide congestion management throughout the corridor since they would not provide additional capacity. TSM could be incorporated as an enhancement into any of the build alternatives.

The TSM Alternative does not meet any of the purpose and need criteria, as it would not facilitate congestion management, provide a reliable route for transit, or facilitate reliable emergency response in the corridor. Therefore, TSM has been eliminated from further study as a stand-alone alternative.

1.3.3 Transportation Demand Management Alternative

Transportation Demand Management (TDM) involves managing or decreasing the demand for automobile travel. These strategies typically include alternatives to single-occupant vehicles (such as public transit, carpooling, vanpooling, or bicycling), alternative work environments/schedules (telecommuting, flex time, etc.), and parking management.

TDM would involve improving the existing transportation system by implementing various TDM strategies, rather than by increasing the overall capacity of US 183. TDM strategies do not address the need for additional capacity in the transportation network caused by the rate of growth in population and travel demand throughout the region. TDM could be incorporated as an enhancement into any of the build alternatives.

The TDM Alternative does not meet any of the purpose and need criteria, as it would not facilitate congestion management, provide a reliable route for transit, or facilitate reliable emergency response in the corridor. Therefore, TDM has been eliminated from further study as a stand-alone alternative.
1.3.4 Add Two General Purpose Lanes in Each Direction Alternative

This alternative would include the addition of two general purpose (GP) lanes in each direction within the existing US 183 ROW. GP lanes are standard traffic lanes available for use by all types of vehicles.

Traffic modeling into 2035 showed that average daily speeds on the GP lanes are projected to be approximately nine mph faster northbound and southbound during the AM peak travel period and 13 mph faster northbound and southbound during the PM peak travel period in 2035 with the addition of two GP lanes than they would be under the No Build Alternative. However, these additional lanes would remain congested. Nevertheless, since this alternative would increase average daily speeds, it was considered to facilitate congestion management. However, it would not provide a reliable route for transit or facilitate reliable emergency response in the corridor. Therefore, the General Purpose Lanes Alternative has been eliminated from further study.

1.3.5 Add Two High Occupancy Vehicle Lanes in Each Direction Alternative

This alternative would include the addition of two High Occupancy Vehicle (HOV) lanes in each direction within the existing US 183 ROW. HOVs are defined as vehicles containing multiple occupants, including carpools, vanpools, and transit buses. Most jurisdictions define HOV as any vehicle with two or more occupants; some also include single-occupant motorcycles. An HOV lane is dedicated exclusively to the use of HOVs. Emergency responders would also be able to use the HOV lanes.

Traffic modeling indicates that average speeds on the HOV lanes during the AM and PM peak travel periods in 2035 would be 65 mph. Table 1 shows the average speeds of the GP lanes in 2035 under the No Build and HOV Lanes Alternative.

Table 1: Average Speeds of GP Lanes during Peak Travel Periods

<table>
<thead>
<tr>
<th></th>
<th>Northbound AM Speed</th>
<th>Southbound AM Speed</th>
<th>Northbound PM Speed</th>
<th>Southbound PM Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build Alternative</td>
<td>48 mph</td>
<td>10 mph</td>
<td>12 mph</td>
<td>41 mph</td>
</tr>
<tr>
<td>HOV Lanes Alternative</td>
<td>49 mph</td>
<td>11 mph</td>
<td>15 mph</td>
<td>42 mph</td>
</tr>
</tbody>
</table>

As shown above, the HOV Lanes Alternative was shown to facilitate congestion management. Under the HOV Lanes Alternative, a reliable route for transit, emergency responders, and high occupancy vehicles would be provided.

The HOV Lanes Alternative meets all three purpose and need criteria; therefore, it is carried forward for further analysis (see Section 1.4.1).
1.3.6 Add Two Express Lanes in Each Direction Alternative

This alternative would provide for the addition of two express lanes in each direction within the existing US 183 ROW. Express lanes offer a variety of methods to maintain desired levels of service and ensure the efficient movement of people and goods. Express lanes under this alternative would be separated from the GP lanes and would utilize variable toll pricing to manage the amount of traffic in the lanes by increasing the toll when traffic is heavy and decreasing the toll when traffic is light. In this way, free-flowing traffic within the express lanes would be maintained even during peak travel periods. Under Central Texas Regional Mobility Authority (Mobility Authority) policy, public transit buses, registered vanpools, and emergency vehicles would all be able to use the express lanes toll-free. The Express Lanes Alternative would also include direct connectors linking the GP and express lanes on US 183 to RM 620/SH 45N at the northern terminus of the project and direct connectors linking the 183 express lanes to the MoPac express lanes at the southern terminus.

Traffic modeling shows that average speeds within the express lanes in 2035 would be approximately 65 mph. Table 2 compares the GP lanes speeds of the No Build and Express Lane Alternative.

<table>
<thead>
<tr>
<th></th>
<th>Northbound AM Speed</th>
<th>Southbound AM Speed</th>
<th>Northbound PM Speed</th>
<th>Southbound PM Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build Alternative</td>
<td>48 mph</td>
<td>10 mph</td>
<td>12 mph</td>
<td>41 mph</td>
</tr>
<tr>
<td>Express Lanes Alternative</td>
<td>50 mph</td>
<td>12 mph</td>
<td>17 mph</td>
<td>45 mph</td>
</tr>
</tbody>
</table>

The Express Lanes Alternative was shown to facilitate congestion management. As described above, under the Express Lanes Alternative, transit and emergency vehicles would be able to utilize the lanes toll-free; therefore, the Express Lanes Alternative would also facilitate reliable transit and emergency response operations.

The Express Lanes Alternative meets all three purpose and need criteria; therefore, it is carried forward for further analysis (see Section 1.4.2).

1.3.7 Summary of Preliminary Alternatives

Based on the preceding analysis, only two of the preliminary build alternatives considered met the proposed project’s purpose and need. A summary of these evaluations is provided in Table 3. The HOV Lanes and Express Lanes alternatives were carried forward for further consideration (Section 1.4).
Table 3: Evaluation of Preliminary Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Does the Alternative Meet the Purpose and Need for the Project?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Facilitate Congestion Management in the Corridor</td>
</tr>
<tr>
<td>Transportation System Management</td>
<td>No</td>
</tr>
<tr>
<td>Transportation Demand Management</td>
<td>No</td>
</tr>
<tr>
<td>Two General Purpose Lanes in Each Direction</td>
<td>Yes</td>
</tr>
<tr>
<td>Two High Occupancy Vehicle Lanes in Each Direction</td>
<td>Yes</td>
</tr>
<tr>
<td>Two Express Lanes in Each Direction</td>
<td>Yes</td>
</tr>
<tr>
<td>No Build</td>
<td>No</td>
</tr>
</tbody>
</table>

1.4 Alternatives Carried Forward

The HOV Lanes and Express Lanes alternatives meet all three criteria for the purpose and need of the proposed project, as shown in Table 3, and were carried forward as reasonable alternatives for further evaluation. The No Build Alternative was also carried forward for further evaluation.

Whereas the preliminary alternatives were evaluated based on their ability to meet the purpose and need of the project, the reasonable alternatives were evaluated based on the degree to which the alternatives meet the following additional screening criteria:

- Maximizing use of the existing ROW and infrastructure
- Limiting environmental effects by staying within existing ROW
- Projected impacts on mobility
- Providing a reliable link between 183A, SH 45N, and MoPac express lanes
- Ability to Fund Project

Both of the build alternatives carried forward would include bicycle and pedestrian facilities, where reasonable and feasible, developed in accordance with regulations under the US Department of Transportation’s Policy Statement on Bicycle and Pedestrian Accommodation (2010). Regulations under this policy include: ensuring safety and security for both motorized
and non-motorized users, inclusion of intermodal facilities and connectors, designing for accessibility of both pedestrian walkways and bicycling transportation facilities, and providing opportunity for public participation in the planning process.

Detailed traffic demand modeling was conducted for these reasonable alternatives using the CAMPO travel demand model (CDM Smith, 2014). Each alternative was also evaluated in terms of its reliability, in accordance with the project’s stated purpose.

The term “reliability” is said to be the "consistency or dependability in travel times, as measured from day to day and/or across different times of the day" (FHWA, 2013). There are several methods of measuring reliability, including the 90th and 95th Percentile Travel Time, Buffer Index, Planning Time Index, Frequency that Congestion Exceeds some Expected Threshold, and Travel Time Index. Travel Time Index was selected to measure reliability in this case, due to the data available from the CAMPO demand model. This method is widely used among transportation professionals to evaluate reliability along a corridor (Lyman and Bertini, 2007; Lomax, et. al., 2003). The Travel Time Index represents the average time it takes to travel during a system’s peak period compared to free flow conditions:

\[
\text{Travel Time Index} = \frac{\text{average peak travel time (minutes)}}{\text{free flow travel time (minutes)}}
\]

Average Peak Travel Time is calculated by dividing the distance traveled by the average speed at which vehicles cover that distance. For purposes of this study, free flow speed is equivalent to the posted speed limit, which is 65 mph on the mainlanes of the facility for all alternatives. The Travel Time Index offers the best measure of reliability for the purpose of this evaluation because it gives an idea of reliability during the most congested peak periods; it is also the best measure considering the data available from the CAMPO model.

Table 4 shows the Travel Time Index calculated for 2035. The table compares the Travel Time Index of the two reasonable alternatives and the No Build Alternative looking only at the lanes of traffic proposed under this project; this means, for example, that under the HOV Lanes Alternative, only the travel times on the proposed HOV lanes are evaluated as opposed to an average across all lanes of traffic.
Table 4: Quantifying Reliability of Reasonable Alternatives and No Build Alternative in 2035 using the Travel Time Index

<table>
<thead>
<tr>
<th></th>
<th>No Build Alternative</th>
<th>HOV Lanes Alternative</th>
<th>Express Lanes Alternative</th>
<th>General Purpose Lanes</th>
<th>HOV Lanes</th>
<th>General Purpose Lanes</th>
<th>Express Lanes</th>
<th>General Purpose Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
<td>PM Peak</td>
</tr>
<tr>
<td>Average Peak Travel</td>
<td>NB</td>
<td>10.8</td>
<td>42.2</td>
<td>7.8</td>
<td>7.8</td>
<td>10.6</td>
<td>34.6</td>
<td>7.8</td>
</tr>
<tr>
<td>Travel Time (min)*</td>
<td>SB</td>
<td>50.2</td>
<td>12.8</td>
<td>7.8</td>
<td>7.8</td>
<td>44.4</td>
<td>12.4</td>
<td>8.4</td>
</tr>
<tr>
<td>Free Flow Travel</td>
<td>NB</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Travel Time (min)</td>
<td>SB</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
<td>7.8</td>
</tr>
<tr>
<td>Travel Time Index</td>
<td>NB</td>
<td>1.4</td>
<td>5.4</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td>4.4</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>6.4</td>
<td>1.6</td>
<td>1.0</td>
<td>1.0</td>
<td>5.7</td>
<td>1.6</td>
<td>1.1</td>
</tr>
</tbody>
</table>

*Average of northbound and southbound travel times during peak periods (AM: 7 am to 9 am; PM: 4 pm to 6:30 pm) over an 8.5-mile corridor.
Calculations based on data provided by CDM Smith, 2014

As a measure of reliability, the Travel Time Index provides an indication of how easy it is for a traveler to plan his or her trip: the closer the Index is to 1.0, the more similar the planned trip duration is to the actual time needed to make the trip. As the Index decreases, reliability increases. A higher Travel Time Index would therefore require travelers to allot additional time for their trips due to anticipation of potential delays.

As Table 4 shows, the Travel Time Index for both the HOV Lanes and Express Lanes alternatives would be much lower than under the No Build Alternative. Speeds would be maintained in the corridor under both alternatives such that free flow conditions would occur during peak travel periods.
1.4.1 No Build Alternative

No new ROW would be needed for this alternative, and no construction would take place, so project-related environmental impacts would not occur. If no improvements were constructed on US 183 within the proposed project limits, by 2035 the average speed in the GP lanes is expected to drop to 29 mph during the AM peak period and 26 mph during the PM peak period. Selection of the No Build Alternative would result in worsening roadway conditions and traffic congestion. As shown in Section 1.3.6, the No Build Alternative would not meet any of the proposed project's purpose and need criteria. Although this alternative does not meet the project's purpose and need, it will be carried forward for impacts analysis as required by NEPA policy in order to assess the consequences of no action. The No Build Alternative assumes that all other projects listed in the 2035 RTP would be implemented. These projects may result in their own environmental impacts; these impacts would be addressed in separate, project-specific environmental documents.

1.4.2 HOV Lanes

The addition of two HOV lanes in each direction would be constructed entirely within the existing ROW throughout the proposed project limits. As a result, impacts to some environmental resources such as vegetation, wildlife habitat, and waterways would be minimized and residential or commercial displacements would be avoided.

The addition of the HOV lanes would improve speed and travel time for users of the GP lanes as well. Southbound AM peak travel time would improve by 5.8 minutes and northbound PM peak travel would improve by 7.6 minutes (see Table 4). According to the traffic modeling conducted for this project, adding two HOV lanes in each direction would result in average speeds of approximately 30 mph in the existing GP lanes in 2035 during the AM peak period and approximately 28 mph during the PM peak period. The average speed on the HOV lanes during both periods would be approximately 65 mph. Calculating traffic volumes at Oak Knoll Road, approximately 8,100 vehicles carrying 17,091 people would travel on the HOV lanes during the peak travel periods (CDM Smith, 2014).

FHWA (2007) has noted that HOV lanes are often under-utilized in off-peak travel periods, and in turn can be over-utilized during peak travel periods. In Houston, the Katy Freeway’s HOV lane became over-utilized when vehicles containing two or more occupants were permitted to use the lane, but suffered from under-utilization once the occupancy limit was raised to three people (Burris, 2006). However, in the case of the proposed project, traffic modeling indicates that even during peak periods, the HOV lanes along the project limits would be under-utilized in 2035, even when allowing vehicles with only two passengers to use the lanes. This under-utilization is reflected in the fact that the HOV lanes are projected to transport 13 percent (2,240) fewer people in 2035 than the Express Lanes Alternative (CDM Smith, 2014b). With only one HOV lane in either direction, utilization per lane might increase, but congestion would not be managed as efficiently as it would be under other alternatives: with only one HOV lane, traffic
must move at the speed of the slowest vehicle, since there would be no room to pass (Varaiya, 2007). In addition, disruption in traffic flow would result if an incident blocking the HOV lane were to occur, as vehicles would be unable to change lanes to bypass the incident.

While utilization has been cited as a challenge for HOV lanes, enforcement can often create issues as well. A study by TxDOT (2009) found that violations (which occur when single occupant vehicles or vehicles with fewer than the required number of passengers travel in HOV lanes) as high as 40 percent have been observed on HOV lanes in the state. FHWA (2007) found that automatic enforcement technology is not yet reliable and accurate enough to be widely deployed. However, physical enforcement by police can often pose its own challenges: in Minnesota, physical enforcement of HOV lanes led to severe congestion on GP lanes as a result of onlooker delay (TTI, 2003).

Because of these issues, departments of transportation across the country have been converting HOV lanes to High Occupancy Toll (HOT) lanes or express lanes. As of spring 2013, 24 conversions of HOV lanes had either taken place or were planned in the US (Caltrans, 2013).

While this alternative would minimize environmental effects by constructing the additional lanes within the existing ROW, and would provide a link to 183A, it would not provide a reliable link to the express lanes on MoPac, as it would connect to the existing MoPac GP lanes rather than the express lanes. Further, the HOV Lanes Alternative’s projected impacts on mobility are less beneficial than those expected to result from the Express Lanes Alternative, as traffic modeling shows that HOV lanes along the limits of the proposed project would not be effectively utilized as the HOV lanes would be expected to move 13 percent fewer people than the express lanes (CDM Smith, 2014b). Given this under-utilization, combined with the challenges of effective enforcement, and its failure to provide a reliable link to the other managed lanes adjacent to the project limits, the HOV Lanes Alternative was removed from consideration as the recommended alternative.

### 1.4.3 Express Lanes

Two express lanes in each direction would be constructed entirely within the existing ROW throughout the proposed project limits. This alternative would therefore minimize impacts to some environmental resources such as vegetation, wildlife habitat, and waterways and avoid residential and commercial displacements.

The addition of the express lanes would improve speed and travel time for users of the GP lanes as well. Southbound AM peak travel time would improve by 9 minutes and northbound PM peak travel would improve by 11 minutes (see Table 4). Traffic modeling on this alternative indicates that in 2035, traffic in the existing GP lanes would average speeds of approximately 31 mph during the AM peak period and 30 mph during the PM peak period. Traffic in the express lanes would average speeds of approximately 63 mph during both peak periods. Calculating
traffic volumes at Oak Knoll Road, approximately 17,000 vehicles carrying 19,331 people would travel on the express lanes during the peak travel periods, or 13 percent (2,240) more people than under the HOV Lane Alternative (CDM Smith, 2014b).

Variable toll pricing would be utilized on the express lanes to ensure a minimum average speed and maintain reliability of the facility throughout the day, even when accidents or other incidents occur on the GP lanes. Trips on transit vehicles using the express lanes would be more reliable and emergency vehicles would be able to utilize the express lanes to more rapidly reach their destinations during peak travel times.

An extensive analysis of the financial resources available to continue and/or complete the region’s planned major transportation initiatives was conducted as part of the CAMPO 2035 RTP process. Financial projections of future federal, state, local, and private funding showed a much reduced level of funding available for projects through 2035. The 2035 RTP includes the proposed project as a future planned toll facility (p. 47). The 2035 RTP also indicates that the study would be for one managed lane in each direction. The 183 North Mobility Project was among a number of high capacity corridors identified in the financially constrained RTP as potential toll feasible projects. Moreover, projects included in the RTP were selected based on extensive public involvement and reflect the wishes of public officials, civic leaders, and the overall regional population.

The Express Lanes Alternative would also provide a link between the existing 183A toll facility and the MoPac express lanes, slated to open to traffic in fall 2015, allowing travelers the option to quickly reach their destinations by bypassing congestion on the heavily traveled US 183 and MoPac corridors. Although the northern limit for the proposed project is the SH 45N/RM 620 intersection, the Express Lanes Alternative would include a transition from the US 183 – SH 45N interchange to the first toll gantries on the 183A toll road in order maintain a complete link between this facility and the proposed express lanes.

As shown in the preceding analysis, the Express Lanes Alternative would transport more people through the corridor than the HOV Lanes Alternative and maintain reliability throughout the day through the use of variable toll pricing. Further, variable toll pricing would provide funding to construct and operate the proposed project, as included in the region’s financially constrained long range RTP. For these reasons the Express Lanes Alternative is recommended for further consideration.

1.4.4 Summary of Reasonable Alternatives

Results of the reasonable alternatives screening can be seen in Table 5.
<table>
<thead>
<tr>
<th>Alternative</th>
<th>Maximizing use of existing ROW and infrastructure</th>
<th>Environmental effects</th>
<th>Projected impacts on mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build</td>
<td>The existing infrastructure would continue to be utilized, with normal routine maintenance.</td>
<td>No construction-related environmental impacts would occur. However, as congestion increases on the facility, impacts associated with declining air and water quality due to idling vehicles could be expected to occur.</td>
<td>Mobility would worsen under the No Build scenario, with peak travel times nearly tripling in the corridor by 2035 (compared to 2013 travel times) (CDM Smith, 2015). Alternative would not provide a reliable link between MoPac, SH 45N, or 183A. The No Build Alternative would not require funding.</td>
</tr>
<tr>
<td>HOV Lanes</td>
<td>Alternative would construct HOV lanes in existing ROW</td>
<td>Environmental effects would be minimized due to construction of lanes in existing median.</td>
<td></td>
</tr>
<tr>
<td>Express Lanes</td>
<td>Alternative would construct express lanes in existing ROW</td>
<td>Environmental effects would be minimized due to construction of lanes in existing median.</td>
<td>Mobility would improve as HOV lanes provide additional capacity, allowing HOVs, transit, and emergency responders to bypass congested GP lanes. Traffic modeling shows these lanes would be underutilized, carrying fewer people than the Express Lanes Alternative. Enforcement would also be problematic. The HOV lanes could connect with 183A, but would connect to the GP lanes on MoPac, not the express lanes currently being constructed. A reliable link between these MoPac express lanes and the other managed lane facilities to the north would not occur under this alternative. No viable funding source was identified for this alternative.</td>
</tr>
</tbody>
</table>

The CAMPO 2035 RTP designated the US 183 corridor within the project limits as a planned toll facility. Funding for the Express Lanes Alternative would be achievable through toll revenues and a combination of local, state, and/or federal funds.
1.5 Recommended Alternative

1.5.1 Identification of the Recommended Alternative

For the reasons described in Section 1.4, the HOV Lanes and No Build alternatives were not selected as the recommended alternative. The Express Lanes Alternative would transport the largest number of people through the project corridor and would maintain reliability along the facility throughout the day, as discussed in Section 1.4.2. Additionally, as identified in the CAMPO 2035 RTP, the Express Lanes Alternative is the only build alternative that has sufficient funding available for construction.

Based on its mobility advantages and available funding, the recommended alternative for the 183 North Mobility Project is adding two express lanes in each direction.

1.5.2 Modified Recommended Alternative

The Recommended Alternative was presented to the public at Open Houses held in February 2014 and July 2014. Public comments received at the Open Houses cited the traffic congestion that results from MoPac to McNeil Drive both northbound and southbound as the lanes are reduced from four to three on either side of this stretch of roadway. In response to these concerns, the Recommended Alternative was modified to include a fourth GP lane, northbound and southbound, in those areas where only three GP lanes currently exist: northbound between Braker Lane and McNeil Drive/Spicewood Springs Road; southbound from approximately Lake Creek Parkway to the entrance ramp from SH 45; and southbound between one mile north of McNeil Drive/Spicewood Springs Road and MoPac. The modified Recommended Alternative retains the express lane design described in the Recommended Alternative (Section 1.3.5).

Table 6 below compares the Travel Time Index for 2035 for the modified Recommended Alternative to the original Recommended Alternative (without the additional GP lanes) as well as to the No Build Alternative.
Table 6: Quantifying Reliability of Recommended Alternative, Modified Recommended Alternative, and No Build Alternative in 2035 using the Travel Time Index

<table>
<thead>
<tr>
<th></th>
<th>No Build Alternative</th>
<th>Express Lanes Alternative</th>
<th>Modified Recommended Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General Purpose Lanes</td>
<td>Express Lanes</td>
<td>General Purpose Lanes</td>
</tr>
<tr>
<td></td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
</tr>
<tr>
<td>Average Peak Travel Time (min)*</td>
<td>NB</td>
<td>10.8</td>
<td>42.2</td>
</tr>
<tr>
<td></td>
<td>SB</td>
<td>50.2</td>
<td>12.8</td>
</tr>
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<td>SB</td>
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</tr>
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*Average of northbound and southbound travel times during peak periods (AM: 7 am to 9 am; PM: 4 pm to 6:30 pm) over an 8.5-mile corridor.
Calculations based on data provided by CDM Smith, 2014, 2015

1.5.3 Proposed Facility

The Recommended Alternative would include the construction of two variable-priced (tolled) express lanes in each direction. The express lanes would extend from SH 45/RM 620 (on the north) to MoPac (on the south). Transitions between the express lanes and existing roadways would occur along US 183 (extending 2,800 feet north of SH 45/RM 620 and 2,000 feet south of MoPac), SH 45/RM 620 (extending 0.9 mile west of US 183) and MoPac (extending 3 miles south to RM 2222). The length of the proposed project, including all transitions, is approximately 13 miles.

The proposed express lanes would be constructed in the center median of US 183. Each express lane would be 11-feet-wide. A four-foot-wide buffer would separate the express lanes from the GP lanes. A concrete median barrier and four-foot-wide inside shoulders would separate express lane directions of travel.

Access to and from SH 45/RM 620 and MoPac to the US 183 express lanes would be provided via direct connectors (also known as “flyovers”) to be constructed as an element of the proposed project. Access to and from SH 45/RM 620 to the US 183 GP lanes would also be provided via the direct connectors. The direct connectors would be 26-feet-wide and would accommodate a single 14-foot-wide lane, four-foot-wide inside shoulder and eight-foot-wide...
outside shoulder. Additional access to the express lanes would be provided from the GP lanes via entrances/exits. Entrances/exits would be located at each end of the project and at various locations along the corridor. In total, 14 entrances/exits are proposed.

The direct connectors would be elevated; the express lanes and additional GP lanes would, in most areas, be built at the grade of the existing GP lanes.

The project would include construction of a fourth (non-tolled) GP lane, northbound and southbound, in those areas where only three GP lanes currently exist: northbound between Braker Lane and McNeil Drive/Spicewood Springs Road; southbound from approximately Lake Creek Parkway to the entrance ramp from SH 45; and southbound between one mile north of McNeil Drive/Spicewood Springs Road and MoPac. All GP lanes and auxiliary lanes would be 11-feet-wide. In general, ten-foot-wide outside shoulders would be adjacent to the GP lanes.

To complement the capacity improvements described above, a 1,300-foot-long auxiliary lane would be added at the southbound entrance ramp from Oak Knoll (addressing an existing bottleneck).

A shared use (bicycle/pedestrian) path would be constructed from Jollyville Road to Pond Springs Road, crossing under US 183 at McNeil Drive/Spicewood Springs Road. This shared use path would connect the existing bike lanes on Jollyville Road to the existing bike lanes on Pond Springs Road. Another shared use path would be constructed along the northbound frontage road from Pond Springs Road to Lake Creek Parkway. This path would connect the existing bike lanes on Pond Springs Road to the existing bikes lanes on Lake Creek Parkway. Gaps in existing sidewalks along the frontage roads would be filled throughout the project limits. Additionally, with the exception of Braker Lane, Lake Creek Parkway and Loop 360 (which already have bike lanes), all cross streets would be restriped to include bike lanes under US 183.

To achieve desired water quality treatment goals, existing water quality ponds would be expanded and/or new water quality ponds would be constructed. The size and location of ponds would be determined during the final design of the proposed improvements. For purposes of environmental study, several potential (candidate) pond sites have been identified. Collectively, the potential pond sites encompass approximately eight acres. It is anticipated that actual ROW necessary for ponds could be less than eight acres; thus, the eight acres is considered the “maximum footprint”. Permanent easements (in addition to those that currently exist) are not proposed. The eight acres of ROW represents the maximum amount of additional ROW necessary for the proposed project.
2.0 References


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