



Final Environmental Assessment

MoPac (State Loop 1) Intersections, Austin District

From North of Slaughter Lane to South of La Crosse Avenue

CSJ: 3136-01-015

Travis County, Texas

December 2015

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.

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The Central Texas Regional Mobility Authority (Mobility Authority) and Texas Department of Transportation (TxDOT) propose to construct needed operational improvements to two heavily used intersections, Slaughter Lane at MoPac and La Crosse Avenue at MoPac, located in Travis County, Texas (see **Appendix A**). These two intersections make up the MoPac Intersections project. The limits of the proposed project are from approximately 2,500 feet north of Slaughter Lane to approximately 3,700 feet south of La Crosse Avenue. The proposed project is approximately two miles long.

This Environmental Assessment (EA) has been developed in order to study the potential environmental consequences of constructing the proposed project. The EA is organized to provide concise information with accompanying technical memoranda that support the findings within the EA. This document has been prepared in accordance with the procedural provisions of the National Environmental Policy Act (NEPA); the Council on Environmental Quality (CEQ) regulations in *Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] Parts 1500-1508) and *Environmental Impact and Related Procedures* (23 CFR Part 771); and Texas Administrative Code (TAC) Title 43, Part 1, Chapter 2, *Environmental Review of Transportation Projects*.

1.2 PUBLIC REVIEW OF THE ENVIRONMENTAL ASSESSMENT

Notice of availability (NOA) of the EA will be published on www.txdot.gov. Interested parties and stakeholders, including the Capital Area Metropolitan Planning Organization (CAMPO), will be notified via email about the availability of the document and how to access it. A digital version of the EA will be posted to the MoPac Intersections Environmental Study page on www.MoPacSouth.com.

Written comments can be submitted through the project website www.MoPacSouth.com, by fax to (512) 996-9784, or mailed to: Central Texas Regional Mobility Authority, c/o MoPac Intersections Environmental Study, 3300 North IH-35, Suite 300, Austin, Texas 78705.

The Mobility Authority and TxDOT will thoroughly consider all comments submitted during the comment period. Based on the analysis conducted in this EA and comments received during the comment period, TxDOT will determine whether the potential environmental effects warrant the preparation of an Environmental Impact Statement. If TxDOT determines that there are no significant adverse effects, it will prepare and sign a Finding of No Significant Impact (FONSI), which will be made publically available.

2.0 PROJECT DESCRIPTION

2.1 EXISTING FACILITY

The entire existing MoPac facility (from SH 45 South to SH 45 North) was constructed over a 34-year period beginning in 1973 and ending in 2006. This expansion of the MoPac facility was in response to rapid growth in population and employment in the Austin metropolitan area over the last several decades. Beginning in late 2013, an added capacity design-build project—the MoPac Improvement Project (MIP)—was initiated to add one express lane in each direction

from the Cesar Chavez/5th Street interchange to Parmer Lane (FM 734). This project is scheduled for completion in late 2015. No other major added capacity improvements have been constructed for any other section of MoPac. The Slaughter Lane and La Crosse Avenue intersections are the only remaining at-grade intersections in the entire MoPac corridor.

Within the project limits, MoPac consists of a four-lane divided arterial, with at-grade, signalized intersections at Slaughter Lane and La Crosse Avenue, consisting of two 12-foot lanes, a 10-foot outside shoulder and a 4-foot inside shoulder in each direction; there are no auxiliary lanes. At each of these intersections, the median width increases significantly, from a typical width of 76 feet to approximately 435 feet at Slaughter Lane and 422 feet at La Crosse Avenue. The pavement section consists of asphalt, with intermittent curb and gutter. Drainage from the roadway is accommodated through a combination of curb inlets and open ditches. The right-of-way (ROW) width varies from 300 feet between the intersections to as much as 784 feet at the Slaughter Lane intersection. In addition, this section of MoPac contains several hazardous material trap (HMT) structures to which roadway surface drainage is directed via curb and gutter inlets and subsurface drainage.

The existing pedestrian and bicycle facilities in the project area include a section of trail and the Veloway in Circle C Ranch Metropolitan Park. In addition, a future section of the Violet Crown Trail will also pass through the project area. There is a sidewalk on the south side of the Slaughter Lane and MoPac intersection including crosswalks. At the La Crosse Avenue and MoPac intersection there are crosswalks but no sidewalks. There currently are no bike lanes in the project area and no pedestrian or bicycle facilities that connect the Slaughter Lane and MoPac intersection with the La Crosse Avenue and MoPac intersection.

2.2 PREFERRED ALTERNATIVE

The proposed improvements would involve grade separating the cross streets of Slaughter Lane and La Crosse Avenue such that MoPac would pass under the existing cross streets. Traffic traveling northbound and southbound in this corridor would no longer need to stop at a signalized intersection to travel through the area. The proposed improvements to MoPac consist of two 12-foot lanes with one auxiliary lane in each direction, and 10-foot outside shoulders and 4-foot inside shoulders in each direction. One of the existing HMT structures would be disturbed by the improvements and would be replaced.

The grade separation at La Crosse Avenue and MoPac would be configured as a standard diamond interchange. The grade separation at Slaughter Lane and MoPac would be accommodated with a diverging diamond interchange (DDI). A DDI is an innovative intersection that shifts traffic approaching the interchange to the left, then back to the right after the interchange to allow drivers who want to turn left to keep moving and reduce the number of traffic signal intervals. See **Appendix B** for a preliminary layout and typical sections.

The benefits of a diverging diamond intersection include enhanced safety and more effective signal operation (resulting in more “green time”).

There is an existing recreational trail outside of the ROW from Slaughter Lane to Slaughter Creek on the west side of MoPac. An additional 10-foot wide shared use path is proposed on the west side of MoPac from Slaughter Creek to La Crosse Avenue. These improvements in

combination with existing and other¹ pedestrian and bicycle facilities would provide a continuous bicycle and pedestrian connection between Slaughter Lane and La Crosse Avenue (see **Section 5.6** and the preliminary layout **Appendix B**). Improvements are proposed to be made within existing ROW.

The logical termini of the project are the intersections of Slaughter Lane with MoPac and La Crosse Avenue with MoPac. These termini allow for the consideration of alternatives, including a no build alternative. The proposed project has independent utility without the benefit of any other transportation improvements, which would meet the purpose of and need for the project. The proposed improvements would function as a usable roadway, would not require implementation of any other projects to operate, and would not restrict consideration of alternatives for other foreseeable transportation improvements.

The construction limits extend from approximately 2,500 feet north of Slaughter Lane to approximately 3,700 feet south of La Crosse Avenue, which results in a total project length of 2.07 miles. The construction limits allow the intersection improvements to tie back into the existing MoPac facility north of Slaughter Lane and south of La Crosse Avenue. The proposed improvements would be constructed within existing ROW and would not require any easements.

The preliminary cost estimate for this project is approximately \$46 million.

2.3 NO-BUILD ALTERNATIVE

The No-Build Alternative assumes no improvements are constructed within the project limits. It only considers routine maintenance for pavement and structures, and assumes all other improvements contained in CAMPO's Regional Transportation Plan (RTP) are implemented. The No-Build Alternative does not meet the need and purpose of the proposed project; however, it is considered for comparison purposes.

3.0 PURPOSE AND NEED FOR THE PROPOSED PROJECT

The purpose of the project describes the solutions that the project is trying to achieve; whereas the need for the project describes the problems that the project is trying to address. See the *Proposed Action, Purpose and Need Technical Memorandum* for a detailed analysis.

3.1 PURPOSE OF THE PROPOSED PROJECT

The purpose of the project is to reduce travel delay and enhance safety by improving intersection operations.

3.2 NEED FOR THE PROPOSED PROJECT

The need for the project arises from historic population and employment growth in the surrounding area, which has led to traffic congestion, increased delay and a high crash rate at the intersections. Growth trends are expected to continue, leading to further deterioration in intersection operations and safety.

¹ A small section of the shared use path would be needed outside the ROW in Circle C Metropolitan Park to provide a continuous connection. The park is owned by the City of Austin. This section would be developed by the City of Austin or others.

4.0 PLANNING AND PROGRAMMING STATUS

This proposed project is consistent with *CAMPO 2040 Regional Transportation Plan (CAMPO 2040)* and TxDOT's 2015-2018 Statewide Transportation Improvement Program (STIP) for the Austin District. The proposed project would be constructed using state and federal funds and is included in the CAMPO Transportation Improvement Program (TIP) under the Preventative Maintenance and Rehabilitation grouping, control-section-job (CSJ) 5000-00-952, 5000-00-957, and 5000-00-958 (see **Appendix C**). The total project cost is approximately \$45,874,993. Construction is anticipated to begin in 2016. The MoPac Intersections project is estimated to be open for traffic in 2019.

5.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The project purpose and need and social and environmental issues were the primary focus of the planning, design and environmental analysis processes. Several technical memoranda were prepared in support of this EA and will be available at the Mobility Authority's office, TxDOT-Austin District's office and on the project website, www.MoPacSouth.com (**Table 1**).

Table 1: List of Technical Memoranda Cited

<u>Technical Memoranda</u>	<u>Date</u>
<i>Standards of Uniformity for Historic Resources – Project Coordination Request</i>	February 2014
<i>Hazardous Materials Technical Memorandum</i>	April 2014
<i>Additional Geologic Studies</i>	October 2014
<i>Preliminary Risk Assessment of Proposed MoPac Underpasses at Slaughter Lane and La Crosse Avenue</i>	October 2014
<i>Open House Summary Report</i>	November 2014
<i>Air Quality Technical Memorandum</i>	June 2015
<i>Biological Studies Technical Memorandum</i>	June 2015
<i>Indirect and Cumulative Impacts Technical Memorandum</i>	June 2015
<i>Proposed Action, Purpose and Need Technical Memorandum</i>	June 2015
<i>Socioeconomic Resources Technical Memorandum</i>	June 2015
<i>Traffic Noise Technical Memorandum</i>	June 2015
<i>Water Resources Technical Memorandum</i>	June 2015
<i>Public Hearing Summary Report</i>	November 2015

Source: MoPac Intersections Study Team, 2014 and 2015

5.1 RIGHT OF WAY/DISPLACEMENTS SUMMARY

The proposed project would be constructed within the existing ROW; as such no new ROW would be acquired and no businesses or residences would be displaced.

Under the No-Build Alternative, no additional ROW would be acquired so no properties would be displaced.

5.2 LAND USE SUMMARY

The project is located in southwest Austin. The intersection of MoPac and Slaughter Lane is characterized by commercial shopping centers and multi-family residential properties and the MoPac and La Crosse Avenue intersection is predominantly parkland space and single family residential communities. The proposed project would not impact land use in the project area because it would be built within the existing ROW.

The No-Build Alternative would not impact land use.

5.3 GROWTH SUMMARY

As described in the *Proposed Action, Purpose and Need Technical Memorandum*, the population in Travis and Hays counties combined has increased by 159 percent between 1980 and 2012, households have grown by 169 percent and employment has grown almost 320 percent. Traffic (vehicles per day [vpd]) along MoPac has grown along with the demographic changes. Between 2000 and 2012, traffic in the project area has almost doubled.

CAMPO forecasts that the growth trends will continue. Between 2012 and 2035 the population is projected to grow by another 61 percent, households are projected to grow by 64 percent and employment is projected to grow by 74 percent. Traffic in the project area is projected to grow from approximately 26,500 vpd in 2012 to 42,000 vpd by 2035.

5.4 SOCIOECONOMIC IMPACTS SUMMARY

The *Socioeconomic Resources Technical Memorandum* characterizes the demographics of the study area as well as the effects of the proposed project on economic conditions, community resources and environmental justice populations, as summarized below.

The study area was predominantly white, non-Hispanic (69 percent). Households were predominantly families with school-aged children with median household incomes ranging between \$66,538 and \$137,796 per year. Most working-age people were employed in the education, health care, social services, professional, scientific, management, administrative or waste management services sectors.

5.4.1 Economic Impacts

There are no major employers in the project area; the dominant economic activity includes the businesses in the commercial shopping centers located at the intersection of MoPac and Slaughter Lane. The people that live in the project area predominantly commute between the project area and employment centers outside of the project area.

The proposed project would not require additional ROW so it would not displace any businesses. The proposed improvements would improve mobility and accessibility within and through the project area by replacing the at-grade intersections with grade-separated intersections at Slaughter Lane and La Crosse Avenue; thereby separating north-south traffic traveling on MoPac from east-west traffic traveling along Slaughter Lane and La Crosse Avenue. These changes would improve access and safety to and from the neighborhoods and businesses in the proposed project area and could contribute to reduced commute times.

Under the No-Build Alternative, no improvements would be made. It is anticipated that mobility and accessibility within and through the project area would degrade as the population grows and traffic volumes increase. These effects may make it more difficult to access the businesses

in the project area and may adversely affect those that travel out of or through the project area for work or to conduct business.

5.4.2 Community Impacts

Within one-half mile of the proposed project there are several residential neighborhoods, six parklands, an elementary school, a university, and two urgent care clinics. Adverse community impacts can occur when an action severs or alters social interaction among groups or individual members of a community, divides or displaces a functioning neighborhood, displaces areas or makes it more difficult for members of a community to assemble and interact.

The proposed improvements would not require additional ROW; therefore, no community amenities would be displaced. The proposed project would not sever or alter social interactions. Instead, the project would improve mobility and accessibility within and through the project area, which would improve access to and from neighborhoods and the community amenities in the project area. The project also proposes a new shared use path from Slaughter Creek to La Crosse Avenue. These improvements, in combination with existing and other pedestrian and bicycle facilities, would provide a continuous connection between Slaughter Lane and La Crosse Avenue for pedestrians and cyclists; further improving community cohesion and safety (see the preliminary layout in **Appendix B** for the location of the existing and proposed pedestrian and bicycle facilities).

The No-Build Alternative would not change community cohesion from the existing condition; however, as mobility and accessibility degrades over time, it may become more difficult to access the community amenities in the project area.

5.5 UTILITIES/EMERGENCY SERVICES SUMMARY

The proposed improvements may require the relocation of underground or overhead utilities. At this stage of the project design, it is assumed that the extent of excavation for the roadway and ditches would be approximately 23 feet, which would not require the relocation or adjustment of the Magellan, Phillips 66 or Kinder Morgan pipelines. Bore hole testing was conducted in August of 2015 to confirm the location and general conditions of the pipelines in the project area. Based on these tests, pipeline relocation is not likely to be required. The need for adjustments to the pipelines will be further evaluated and determined during final design and coordinated with the pipeline owner. Other potentially affected utilities will be identified during final design and coordination with the utility owners will take place at that time. Utility relocation and adjustment will be accomplished with the minimum practicable disruption in service to customers.

The project area is served by Austin Fire Department Stations 29 and 43 and is within Austin Police Department's Southwest Command Station and Southeast Command Station. The proposed improvements may temporarily alter access during construction; however, in the long term, mobility and accessibility improvements resulting from the proposed project would be enhanced. The reduction in congestion at these intersections would potentially improve the response time of emergency service providers. Construction-related detours or changes in access will be posted and communicated to emergency service providers prior to commencing construction.

The No-Build Alternative proposes no action and so would not affect utilities. As traffic conditions degrade over time, it is possible that degraded mobility and accessibility could adversely impact response time of emergency service providers.

5.6 TRAFFIC AND TRANSPORTATION/PEDESTRIAN AND BICYCLE FACILITIES SUMMARY

Minor changes in travel patterns would occur as a result of the proposed improvements. Traffic traveling northbound and southbound on MoPac would no longer need to stop at a signalized intersection to travel through the project area. The grade separation at Slaughter Lane and MoPac would be built as a DDI; an innovative intersection design which reduces the number of traffic signal intervals travelers experience in order to make a left turn. The grade separation at La Crosse Avenue and MoPac would be configured as a standard diamond interchange with traffic signals. Motorists would use on and off ramps to travel to and from MoPac and Slaughter Lane and MoPac and La Crosse Avenue.

The forecasted increase in traffic along MoPac would impact intersection operations at Slaughter Lane and La Crosse Avenue (**Table 2**). Level of service (LOS) is a measure of traffic flow and a driver's perception of how easy it is to change lanes. It is graded on a scale of A to F where A represents the best conditions and F the worst. Total hours of delay represents the delay experienced by each vehicle times the total number of vehicles entering the intersection each day during the morning peak (7:00 am to 8:00 am) and evening peak (4:30 pm to 5:30 pm) periods.

If no improvements are made, the 2035 LOS at Slaughter Lane and MoPac would operate primarily at LOS F and the hours of delay experienced by all travelers could total of over 1,140 hours of delay during the morning peak period and about 740 hours of delay during the evening peak period. At La Crosse Avenue and MoPac, the 2035 LOS would mostly be C or worse and travelers could experience a total of 285 hours of delay each day in morning and 106 hours of delay each day in the evening.

The proposed improvements would improve 2035 traffic operations when compared to the No-Build Alternative. The 2035 LOS at Slaughter Lane and MoPac would vary between B and D in the morning peak period and between A and E in the evening. The total hours of delay would be reduced to approximately 70 hours during the morning peak period and approximately 90 hours in the evening peak period. At La Crosse Avenue and MoPac, LOS would be C or better and total hours of delay would range between approximately 7 hours in the morning to approximately 14 hours in the evening (see the *Proposed Action, Purpose and Need Technical Memorandum* for more details).

Table 2: Level of Service and Hours of Delay in 2035

Alternative	Intersection	AM Peak Period		PM Peak Period	
		LOS	Total Hours of Delay	LOS	Total Hours of Delay
Slaughter Lane and MoPac					
No-Build	Southbound	B to F	262.4	F	441.8
Build		B to D	43.2	A to C	25.4
No-Build	Northbound	F	883.5	E to F	297.9
Build		B to C	26.5	A to E	66.2
No-Build	Overall	B to F	1,145.9	E to F	739.7
Build		B to D	69.7	A to E	91.6
La Crosse Avenue and MoPac					
No-Build	Southbound	C to D	15.3	C to F	78.7
Build		A to B	3.5	B	6.5
No-Build	Northbound	B to F	270.1	B to F	28.0
Build		A to C	3.9	A to C	7.8
No-Build	Overall	B to F	285.4	B to F	106.7
Build		A to C	7.4	A to C	14.3

Source: CAMPO Travel Demand Model; CDM Smith, 2014

Note: The AM Peak Period is from 7 to 8 am and the PM Peak Period is from 4:30 to 5:30 pm. Total hours of delay represents the delay experienced by each vehicle multiplied by the number of vehicles entering the intersection each day during the peak periods.

The project will comply with the U.S. Department of Transportation's *Policy Statement on Bicycle and Pedestrian Accommodations, Regulations and Recommendations*, TxDOT's *Guidelines Emphasizing Bicycle and Pedestrian Accommodations*, and will be consistent with Austin's *2014 Bicycle Master Plan* and *2009 Sidewalk Master Plan*.

The proposed improvements include a new 10-foot wide shared use path within the ROW on the west side of MoPac from Slaughter Creek to La Crosse Avenue. These improvements in combination with existing and other pedestrian and bicycle facilities would provide a continuous connection between Slaughter Lane and La Crosse Avenue for pedestrians and cyclists. The intersections would also include sidewalks and crosswalks.

The grade separation at Slaughter Lane and MoPac would include sidewalks, crosswalks and bike lanes. Approaching the east and west side of the intersection, the sidewalks would be located on the outside of the roadway. Through the DDI, the sidewalk facility would be located on the inside median. At each end of the DDI, pedestrians would cross to and from the median sidewalk with the aid of traffic yield and warning signs, pavement markings and crosswalks, and pedestrian islands. The project would provide striped bike lanes in both directions following the flow of vehicular traffic through the intersection.

The grade separation at La Crosse Avenue and MoPac would provide sidewalks and signals on the outside of the roadway. Cyclists would cross the intersection using striped bike lanes. The proposed pedestrian and bicycle facilities would be safer and would provide better pedestrian and bicycle access than the existing condition.

See the preliminary layout in **Appendix B** for the location of the proposed pedestrian and bicycle facilities.

The No-Build Alternative would not change access in the project area nor would it provide new pedestrian and bicycle amenities.

5.7 ENVIRONMENTAL JUSTICE

An environmental justice analysis (EJ) was conducted in accordance with Presidential Executive Order (EO) 12898; Federal Highway Administration Order 6640.23A and U.S. Department of Transportation Order 5610(a) (see the *Socioeconomic Resources Technical Memorandum* for details). These regulations call for federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of a project on minority and low-income populations.

Of the 160 Census blocks in the study area, two contain a population greater than 50 percent minority and no Census block group meets the definition of low-income. The proposed improvements would not result in displacements or negatively impact community cohesion and would improve traffic flow and safety for all communities including EJ populations. After considering the potential adverse and beneficial effects of the proposed improvements, disproportionately high and adverse effects on minority and low-income populations would not occur. The directive of EO 12898 has been satisfied.

The No-Build Alternative proposes no action and so would not result in disproportionately high and adverse impacts on minority and low-income populations.

5.8 LIMITED ENGLISH PROFICIENCY

Limited English proficiency (LEP) is defined as having limited ability to read, write, speak or understand English. Title VI of the Civil Rights Act of 1964 and EO 13166 require projects to provide meaningful access to services and communications and are thereby not discriminated against on the basis of national origin.

The most commonly spoken languages in the project area are English only (83.1 percent), followed by Spanish (8.2 percent) and Chinese (2.4 percent). Approximately 4.3 percent of the population in the project area speak a language other than English and have LEP; 1.1 percent of LEP speakers speak Spanish and 1.3 percent speak Chinese.

In order to provide meaningful communication to the people that could be affected by the MoPac Intersections project, materials were made available in the dominant language spoken (English) and translation services were available upon request for speakers of other languages. The public involvement activities and communications for the proposed project were and will continue to be conducted in accordance with EO 13166 to ensure full and fair participation.

5.9 VISUAL/AESTHETICS SUMMARY

The assessment of visual and aesthetic impacts was conducted using the guidelines presented in the Federal Highway Administration's 1981 *Visual Impact Assessment for Highway Projects*². Visual impacts were assessed from the perspective of the roadway viewer (those that have a

² Federal Highway Administration, Office of Environmental Policy. 1981. *Visual Impact Assessment for Highway Projects*, U. S. Department of Transportation, Washington D. C. Mar 1981.

permanent view of the project area) and roadway users (those that pass through the project area and have a transient view of the project area). Roadway viewers are generally affected more by visual and aesthetic change than roadway users as roadway viewers have an ongoing view of the project area.

The roadway viewers in the project area include residential and commercial properties adjacent to MoPac; most residential viewsheds of the roadway are buffered by trees. A small section of the MoPac roadway is currently visible from the water tower at the Lady Bird Johnson Wildflower Center, although the viewshed from this vantage point is predominantly vegetation. A temporary view of MoPac is experienced by those using the existing trail in Circle C Metropolitan Park. The existing visual landscape for roadway viewers includes the roadway infrastructure of MoPac and the signalized intersections at Slaughter Lane and La Crosse Avenue as well as the trees and maintained landscaping within the median and outer ROW of the MoPac lanes.

From the perspective of the roadway user, the existing visual landscape of the project area includes limited views of the apartments adjacent to MoPac at Legacy at Western Oaks and single family homes south of La Crosse Avenue; the commercial development at the Slaughter Lane and MoPac intersection; Deer Park at Maple Run Preserve and Circle C Ranch Metropolitan Park; trees and maintained landscaping within the median and outer ROW of the MoPac lanes; and the roadway infrastructure at the signalized intersections of Slaughter Lane and MoPac and La Crosse Avenue and MoPac.

Slaughter Lane would be raised less than three feet above its existing elevation to accommodate the grade separation. Roadway viewers would experience negligible to no change in viewshed as a result of this change. The elevation of La Crosse Avenue would not change.

The MoPac through lanes would be depressed below grade in order to pass under Slaughter Lane and La Crosse Avenue and would be less visible to the roadway viewer than they currently are today. For the user of the MoPac through lanes, the bridge infrastructure would be a new visual element at Slaughter Lane and La Crosse Avenue.

The vegetation and trees in the median and ROW would be removed to accommodate the depressed sections of the MoPac through lanes. The vegetative changes would be perceivable to both roadway viewers and roadway users in the Slaughter Lane and La Crosse Avenue areas. For some roadway viewers, the removal of vegetation may widen their viewshed into or across the ROW which may make the roadway more visible, which was previously blocked by the vegetation. Roadway users may notice the change in vegetative landscape; however, their viewshed is fleeting as they pass through.

The traffic noise analysis concluded that three noise barriers would be reasonable and feasible to abate the projected traffic noise resulting from the proposed improvements (see **Section 5.12.6** and the *Traffic Noise Technical Memorandum*). The proposed noise barriers would be visible to roadway users and adjacent roadway viewers. Potential viewers of the proposed noise barriers could include some commercial properties in Parkside Village, users of the Circle C Metropolitan Park trail adjacent to MoPac, some residential properties that back on to MoPac in the Circle C on the Park and Circle C Wildflower Park neighborhoods and from some vantages in the Lady Bird Johnson Wildflower Center.

Mitigation for the potential visual and aesthetic impacts could include landscaping improvements and aesthetic enhancements. The aesthetic design would be the same as that being constructed for the MoPac Improvement Project (MIP) (north of Cesar Chavez Street) and could be applied to the roadway infrastructure, including the proposed noise barriers, the bridge structure and/or other built features. This design was proposed to allow for a sense of visual continuity throughout the MoPac corridor. The aesthetic design being used on the MIP was selected through a context-sensitive solutions public process.

A traffic noise workshop was held on September 3, 2015 with property owners who live adjacent to the area of the proposed noise barriers. A simple majority vote was taken to determine whether those property owners would like the noise barriers to be incorporated into the final design of the proposed project. In addition, meetings were held with the Wildflower Center and Parkside Village to solicit their votes on the proposed noise barriers adjacent to their properties. A summary of the workshop and meetings as well as results from the vote will be published in the *Noise Workshop and Meeting Summary Report* and posted to the MoPac Intersections Environmental Study webpage of the www.MoPacSouth.com website upon the completion of discussions with affected property owners. The final decision to construct the proposed noise barriers will not be made until final design and after utility evaluation.

The No-Build Alternative would not change any visual or aesthetic elements in the landscape.

5.10 CULTURAL RESOURCES SUMMARY

5.10.1 Archeological Resources

An archeological resources background study was completed for the project in February 2014. Two archeological sites were identified within the area of potential effect (APE), Site 41TV1071 and Site 41TV1077. Neither of these sites is eligible for the National Register of Historic Properties (NRHP), according to the Texas Historical Commission's (THC) Archeological Sites Atlas.

On May 12, 2014, TxDOT determined that the proposed improvements meet the definition of an undertaking with no potential to cause effects on historic properties. Item 7 of Appendix 3 of the *Programmatic Agreement Among the Federal Highway Administration (FHWA), TxDOT, the Texas State Historic Preservation Officer (SHPO) and the Advisory Council of Historic Preservation (ACHP)* stipulates that federal projects solely involving intersection improvements that require no additional ROW are projects with no potential to cause effects and therefore do not require specific review. Consultation with the SHPO or with Native American Indian Tribes, as stipulated under Section 106 of the National Historic Preservation Act, is not required.

The No-Build Alternative would not affect listed or eligible archeological resources.

5.10.2 Historic Resources

A historic studies project coordination request was submitted for the MoPac Intersections project in February 2014. A search of the Texas Historic Sites Atlas revealed no previously identified National Historic Landmarks, NRHP, Recorded Texas Historic Landmarks, Official Texas Historical Markers, or other historic properties within one-quarter mile of the ROW. The proposed project would be let in 2016 so the historic-age resource date is 1971. A search of historic aerials from 1973, a review of Travis County Tax Appraisal District records online and a windshield survey revealed no buildings from this era within one-quarter mile from the ROW. On May 22, 2014, TxDOT determined that the historic studies were complete under Section

106 of the National Historic Preservation Act and Antiquities Code of Texas and no further action or coordination is required.

The No-Build Alternative would not affect listed or eligible historic resources.

5.11 SECTION 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966 established the requirement for consideration of park and recreational lands, wildlife and waterfowl refuges and historic sites in transportation project development. There are six publically owned parklands within one-half mile of the proposed project that meet the definition of a Section 4(f) property, they include: Ladybird Johnson Wildflower Center, Circle C Metropolitan Park, Dick Nichols Park, Sendera Mesa Park, Deer Park at Maple Run Preserve and the Violet Crown Trail. There are no historic sites in the project area that are listed or eligible for listing on the National Register of Historic Places.

Use of a Section 4(f) property occurs: (1) when land is permanently incorporated into a transportation facility; or (2) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose; or (3) when there is a constructive use (a project's proximity impacts are so severe that the protected activities, features or attributes of a property are substantially impaired).

The proposed improvements would not result in permanent incorporation or temporary occupancy in any of these parklands nor would they sever or alter access to these properties. The traffic noise analysis for the MoPac Intersections project concluded that the project would result in noise impacts at Circle C Metropolitan Park and the Lady Bird Johnson Wildflower Center.

The definition of a constructive use of a Section 4(f) property, as it relates to noise impacts is codified in 23 CFR 774.15(e)(1). Specifically a constructive use occurs "when the projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility." The regulation provides examples of what would be considered a "noise-sensitive facility" including: an outdoor amphitheater, campground, wildlife viewing area, or other historic site or park where serenity and quiet are significant attributes.

Circle C Ranch Metropolitan Park generally follows Slaughter Creek and is located on both the east and west sides of MoPac between Slaughter Lane and La Crosse Avenue. The park amenities include 5.9 miles of walking trails, a 3.1 mile veloway (a non-motorized paved path for the exclusive use of cyclists and rollerbladers), basketball courts, volleyball courts, athletic fields, a disc golf course, a playground and a picnic area. Most of the recreational amenities are located approximately 1.5 miles west of MoPac and would not experience noise impacts resulting from the proposed project. The eastern portion of the park is predominantly open space and is the location of the veloway. A small portion of the walking trail on the west of MoPac and the veloway was built adjacent to MoPac. The traffic noise analysis concluded that the proposed project would not cause noise impacts to the major amenities of the park or the veloway but would impact a portion of the trail on the west of MoPac. The noise impacts to the Circle C Ranch Metropolitan Park would be not be considered a constructive use of a Section 4(f) property because, (1) the affected park activities, features or attributes do not meet the definition of being "noise-sensitive facilities" and (2) because the proposed noise barrier would reduce the noise level at these locations beyond the existing conditions. In addition, none of the

activities, features or attributes of Circle C Ranch Metropolitan Park rely on a serene and quiet environment for their use and enjoyment as defined by 23 CFR 774.15(e)(1). As such, a constructive use of this parkland would not occur.

Lady Bird Johnson Wildflower Center is located on the east side of MoPac and south of La Crosse Avenue. It is both a parkland facility and an organized research unit of The University of Texas at Austin. The mission of the center is to increase the sustainable use and conservation of native wildflowers, plants and landscapes. The Center features a display of more than 650 native Texas plant species in gardens, meadows and woodlands. The grounds include nature trails, central gardens and a family garden, and facilities such as an auditorium, visitors' gallery, wildflower center store, café, library, observation tower, children's facility, the Margaret and Eugene McDermott Learning Center, and research facilities including native plant growing facilities. The increase in traffic noise resulting from the project would not impact the majority of these facilities with the exception of a small portion of trail that was built adjacent to MoPac. Due to its proximity to MoPac, this section of trail currently experiences traffic noise and the proposed project is predicted to increase the noise levels by 4 to 5 dB(a). The noise impacts to the Wildflower Center would not be considered a constructive use of a Section 4(f) property because, (1) the affected park activities, features or attributes do not meet the definition of being "noise-sensitive facilities" and (2) because the proposed noise barrier would reduce the noise level at these locations beyond the existing conditions.

Noise barriers are proposed to mitigate the noise impacts at the affected locations in these parks (see the *Traffic Noise Technical Memorandum* for more details). A constructive use would not occur as a result of traffic noise because the affected park activities, features or attributes do not meet the definition of being "noise-sensitive facilities" and the proposed noise barriers would attenuate these impacts. The proposed improvements would not result in the use of Section 4(f) properties.

The No-Build Alternative would not result in the use of a Section 4(f) property.

5.12 PHYSICAL ENVIRONMENT SUMMARY

5.12.1 Water Resources – Surface Water

Waters of the U.S. including Wetlands - Section 404 of the Clean Water Act

As described in the *Water Resources Technical Memorandum*, there are five potential waters of the U.S. within the existing ROW, including: Slaughter Creek, three tributaries to Slaughter Creek and one tributary to Danz Creek. Approximately 0.04 acre of a tributary to Slaughter Creek would be affected by the proposed improvements.

The affected tributary to Slaughter Creek is located approximately 1,000 feet southwest of the intersection of MoPac and Slaughter Lane. A natural portion of this stream exists in the median of the ROW. The remaining portions of the stream within the ROW have been routed through concrete culverts beneath the northbound and southbound lanes of MoPac as part of previous roadway construction activities. This tributary appears to have been altered by the original MoPac roadway construction in 1991. It currently serves as road drainage, but appears to have been historically jurisdictional.

Detailed drainage design will be completed later in project development during final design. It is assumed that the placement of temporary or permanent dredge or fill material into potentially jurisdictional waters of the U.S. will be authorized under a U.S. Army Corps of Engineers

(USACE) Section 404 Nationwide Permit (NWP) 14 (Linear Transportation Projects) provided that the dredge or fill is less than 0.5 acre. It is not anticipated that a Pre-Construction Notification (PCN) will be required because the anticipated 0.04 acre impact is under the 0.1-acre threshold. Construction activities will comply with all general and regional conditions applicable to NWP 14. During the modification of the linear transportation facility, appropriate measures will be taken to maintain normal downstream flows and minimize flooding.

The No-Build Alternative would have no impacts to waters of the U.S.

Water Quality - Sections 303(d) and Section 401 of the Clean Water Act

In compliance with Section 303(d) of the Clean Water Act, the Texas Commission on Environmental Quality (TCEQ) identifies water bodies in the State that do not meet the Texas Surface Water Quality Standards (TSWQS) and reports them biennially to the U.S. Environmental Protection Agency (EPA) in the *Texas Integrated Report of Surface Water Quality*. According to the provisions of the TxDOT-TCEQ memorandum of understanding (MOU), coordination with TCEQ is required if all or part of the project drains to an impaired assessment unit that is within five miles of the project and is in the same watershed as the project.

According to the 2012 *Texas Integrated Report of Surface Water Quality*, Segment 1427A of Slaughter Creek (from the confluence with Onion Creek to above US 290) does not meet the TSWQS due to an impaired macrobenthic community. The project area crosses and likely drains to this segment of Slaughter Creek. As of April 2013, Slaughter Creek does not have an EPA-approved total maximum daily load (TMDL) or a TCEQ-approved implementation plan. TxDOT initiated coordination with TCEQ, in accordance with 43 TAC 2.23, on May 15, 2015. Coordination was completed on June 12, 2015. The proposed improvements and its associated activities will be implemented, operated and maintained using both temporary and permanent best management practices (BMPs) to control the discharge of pollutants from the project site.

The proposed improvements must meet the requirements of Section 401 of the Clean Water Act and the TCEQ's *Texas Pollutant Discharge Elimination System* (TPDES). The Section 401 certification requirements for a NWP 14 will be met by implementing BMPs to manage water quality on sites affecting jurisdictional water.

All construction sites greater than one acre that discharge stormwater associated with construction activities to surface waters are required to obtain a General Permit to Discharge (General Permit TXR150000) from the TCEQ. It is anticipated that all discharges related to the proposed construction will be covered under the General Permit. A Stormwater Pollution Prevention Plan (SW3P) will be developed prior to any construction activities in accordance with the guidelines set forth in General Permit document. A Notice of Intent will be required.

The No-Build Alternative would not impact surface water quality.

5.12.2 Water Resources – Ground Water

Geologic Assessment

The proposed project area is located within the Edwards Aquifer Recharge Zone. A desktop survey revealed two faults crossing the proposed ROW as well as one subsurface drainage basin and three surface drainage basins for caves/sinkholes located nearby. Five surface features were observed within the ROW during field investigation in June 2013.

One sensitive recharge feature (MP-001) was documented; it is a zone of enlarged solution fractures in the bed of Slaughter Creek. In addition, the project area lies within the subsurface drainage basin for Blowing Sink Cave, a cave that connects directly to the Edwards Aquifer. The project also intersects the surface drainage basins for Wildflower Cave, La Crosse Cave, and Windmill Flat Sink. Wildflower Cave has been dye traced to connect to the aquifer, and the other cave and sinkhole are likely significant recharge features as well.

Care should be taken near the two faults which cross the proposed ROW; if excavation activities remove the clay-rich soil overlying either fault and/or penetrate bedrock near the fault, the potential for that fault to rapidly transmit water to the subsurface could increase. Soil-covered faults with no surface expression are mapped based on the best available data.

If contaminants are mobilized during construction, they could flow into Slaughter Creek and enter the aquifer via faults, fractures, or other unidentified recharge features, or contaminants could also flow directly into caves or sinkholes whose drainage basins intersect the proposed project area. Temporary BMPs will be implemented throughout the project area during construction to prevent the mobilization of disturbed soils and untreated runoff from entering karst features or creeks.

Typical BMPs such as berming and silt fencing can be overwhelmed by floodwaters in excavation areas that constitute man-made depressions due to the manner in which grade excavation occurs, resulting in possible introduction of silt and construction equipment fuels and lubricants to the subsurface. To avoid such occurrences, excavation will be planned in such a way as to avoid closed depressions, maintaining drainage away from the project area at all times. Without the artificial “head” created by a closed topographic depression, berms or sandbags can be erected around accidentally discovered voids that cannot be overtopped by floodwaters, eliminating the possibility that silt and contaminants from the surrounding area will enter the feature. These protections will remain in place until the feature is biologically assessed and a void closure plan is implemented.

An appropriate buffer will be placed around the solution fracture zone in Slaughter Creek as well as the drainage basins of caves, sinkholes, and other significant recharge features in the area. TCEQ guidelines suggest a natural buffer around each sensitive feature extending to the boundary of the drainage area or 200 feet, whichever is less. All excavation that penetrates the bedrock will be performed under the supervision of a qualified Professional Geoscientist.

Permanent BMPs will be constructed and maintained throughout the operation of the proposed project to protect Slaughter Creek and any sensitive recharge features downstream of the project area.

The No-Build Alternative would not impact the geologic resources in the project area.

Ground Water Quality

The proposed improvements are located within the Barton Springs Segment of the Edwards Aquifer and are therefore subject to the TCEQ *Edwards Aquifer Protection Program* (EAPP) regulations. The TCEQ has developed a technical guidance manual, *Complying with the Edwards Aquifer Rules – Technical Guidance of Best Management Practices, RG-348*, to ensure that new construction activities provide stormwater mitigation measures compliant with the Edwards Aquifer rules and regulations. This document describes in detail the guidelines for selecting and designing temporary and permanent, and structural and non-structural BMPs for

use in mitigating the increase in total suspended solid (TSS) pollutant loads caused by the construction of impervious cover on a project site.

The proposed improvements would add impervious cover, which requires additional TSS removal. The proposed water quality control BMPs include vegetative filter strips, extended detention, vertical sand filters and sand filter systems. With the BMPs proposed, the anticipated net increase in TSS removal is greater than the required amount.

In addition to the water quality controls described above, four detention ponds are proposed which will function primarily to mitigate any increase in downstream flooding risk associated with the changes in drainage patterns and increases in impervious cover. Since the basins are designed to attenuate increases in peak flow for a range of storms, including the 2-year flood event, the detention ponds would provide downstream water quality benefits by helping to limit additional stream bank erosion.

The project area currently contains nine water quality treatment facilities with HMTs; any HMT structures disturbed by the proposed improvements will be replaced.

During the construction of the project, the contractor shall follow the TCEQ *Water Pollution Abatement Plan (WPAP)* guidelines for protecting overall water quality and sensitive features of the Edwards Aquifer Recharge Zone. Temporary protections will be described in detail in the *Temporary Stormwater Section* of the WPAP. The project construction plans will require TCEQ WPAP General Construction Notes. South of Williamson Creek, the Barton Springs Segment is designated as a sole-source aquifer and several cities depend on it for their water. The EPA Sole Source Aquifer Program will review the TCEQ-approved WPAP to ensure the proposed project will not have adverse effects on the quality of groundwater underlying the project site.

The No-Build Alternative would not impact the ground water quality in the project area.

5.12.3 Floodplains

Portions of the proposed project fall within a Federal Emergency Management Agency (FEMA) 100-year floodplain. This project drains into the Kincheon Branch of Williamson Creek and into the Danz Creek Tributary of Slaughter Creek. The hydraulic design for the proposed improvements will be in accordance with current TxDOT design policies. The facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, while minimizing damage to the facility, Williamson Creek and Slaughter Creek watershed or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations or ordinances. Coordination with the local Floodplain Administrator is required.

The No-Build Alternative would not affect the 100-year floodplain.

5.12.4 Hazardous Materials

A review of environmental regulatory databases was conducted in June 2013 and an Initial Site Assessment (ISA) was completed in May 2014 to identify sites or facilities that could result in potential hazardous materials impacts (see the *Hazardous Materials Technical Memorandum* for more details). No hazardous materials concerns were identified; therefore, no further hazardous materials action is required. Any unanticipated hazardous materials impacts encountered during the project construction phase will be addressed in accordance with regulatory requirements. No further assessment is required.

The No-Build Alternative would not require construction so would not result in a risk of hazardous materials discovery.

5.12.5 Air Quality

The proposed improvements are located in Travis County, which is in an area in attainment or unclassifiable for all national ambient air quality standards (NAAQS); therefore, the transportation conformity rules do not apply. The proposed project is consistent with *CAMPO 2040* and the 2015-2018 TIP. See the *Air Quality Technical Memorandum* for more details.

Carbon Monoxide Traffic Air Quality Analysis

Generally, projects such as the proposed action are considered exempt from a transportation air quality analysis (TAQA) because they are intended to enhance traffic safety and improve traffic flow. The proposed action would not add capacity to an existing facility. Current and future emissions should continue to follow existing trends not being affected by this project. Due to the nature of this project, a carbon monoxide analysis was not required.

Congestion Management Process

This project is located in Travis County within an area in attainment or unclassifiable for all NAAQS; therefore a Congestion Management Process analysis is not required.

Mobile Source Air Toxics

The purpose of the project is to reduce travel delay and enhance safety by improving intersection operations. Grade-separated intersections would be constructed at Slaughter Lane and La Crosse Avenue. This project has been determined to generate minimal air quality impacts for Clean Air Act Amendments of 1990 (CAAA) criteria pollutants and has not been linked with any special Mobile Source Air Toxics (MSAT) concerns. This project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the No-Build Alternative.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

Air Quality Construction Emissions

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation. These emissions are temporary in nature (only occurring during actual construction); it is not possible to reasonably estimate impacts from these emissions due to limitations of the existing models. However, the potential impacts of particulate matter emissions will be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this project may generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary MSAT

construction related emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles. The Texas Emissions Reduction Plan (TERP) includes incentive programs to encourage the development of multi-pollutant approaches to ensure that the air in Texas is both safe to breathe and meets minimum federal standards. TxDOT encourages construction contractors to utilize this program to the fullest extent possible to minimize diesel emissions. Information about the TERP program can be found at: <http://www.tceq.state.tx.us/implementation/air/terp/>.

Considering the temporary and transient nature of construction-related emissions, it is not anticipated that emissions from construction of this project would have any significant impact on air quality in the project area.

The No-Build Alternative would result in gradually increasing traffic volumes and congestion over time as the project area grows, which could have an air quality impact. However, EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected over time to cause region-wide MSAT levels to be significantly lower than today.

5.12.6 Traffic Noise

A traffic noise analysis was conducted in accordance with TxDOT's 2011 *Guidance for Analysis and Abatement of Highway Traffic Noise* (see the *Traffic Noise Technical Memorandum* for more details). The traffic noise analysis concluded that there would be a traffic noise impact at 17 modeled receivers representing 101 impacted receivers and the following noise abatement measures were considered:

- Traffic management;
- Alteration of horizontal and/or vertical alignments;
- Acquisition of undeveloped property to act as a buffer zone; and
- The construction of noise barriers.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least five a-weighted decibels [dB(a)]; and to be "reasonable," it must not exceed the cost-effectiveness criterion of \$25,000 for each receiver that would benefit by a reduction of at least five dB(a) and the abatement measure must be able to reduce the noise level at least one impacted, first row receiver by at least seven dB(a).

One of the modeled receivers represents 24 impacted residences at a three-story multi-family complex called the Legacy at Western Oak Apartments located on the west side of MoPac and north of Slaughter Lane. A noise barrier was modeled along the MoPac ROW at a height of 16 feet. The total cost of the noise barrier would be \$230,400 or \$28,800 for each benefitted receiver (8 of the 24 receivers). It was determined that the noise barrier would not be acoustically feasible or economically reasonable; therefore, it was not proposed for incorporation into the project at this location.

On the west side of MoPac, between Slaughter Lane and La Crosse Avenue, the Parkside Village recreational trail parallels MoPac and connects to the Circle C Metropolitan Park trail system. There are residential properties just south of the trail in the Circle C on the Park neighborhood. This area has 9 modeled receivers representing 41 impacted receivers. A noise barrier was modeled at a height of 10 to 14 feet based on the terrain and bridge structure over

Slaughter Creek. This noise barrier would be both feasible and reasonable and is proposed for incorporation into the project.

There are 4 modeled receivers representing 15 impacted single-family residences in the Circle C Wildflower neighborhood, which is located on the east side of MoPac and north of La Crosse Avenue. A noise barrier was modeled along the MoPac ROW at a height of 12 feet. This noise barrier would be both feasible and reasonable and is proposed for incorporation into the project.

Three modeled receivers, representing 21 impacted receivers, are located south of La Crosse Avenue along the east side of MoPac in the southern part of the Lady Bird Johnson Wildflower Center. A noise barrier was modeled along the MoPac ROW at a height of 12 feet. This noise barrier would be both feasible and reasonable and is proposed for incorporation into the project.

The majority of traffic noise impacts resulting from the proposed improvements would be mitigated by the proposed noise barriers. A traffic noise workshop was held on September 3, 2015 with property owners who live adjacent to the area of the proposed noise barriers. A simple majority vote was taken to determine whether those property owners would like the noise barriers to be incorporated into the final design of the proposed project. In addition, meetings were held with the Wildflower Center and Parkside Village to solicit their votes on the proposed noise barriers adjacent to their properties. A summary of the workshop and meetings as well as results from the vote will be published in the *Noise Workshop and Meeting Summary Report* and posted to the MoPac Intersections Environmental Study webpage of the www.MoPacSouth.com website upon the completion of discussions with affected property owners. The final decision to construct the proposed noise barriers will not be made until final design and after utility evaluation.

The No-Build Alternative assumes no intersection improvements would be made. As traffic volumes increase over time, traffic noise levels would be expected to increase or remain the same due to increased congestion at the intersections.

5.13 BIOLOGICAL ENVIRONMENT SUMMARY

The analysis of biological resources, including vegetation, wildlife and threatened and endangered species are detailed in the *Biological Studies Technical Memorandum*. This section summarizes the findings from this memorandum.

5.13.1 Vegetation

According to the MOU between TxDOT and Texas Parks and Wildlife Division (TPWD), there are several triggers that require coordination (see the *Biological Studies Technical Memorandum, Appendix B – Biological Evaluation Form* for detailed analyses). This section summarizes the triggers as they pertain to vegetation.

According to a review of the TPWD's *Ecological Management Systems of Texas* (EMST), the following vegetation types are present in the project area:

- Edwards Plateau: Savanna Grassland;
- Edwards Plateau: Ashe Juniper Motte and Woodland;
- Edwards Plateau: Deciduous Oak / Evergreen Motte and Woodland;
- Edwards Plateau: Live Oak Motte and Woodland;
- Edwards Plateau: Oak/Hardwood Motte and Woodland;
- Edwards Plateau: Post Oak Motte and Woodland;

- Edwards Plateau: Riparian Hardwood / Ashe Juniper Forest;
- Edwards Plateau: Floodplain Hardwood / Ashe Juniper Forest;
- Native Invasive: Mesquite Shrubland;
- Mowed and Maintained ROW: Urban Low Intensity; and
- Mowed and Maintained ROW: Urban High Intensity.

Field investigations revealed that the vegetation types within the ROW fall within Edwards Plateau: Savanna, Woodland and Shrubland. There is also some riparian vegetation at Slaughter Creek. **Table 3** includes the results of field investigations. A total of 18.68 acres of the vegetation type “Edwards Plateau Savannah, Woodland and Shrubland” would be affected by the proposed project. The impact threshold for “Edwards Plateau Savannah, Woodland, and Shrubland” is 3 acres per the *Threshold Table Programmatic Agreement Crosswalk Table*. Coordination is required because the project disturbs a vegetation type greater than the threshold. TxDOT initiated coordination with TPWD on March 3, 2015. Coordination was completed on June 12, 2015.

Table 3: Vegetation Communities within the ROW

<u>Vegetation Type</u>	<u>Vegetative Community*</u>	<u>Vegetation within the ROW (acres)</u>
Edwards Plateau Savannah, Woodland, and Shrubland	Savanna Grassland	13.28
	Ashe Juniper Motte and Woodland	0.13
	Deciduous Oak / Evergreen Motte and Woodland	2.62
	Live Oak Motte and Woodland	0.28
	Oak / Hardwood Motte and Woodland	0.17
	Post Oak Motte and Woodland	2.20
	Total	18.68

Source: Texas Parks and Wildlife Division, EMST, 2010 as revised by the MoPac Intersections Study Team, 2014

* Note: the vegetative communities presented in this table are based on field investigations conducted in 2013.

The proposed project area does not include undisturbed rare communities listed in the 2012 *Texas Conservation Action Plan for the Edwards Plateau*. Remnant mixed and shortgrass communities do exist in the project area and occur with increasing frequency south of Slaughter Lane. Frequently mown areas adjacent to the roadway are dominated by the invasive species and would not be considered remnant vegetation; however pockets of diverse remnant prairie communities are present within the medians, although the invasive King Ranch bluestem is common throughout. This remnant vegetation was determined by qualified biologists to not be of significant importance since it exists within a previously and continually disturbed transportation corridor. The remnant vegetation within the project area has been disturbed in the past, and has re-established following disturbance. The anticipated impacts to remnant vegetation would not be adverse and the impacted vegetation would be allowed to re-establish.

While there are approximately two acres of riparian habitat at Slaughter Creek within the existing ROW, they are not anticipated to be impacted by the proposed improvements.

Based on a vegetation survey conducted in 2013, there are 32 medium trees (19-23 inches in diameter at breast height) and 15 large trees (equal to or greater than 24 inches in diameter at

breast height) within the existing ROW. The proposed project would require removal of these trees.

Upon completion of earthwork operations, disturbed areas will be restored and reseeded in accordance with TxDOT's *Vegetation Management Guidelines* and will be in compliance with the intent of *EO 13112 on Invasive Species*.

Landscaping would be part of the proposed project activities. Re-vegetation of disturbed areas will be in compliance with the *Executive Memorandum on Beneficial Landscaping*. Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation.

The proposed improvements fall within an "Urbanized Area" as defined by the U.S. Census Bureau. As such, it is exempt from the *Farmland Protection Policy Act*.

The No-Build Alternative proposed no construction activities; therefore no impacts to vegetation would occur.

5.13.2 Wildlife

Construction phase activities would directly or indirectly affect most wildlife species present within the ROW. Impacts to wildlife within the proposed project would also occur in conjunction with the removal and disturbance of vegetation. Wooded areas provide cover, food, and habitat for many resident and migratory species. Direct mortality of wildlife species from vehicle collisions (road kill), especially to invertebrates such as insects, is well documented and would likely be an effect.

The No-Build Alternative does not involve construction so effects to wildlife from these activities would not occur; however wildlife would still be subject to direct mortality from vehicle collisions.

Migratory Bird Treaty Act (MBTA)

Migratory birds were observed during August 28, 2013 field investigations and spring 2014 golden-cheeked warbler surveys and may arrive in the project area to breed during construction of the proposed improvements. All appropriate actions will be taken to prevent the take of migratory birds, their active nests, eggs, or young by the use of proper phasing of the project or other appropriate actions.

Migratory birds protected under the MBTA would not be affected by the No-Build Alternative.

5.13.3 Threatened and Endangered Species

Federally-listed Species

Desktop analysis and field investigations conducted in August 2013 indicate that potential habitat for three federally-listed endangered species occurs in the vicinity of the proposed project. These include two amphibians, the Austin blind salamander (*Eurycea waterlooensis*) and the Barton Springs salamander (*Eurycea sosorum*); and one bird, the golden-cheeked warbler (*Setophaga chrysoparia*). See the *Biological Studies Technical Memorandum* for more details.

Amphibians

No *Eurycea* species habitat was identified within the existing ROW during the 2014 presence/absence survey for karst invertebrates. While the proposed project occurs over an area that recharges directly to Barton Springs, temporary and permanent BMPs would prevent

introduction of silt and contaminants generated by the project to the subsurface. Therefore, the project would have **no effect** on the Barton Springs salamander or the Austin blind salamander. The proposed temporary and permanent BMPs include:

- Remove 80 percent of the increase in total suspended solids from stormwater runoff
- Maintain, repair or replace existing hazardous material traps;
- Carefully sequence excavation to avoid closed depressions;
- Strictly monitor for void encounters throughout the project;
- Install protection measures to prevent surface flow into voids upon commencement of construction;
- Design permanent protection, if applicable, to restore groundwater flow in severed conduits to the extent practicable;
- Abide by TCEQ rules outlined in Title 30 Texas Administrative Code Chapter 213.5(f)(2) if voids are encountered;
- Utilize innovative engineered solutions (i.e., project-specific design solutions) to maintain the flow of groundwater and surface-derived nutrients (if any) and prevent untreated surface water from the project area from entering the void, if large voids are encountered; and,
- Install temporary erosion and sedimentation controls upon commencement of construction activities

Bird

A presence/absence survey for golden-cheeked warblers was conducted during the 2014 breeding season according to U.S. Fish and Wildlife Service (USFWS) protocol. No golden-cheeked warblers were detected. It is the opinion of the permitted biologist that no woodland areas that would be impacted by the proposed project constitute habitat likely to be occupied by the warbler. For this reason, the project would have **no effect** on this species.

State-listed Threatened Species and Species of Greatest Conservation Need (SGCN)

Desktop analysis and field investigations indicate that there is potential habitat in the project area for two federally and state-listed endangered species (Barton Springs salamander and golden-cheeked warbler); one federally-listed and state SGCN (Austin blind salamander); and six SGCN (the Balcones Cave amphipod, Bifurcated Cave amphipod, Bandit Cave spider, Leonora's dancer damselfly, the Texas garter snake and plains spotted skunk).

As described above, the proposed project would have **no effect** on the golden-cheeked warbler, the Barton Springs salamander and the Austin blind salamander. No habitat for the two amphipods and spider was encountered within the ROW during the karst invertebrate surveys. Although suitable habitat for the damselfly and snake occurs along Slaughter Creek, this area would not be impacted by the proposed project; therefore, no impacts to these species would be expected. The spotted skunk is a habitat generalist and could occur throughout the proposed project area, especially in areas of wooded, brushy vegetation. Because of this, the project may impact this species.

As the proposed improvements are within range of a state-listed species or SGCN and suitable habitat is present, coordination under the TxDOT-TPWD MOU was initiated March 3, 2015 and completed on June 12, 2015. In accordance with the BMPs in the *Best Management Practices Programmatic Agreement between TxDOT and TPWD under the 2013 MOU*, contractors will be advised of the potential occurrence of these species in the project area and to avoid harming

the species if encountered. Additionally, contractors will be advised to avoid unnecessary impacts to spotted skunk dens if encountered. There are no approved BMPs for the two amphipods and spider listed in the Programmatic Agreement.

The No-Build Alternative would not result in take of any federally- or state-listed threatened or endangered or rare species.

5.14 INDIRECT AND CUMULATIVE IMPACTS SUMMARY

5.14.1 Indirect Impacts

As indicated in the *Indirect and Cumulative Impacts Technical Memorandum*, the proposed improvements would not result in induced growth within the area; therefore an induced growth indirect impacts analysis is not required.

5.14.2 Cumulative Impacts

The proposed improvements would not result in substantial direct or indirect impacts to any resource. Based on TxDOT's policy, the absence of direct and indirect impacts indicate that a cumulative impact analysis is not required. However, given that the project is located within an ecologically sensitive area, the potential for construction activities to result in direct or indirect impact to at-risk resources (ground water and federally endangered karst species) was more thoroughly examined.

Construction-phase impacts are possible but not probable and are unlikely to occur given the BMPs and other regulatory procedures that would be in place for the proposed project. In the event that accidental void discovery does occur, the potential for adverse impacts to at-risk features would be avoided or minimized through regulatory control measures; it is unlikely that any impacts would exceed the carrying capacity of the ecosystem. The proposed project is not anticipated to result in direct or indirect impacts to at-risk resources; therefore, it is unlikely that the project would contribute to cumulative impacts to ground water or federally endangered karst species, and no additional analysis is required.

5.15 CONSTRUCTION IMPACTS SUMMARY

5.15.1 Noise Impacts—Construction Phase

Heavy machinery is a major source of noise in construction; however, it is temporary and would normally only be experienced during daylight hours. None of the modeled noise receivers are expected to be exposed to an inordinate amount of noise as a result of construction activities. The contractor will make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of construction equipment.

5.15.2 Air Quality Impacts—Construction Phase

Construction activities can generate temporary air pollutants such as fugitive dust and emissions from construction vehicles. However, these air quality effects would be temporary and transient and mitigation measures such as site watering to minimize the generation of dust and minimizing idling vehicles will prevent significant impacts on air quality in the area.

5.15.3 Biological Impacts—Construction Phase

Construction activities would remove or disturb the vegetative communities in the project area, which could result in temporary habitat loss for resident and migratory species and could result in the removal of erosion-inhibiting ground cover. Disturbed areas will be restored, re-graded

and reseeded according to TxDOT specifications, and BMPs will be implemented to provide temporary erosion control during construction and permanent erosion control after the project is complete.

5.15.4 Traffic Pattern Impact—Construction Phase

Prior to construction, a detailed traffic control plan would be developed to minimize traffic disruption. Access to adjacent properties would remain open through all phases of construction. The plan will include accommodations for maintaining access to motorized vehicles as well as for pedestrians and cyclists. There may be temporary increases in traffic congestion and potential changes in traffic patterns and routes in the vicinity of the project during construction, which could possibly cause temporary delays. The short-term changes to traffic patterns would be communicated via roadside display signs to alert motorists to the time and day of lane closures. Temporary changes in access would be coordinated with emergency responders (police protection, fire protection, emergency medical service providers and others) and other public service providers prior to construction. Traffic control during project construction would be in accordance with the Texas Manual on Uniform Traffic Control Devices and TxDOT's Work Zone standards.

6.0 COMMENTS AND COORDINATION

Public Involvement for the proposed project has consisted of stakeholder meetings, an open house, a public hearing and attendance at community events. **Table 4** lists the past and planned public involvement activities for the proposed project.

Table 4: Public Involvement Activities

<u>Activity</u>	<u>MoPac Intersections Event</u>	<u>MoPac Intersections Information Available</u>	<u>Date</u>
Stakeholder Meetings*	X		August 2013 – October 2013 <i>February 2015 – July 2015</i> <i>On-going, as needed</i>
Information booth at SH 45SW Open House		X	October 8, 2013
Information booth at Circle C Homeowners Association (HOA) Food Trailer Night		X	October 18, 2013
Information booth at Oak Hill Parkway Open House		X	October 22, 2013
Open House at Parkside Village	X		October 24, 2013
Virtual Open House	X		October 25 – November 4, 2013
Information booth at MoPac South Open House		X	November 7, 2013
Information booth at SH 45SW Open House		X	December 5, 2013
Neighborhood Meeting for Circle C HOA	X		January 15, 2014
Information booth at MoPac South Open House		X	April 29, 2014
Bicycle and Pedestrian Workshop		X	February 17, 2015
Information booth at MoPac South Open House		X	February 26, 2015
Neighborhood Meeting for the South Brodie Neighborhood Alliance		X	March 12, 2015
Information booth at the Circle C HOA Food Trailer Night	X		March 13, 2015
Neighborhood Meeting for Sendera HOA		X	April 14, 2015
Neighborhood Meeting for the South Brodie Neighborhood Alliance		X	July 9, 2015
Neighborhood Meeting for the Shady Hollow HOA		X	July 16, 2015
Information booth at the Circle C HOA Food Trailer Night	X		July 10, 2015
Public Hearing	X		<i>July 30, 2015</i>
Traffic Noise Workshop and Meetings	X		<i>September - October 2015**</i>

Source: MoPac Intersections Study Team, 2014

* This was a combined effort between the MoPac South and MoPac Intersections projects. The Study Team met with over 20 organizations including: the City of Austin, Capital Metro, neighborhood organizations, representatives of the business community and environmental and other interest groups. A list of these meetings through October 2013 is included in the *Open House Summary*.

** Coordination on the Traffic Noise Workshop and Meetings is still ongoing.

Comments on the project associated with Open House held on October 24, 2013 were received from September 22 through November 4, 2013. Comments could be submitted at the Open House or by mail, online on the MoPac Intersections Environmental Study webpage of the www.MoPacSouth.com website, by email or by fax.

One-hundred twenty-seven (127) comments were received during the comment period of which seventy-three (73) were provided at the open house on a comment form, nine (9) were provided to a court reporter at the open house and forty-five (45) were provided online. Several major themes were brought up including:

- Build something now, the No-Build Alternative is not acceptable;
- Those that favored the No-Build Alternative had concerns about visual and noise impacts, environmental impacts and a perceived connection to SH 45 SW;
- Most favored underpasses to minimize noise and visual impacts, particularly at La Crosse Avenue because of its proximity to the Lady Bird Johnson Wildflower Center;
- Provide the least disruptive, most cost effective solution that is environmentally sound;
- Finish the proposed project construction before SH 45 SW;
- Concerns about bicycle and pedestrian safety. Most suggested to separate bicyclists and pedestrians from heavy traffic and provide connectivity east and west near the Veloway;
- Several respondents provided suggestions of improvements to be made while the study is underway such as: lengthening green lights; dedicating/extending turn lanes to improve traffic flow and reduce collisions.

After the close of the public comment period a summary report was prepared which documented all comments received and provided responses (see the *Open House Summary* for more details). The report was posted to the MoPac Intersections Environmental Study page at www.MoPacSouth.com/intersections/. The comments received were considered in this study.

The decision to advance the underpass option solution for the Build Alternative was largely driven by community concerns regarding noise and visual impacts associated with MoPac overpassing Slaughter Lane and La Crosse Avenue.

A Public Hearing was held on July 30, 2015. The hearing was held to solicit public input on the Draft EA. The Draft EA was made available for public review on June 30, 2015. Following the public hearing a virtual public hearing was available on www.MoPacSouth.com from July 31, 2015 through August 10, 2015. Comments were submitted between June 30, 2015 and August 10, 2015.

Four hundred nine (409) comments were received during the comment period. At the public hearing, twenty-four (24) people provided written comments, seven (7) people testified and four (4) people provided comments to a court reporter. Thirty-two (32) comment forms and one (1) letter were hand-delivered to the Mobility Authority, along with a 55-page petition. Two (2) additional letters were received by mail and one (1) comment was faxed. Three hundred and thirty-eight (338) comments were received via web mail. Several major themes were brought up including:

- Build something now, the No-Build Alternative is not acceptable;
- Cumulative effects of this project in combination with MoPac South and SH 45SW would create a southern loop that will function as a relief route for I-35;
- Transportation improvements should serve the local community and not the region;

- Concerns were raised about impacts to the Edwards Aquifer, parklands, traffic noise levels, air quality and light pollution; and
- Several respondents provided suggestions including: making the EA available in libraries; remediation related to the removal of trees; a physical barrier separating cyclists from vehicles; natural noise barriers; and planning for a future that encourages less vehicle trips.

After the close of the public comment period a summary report was prepared which documented all comments received and provided responses (see the Public Hearing Summary for more details). The comments received were considered in this study.

The design of the Build Alternative was not changed as a result of Public Hearing comments. However, language in the EA was revised as a result of comments received on the draft EA during the posted comment period and from comments made at the public hearing. Changes included explanation of the EA format and function of the technical memoranda; confirmation of the project's consistency with the Capital Area Metropolitan Planning Organization's 2040 Plan; clarifications of bicycle and pedestrian improvements; updates on the noise barrier workshop and meetings; clarification that the aesthetic treatment of noise barriers will be consistent with the MoPac Improvement Project; updates on utility information; addition of potential traffic pattern impacts during construction; updates on public involvement activities; a description of the public hearing; and addition of a commitment to develop a native seed mix for the project with support from the Lady Bird Johnson Wildflower Center.

6.1 Agency Coordination

6.1.1 U.S. Environmental Protection Agency

The proposed project crosses a portion of the Barton Springs Segment of the Edwards Aquifer which is designated as a sole-source aquifer. As such, the EPA Sole Source Aquifer Program will review the TCEQ-approved WPAP to ensure the proposed project will not have adverse effects on the quality of groundwater underlying the project site.

6.1.2 Texas Commission on Environmental Quality

According to the provisions of the TxDOT-TCEQ MOU, coordination with TCEQ is required if all or part of a project drains to an impaired assessment unit that is within five miles of the project and is in the same watershed as the project. The project area crosses and likely drains to an impaired assessment unit (Slaughter Creek) which is within five miles of the project and is in the same watershed as the project. As such, coordination with TCEQ for water quality was required. TxDOT initiated coordination with TCEQ, in accordance with 43 TAC 2.23, on May 15, 2015. Coordination was completed on June 12, 2015. Slaughter Creek does not have an EPA-approved TMDL or a TCEQ-approved implementation plan. The proposed improvements and their associated activities will be implemented, operated and maintained using both temporary and permanent best management practices (BMPs) to control the discharge of pollutants from the project site. A WPAP and SW3P will be developed for the project.

6.1.3 Texas Parks and Wildlife Department

According to the 2013 TxDOT-TPWD MOU, there are several triggers that require coordination with TPWD. The proposed project requires coordination because it would impact more than 3 acres of the Edwards Plateau: Savanna, Woodland, and Shrubland vegetation type, within the range of a state-listed species or SGCN, and suitable habitat is present. TxDOT initiated early

coordination with TPWD in accordance with the MOU on March 3, 2015. Coordination was completed on June 12, 2015.

6.1.4 Travis County

The proposed improvements include work within a FEMA-designated 100-year floodplain; therefore coordination with the local Floodplain Administrator is required.

7.0 PERMITS AND APPROVALS NEEDED

The Environmental Permits, Issues and Commitments (EPIC) are included in the project file.

7.1 Clean Water Act

Detailed drainage design for the proposed improvements is preliminary at this time. However, it is anticipated that a Section 404 NWP 14 without PCN will be required for the placement of temporary or permanent dredge or fill material into potentially jurisdictional waters of the U.S. A PCN is required for the NWP 14 if the loss of waters to the U.S. exceeds 0.10 acre. If permanent fill amounts exceed 0.50 acre, an Individual Permit is required.

The proposed project must meet the requirements of Section 401 of the Clean Water Act. The Section 401 certification requirements for a NWP 14 will met by implementing BMPs to manage water quality on sites affecting jurisdictional water.

All construction sites greater than one acre that discharge stormwater associated with construction activities to surface waters are required to obtain a General Permit to Discharge (General Permit TXR150000) from the TCEQ. It is anticipated that all discharges related to the proposed construction will be covered under the General Permit. A SW3P will be developed prior to any construction activities in accordance with the guidelines set forth in General Permit document. A Notice of Intent is required.

The proposed project includes a drainage system that is regulated under the Municipal Separate Storm Sewer System (MS4) permit held by TxDOT. The MS4 program regulates storm water discharges to local water-bodies to protect the receiving streams. The City of Austin operates the MS4 within the city boundaries. TxDOT will provide a Notice of Intent (NOI) for the change to the MS4 permit to the City of Austin and coordination will occur as necessary.

7.2 Edwards Aquifer Rules

A WPAP must approved by TCEQ prior to construction of the project. Temporary protections will be described in detail in the *Temporary Stormwater Section* of the WPAP. The project construction plans will require TCEQ WPAP General Construction Notes.

8.0 COMMITMENTS

The Environmental Permits, Issues and Commitments (EPIC) are included in the project file.

8.1 Archeological Resources

In the unlikely event that significant cultural resources are discovered during construction, TxDOT will immediately initiate cultural resources discovery procedures. All work in the vicinity will immediately cease until a specialist from TxDOT and/or the Texas Historical Commission can assess the discovery's significance and the need for additional investigation, if necessary.

8.2 Water Quality

In compliance with the Edwards Aquifer Rules, water quality controls and BMPs will remove 80 percent of the increase in total suspended solids from stormwater runoff. More detail will be provided on these controls and BMPs during the development of PS&E in the TCEQ-approved WPAP.

The highest risk for negative ground water impacts is associated with the intersection of voids during roadway excavation. These impacts will be minimized and mitigated through project-wide awareness and education about the need to report void discoveries and implement protection measures to protect voids by covering them to prevent sediment introduction and desiccation. Permanent protection, if applicable, will be designed to maintain ground water flow to the extent practicable. Impacts to karst features will be closely monitored during construction.

If voids or water flow are encountered, 30 TAC 213.5(f)(2) requires that construction in the vicinity of the void cease. A geologist will evaluate the void and work with the design engineer, if necessary for structural concerns, to develop a void mitigation plan. The void mitigation plan must be certified by a geologist, submitted to TCEQ and approved prior to the implementation of mitigation and before continuing construction in the vicinity of the void. In addition, a Section 10(A)(1)(a) permitted scientist will inspect the site as soon as possible to evaluate potential for species habitat. If habitat for federally-listed endangered species is encountered, there may be an effect on those species. Construction will cease and coordination with USFWS will occur.

Measures will be taken to prevent and correct erosion that may develop during construction. Temporary erosion controls will be in compliance with TxDOT Standard Specifications and will be in place, according to the construction plans, prior to commencement of construction. They will be inspected on a regular basis to ensure maximum effectiveness.

Temporary Water Pollution Control Measures: Water quality impacts will be minimized during construction of the proposed project through the implementation of a SW3P. These plans will include structural controls and practices that will be followed throughout the construction of the project to minimize water impacts. Guidance documents, such as TxDOT's *Storm Water Management Guidelines for Construction Activities*, provide a detailed discussion of construction BMPs and additional information on implementation of temporary storm water controls. The controls will include the following:

- Minimize the extent and the duration of disturbed areas;
- Plan the phases of construction to minimize exposure;
- Use vegetation to stabilize disturbed areas as practicable;
- Apply erosion control practices to minimize the loss of sediment;
- Keep soil covered and in place as much as possible using temporary or permanent vegetation, erosion control blankets, or various mulch materials;
- Use diversion structures to channel surface runoff from exposed soils;
- Use slope drains where grades may be prone to erosion;

- Apply perimeter controls to minimize the discharge of sediment laden stormwater such as silt fences, diversion structures, swales, dikes, sediment traps, rock berms, and vegetative filters;
- Stabilize disturbed areas as quickly as possible after final grade has been attained using permanent structures, temporary or permanent vegetation, mulch, stabilizing emulsions, or a combination of these measures;
- Carefully sequence excavation to avoid closed depressions;
- Strictly monitor for void encounters throughout the project;
- Immediately install protection measures to prevent surface flow into encountered voids; and
- Design permanent protection, if applicable, to restore groundwater flow in severed conduits to the extent practicable.

Permanent Water Pollution Control Measures: Examples of stormwater pollution mitigation measures include detention ponds, wet ponds, sand filters, vegetative filter strips, and grassed swales. The primary mechanisms making these measures effective in removing pollutants from storm water are detention and filtration. The selection, design, and effectiveness of these measures are highly site dependent, but all have been shown to be effective in treating highway runoff. The type and location of appropriate permanent water pollution control measures will be determined during the final design of the proposed project. These measures will be designed for site-specific conditions.

8.3 Hazardous Materials

Any unanticipated hazardous materials and/or petroleum contamination encountered during construction will be handled according to applicable federal and state regulations per TxDOT Standard Specifications.

8.4 Traffic Noise

In August 2015, TxDOT began engaging property owners adjacent to the proposed noise barriers by offering a traffic noise workshop. At the workshop held on September 3, 2015, property owners were asked to provide input on the traffic noise barriers to be included in the final design, including whether the traffic noise barriers are desirable. In addition, meetings were held with the Wildflower Center and Parkside Village to solicit their votes on the proposed noise barriers adjacent to their properties. The final decision to construct the proposed noise barriers will not be made until final design and after utility evaluation.

8.5 Vegetation and Wildlife

Upon completion of earthwork operations, disturbed areas will be restored and reseeded in accordance with TxDOT's *Vegetation Management Guidelines* and will be in compliance with the intent of *EO 13112 on Invasive Species*. Re-vegetation of disturbed areas will also be in compliance with the *Executive Memorandum on Beneficial Landscaping*. Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation with support from the Wildflower Center to develop a native seed mix for the project. Best management practices will be implemented to provide temporary erosion control during construction and permanent erosion control after the project is complete.

8.5.1 Migratory Bird Treaty Act

Appropriate measures will be taken to avoid adverse impacts on migratory birds which will include the following:

- Disturbing, destroying, or removing active migratory bird nests, including ground nesting birds, will be prohibited during the February 15 through October 1 nesting season;
- The removal of unoccupied inactive nests will be avoided where practicable;
- The establishment of active nests during the nesting season on TxDOT owned-and-operated facilities and structures proposed for replacement or repair will be prevented; and
- The collection, capture, relocation, or transportation of birds, eggs, young, or active nests without a permit will be prohibited.

8.6 Construction

The contractor will properly maintain equipment and minimize idling during construction to minimize emissions of particulate matter. The contractor will implement measures, such as site watering to minimize the generation of dust.

Provisions in the PS&E will require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of construction equipment.

Disruption of travel patterns and traffic will be minimized through a traffic control plan which will be consistent with all local, state and federal traffic and safety regulations. The plan will include accommodations for maintaining access to motorized vehicles as well as for pedestrians and cyclists. Notification of detours or changes to travel patterns will be posted via signage and timely communication will be provided to affected residences, businesses, transit providers and emergency services providers.

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REFERENCES

- Texas Department of Transportation and Central Texas Regional Mobility Authority. 2015a. Air Quality Technical Memorandum. Jun 2015.
- _____. 2015b. Biological Studies Technical Memorandum. Jun 2015.
- _____. 2015c. Indirect and Cumulative Impacts Technical Memorandum. Jun 2015.
- _____. 2015d. Proposed Action, Purpose and Need Technical Memorandum. Jun 2015.
- _____. 2015e. Socioeconomic Resources Technical Memorandum. Jun 2015.
- _____. 2015f. Traffic Noise Technical Memorandum. Jun 2015.
- _____. 2015g. Water Resources Technical Memorandum. Jun 2015.
- _____. 2015h. Public Hearing Summary Report. Nov 2015.
- _____. 2014a. Standards of Uniformity for Historic Resources – Project Coordination Request. Feb 2014.
- _____. 2014b. Hazardous Materials Technical Memorandum. Apr 2014.
- _____. 2014c. Additional Geologic Studies. Oct 2014.
- _____. 2014d. Preliminary Risk Assessment of Proposed MoPac Underpasses at Slaughter Lane and La Crosse Avenue. Oct 2014.
- _____. 2014e. Open House Summary Report. Nov 2014.

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LIST OF ACRONYMS

-A-

ACHP Advisory Council of Historic Preservation

APE area of potential effect

-B-

BMPs best management practices

-C-

CAAA Clean Air Act Amendments of 1990

CAMPO Capital Area Metropolitan Planning Organization

CEQ Council on Environmental Quality

CFR Code of Federal Regulations

CSJ control-section-job

CSS context sensitive solutions

-D-

dB(a) a-weighted decibels

DDI diverging diamond interchange

-E-

EA Environmental Assessment

EAPP Edwards Aquifer Protection Program

EJ environmental justice

EO Executive Order

EMST Ecological Management Systems of Texas

EPA Environmental Protection Agency

-F-

FEMA Federal Emergency Management Agency

FHWA Federal Highway Administration

FONSI Finding of No Significant Impact

-G-

-H-

HMT hazardous material trap

-I-

ISA	Initial Site Assessment
-J-	
-K-	
-L-	
LEP	limited English proficiency
LOS	level of service
-M-	
MBTA	Migratory Bird Treaty Act
MIP	MoPac Improvement Project
MoPac	State Loop 1
MOU	Memorandum of Understanding
MSAT	mobile source air toxics
MS4	Municipal Separate Storm Sewer System
-N-	
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NOI	Notice of Intent
NRHP	National Register of Historic Properties
NWP	Nationwide Permit
-O-	
-P-	
PA	Programmatic Agreement
PCN	Pre-Construction Notification
PS&E	Plans, Specifications and Estimates
-Q-	
-R-	
ROW	right-of-way
RTP	Regional Transportation Plan
-S-	
SGCN	species of greatest conservation need

SHPO	State Historic Preservation Officer
STIP	Statewide Transportation Improvement Plan
SW3P	Stormwater Pollution Prevention Plan
-T-	
TAC	Texas Administrative Code
TAQA	transportation air quality analysis
TCEQ	Texas Commission on Environmental Quality
TERP	Texas Emissions Reduction Plan
THC	Texas Historical Commission
TIP	Transportation Improvement Plan
TMDL	total maximum daily load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSS	total suspended solids
TSWQS	Texas Surface Water Quality Standards
TxDOT	Texas Department of Transportation
-U-	
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
-V-	
vpd	vehicles per day
-W-	
WPAP	Water Pollution Abatement Plan
-X-	
-Y-	
-Z-	

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Appendix A: Project Location Map

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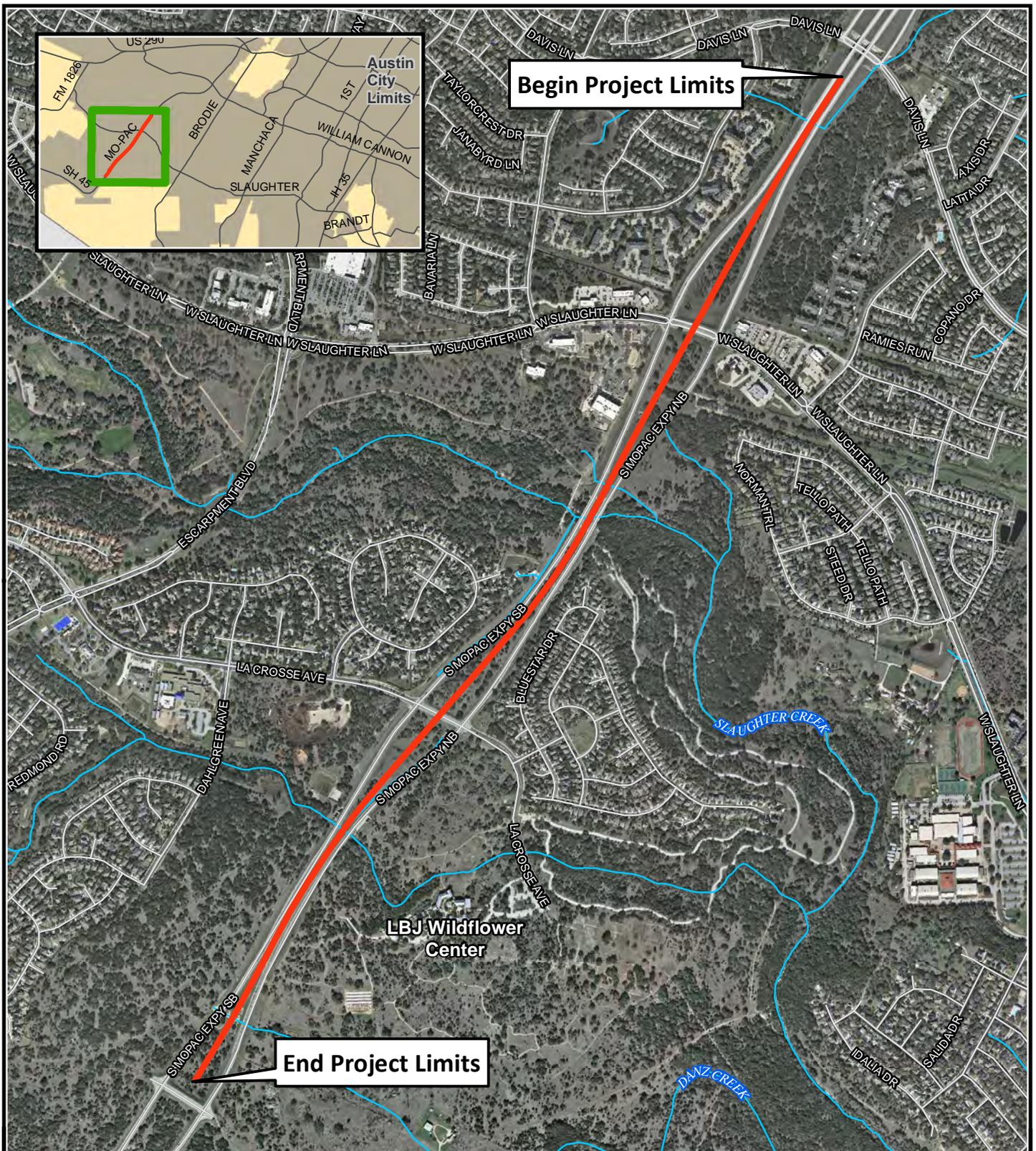


Figure 1
Project Location
MoPac Intersections
 Travis County, Texas

Legend

— Project Limits



0 1,000 2,000 3,000 4,000
 Feet

CSJ: 3136-01-015

Scale: 1 in = 1,300 feet

Source(s): CAPCOG 2012

Date 3/20/2015

Texas State Plane, Central, NAD 83, feet

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Appendix B: Preliminary Layout

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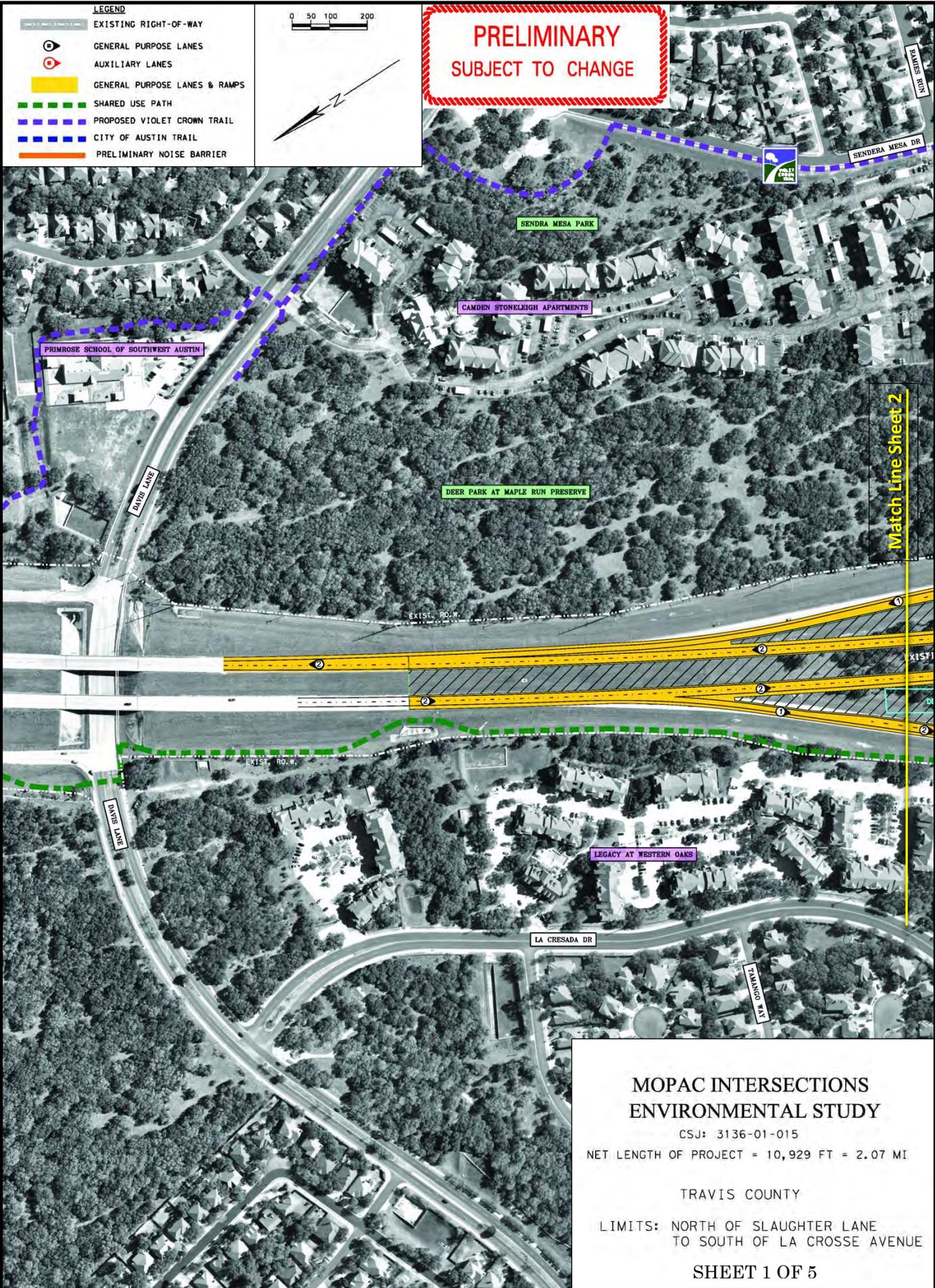
LEGEND

-  EXISTING RIGHT-OF-WAY
-  GENERAL PURPOSE LANES
-  AUXILIARY LANES
-  GENERAL PURPOSE LANES & RAMPS
-  SHARED USE PATH
-  PROPOSED VIOLET CROWN TRAIL
-  CITY OF AUSTIN TRAIL
-  PRELIMINARY NOISE BARRIER

0 50 100 200



**PRELIMINARY
SUBJECT TO CHANGE**



**MOPAC INTERSECTIONS
ENVIRONMENTAL STUDY**

CSJ: 3136-01-015

NET LENGTH OF PROJECT = 10,929 FT = 2.07 MI

TRAVIS COUNTY

LIMITS: NORTH OF SLAUGHTER LANE
TO SOUTH OF LA CROSSE AVENUE

SHEET 1 OF 5

LEGEND

-  EXISTING RIGHT-OF-WAY
-  GENERAL PURPOSE LANES
-  AUXILIARY LANES
-  GENERAL PURPOSE LANES & RAMPS
-  SHARED USE PATH
-  PROPOSED VIOLET CROWN TRAIL
-  CITY OF AUSTIN TRAIL
-  PRELIMINARY NOISE BARRIER

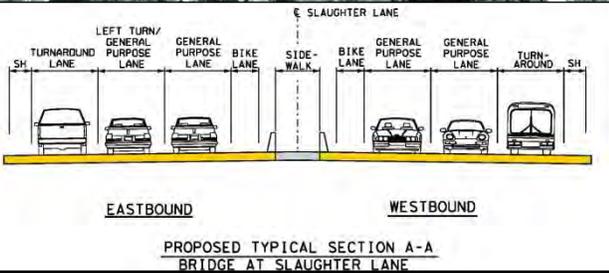
0 50 100 200



**PRELIMINARY
SUBJECT TO CHANGE**



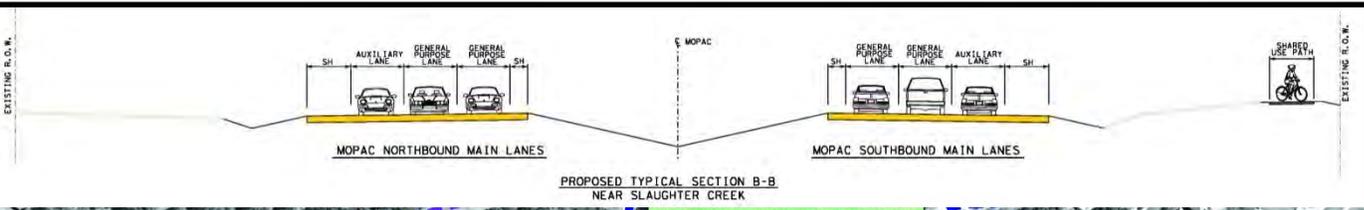
This proposed noise barrier may be considered as three different barriers (one for Parkside Village, one for Circle C Ranch Metro Park, and one for Circle C on the Park).



**MOPAC INTERSECTIONS
ENVIRONMENTAL STUDY**

CSJ: 3136-01-015
NET LENGTH OF PROJECT = 10,929 FT = 2.07 MI

TRAVIS COUNTY
LIMITS: NORTH OF SLAUGHTER LANE
TO SOUTH OF LA CROSSE AVENUE



This proposed noise barrier may be considered as three different barriers (one for Parkside Village, one for Circle C Ranch Metro Park, and one for Circle C on the Park).

**PRELIMINARY
SUBJECT TO CHANGE**

LEGEND

- EXISTING RIGHT-OF-WAY
- GENERAL PURPOSE LANES
- AUXILIARY LANES
- GENERAL PURPOSE LANES & RAMPS
- SHARED USE PATH
- PROPOSED VIOLET CROWN TRAIL
- CITY OF AUSTIN TRAIL
- PRELIMINARY NOISE BARRIER

0 50 100 200

**MOPAC INTERSECTIONS
ENVIRONMENTAL STUDY**

CSJ: 3136-01-015

NET LENGTH OF PROJECT = 10,929 FT = 2.07 MI

TRAVIS COUNTY

LIMITS: NORTH OF SLAUGHTER LANE
TO SOUTH OF LA CROSSE AVENUE

SHEET 3 OF 5

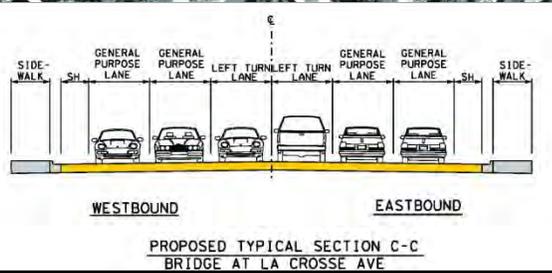
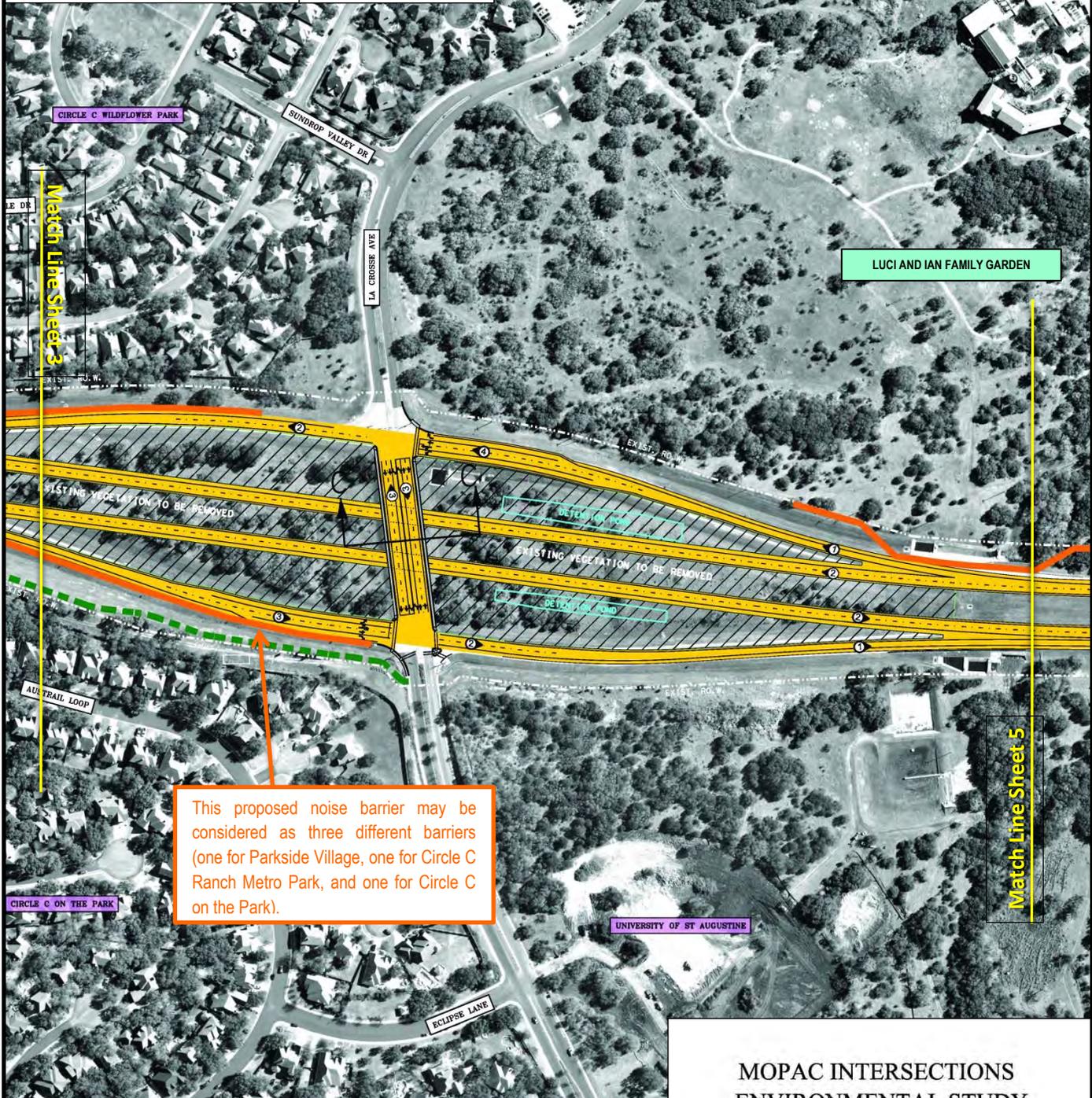
LEGEND

-  EXISTING RIGHT-OF-WAY
-  GENERAL PURPOSE LANES
-  AUXILIARY LANES
-  GENERAL PURPOSE LANES & RAMP
-  SHARED USE PATH
-  PROPOSED VIOLET CROWN TRAIL
-  CITY OF AUSTIN TRAIL
-  PRELIMINARY NOISE BARRIER

0 50 100 200



**PRELIMINARY
SUBJECT TO CHANGE**



**MOPAC INTERSECTIONS
ENVIRONMENTAL STUDY**

CSJ: 3136-01-015

NET LENGTH OF PROJECT = 10,929 FT = 2.07 MI

TRAVIS COUNTY

LIMITS: NORTH OF SLAUGHTER LANE
TO SOUTH OF LA CROSSE AVENUE

SHEET 4 OF 5

LEGEND

-  EXISTING RIGHT-OF-WAY
-  GENERAL PURPOSE LANES
-  AUXILIARY LANES
-  GENERAL PURPOSE LANES & RAMPS
-  SHARED USE PATH
-  PROPOSED VIOLET CROWN TRAIL
-  CITY OF AUSTIN TRAIL
-  PRELIMINARY NOISE BARRIER

0 50 100 200



**PRELIMINARY
SUBJECT TO CHANGE**



LUCI AND IAN FAMILY GARDEN

Match Line Sheet 4



**MOPAC INTERSECTIONS
ENVIRONMENTAL STUDY**

CSJ: 3136-01-015

NET LENGTH OF PROJECT = 10,929 FT = 2.07 MI

TRAVIS COUNTY

LIMITS: NORTH OF SLAUGHTER LANE
TO SOUTH OF LA CROSSE AVENUE

SHEET 5 OF 5

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Appendix C: Planning Documents

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Project Scope Amendment

This form should be used any time a project scope amendment is necessary.

If this amendment includes a restated project scope, please complete a revised project scope document.

Amendment Number:

1

Date: September 9, 2014

Restatement of project scope.

Check this box if a restated project scope is completed.

A restated project scope may be completed if changes to the original scope are substantial.

I. Project Definition

Control Section Job Number (CSJ): 3136-01-015

Facility Name: MoPac Expressway (Loop 1)

County Name: Travis County

Project Description: Proposed Loop 1 grade separations at La Crosse Avenue and Slaughter Lane

Project Limits:

From: 0.7 mile south of La Crosse Avenue

To: 0.5 mile north of Slaughter Lane

Letting Date: 2019

Funding Source(s):

FHWA State Local Other

Included in TxDOT 2013 Unified Transportation Program

\$45,874,993 STP Funding (L24E) Category 2 - Metropolitan Corridor Projects

Briefly describe the reason for amendment:

The project is being amended from a categorical exclusion (CE) to an environmental assessment because the project was determined by TxDOT Environmental Affairs Division to not qualify as a CE.



Project Scope Amendment

Describe any other changes to Project Definition, if any:
Note: It is not necessary to describe changes reflected above.

None.

II. Changes to Project Scope

Describe the changes to the project scope.

It is not necessary to complete this section if this amendment includes a restated project scope.

Identify the Section number and title (e.g. IV. Coordination with Participating Agencies).

Check the appropriate box to identify the Responsible Party.

Section number and title: Draft EA submittal

- Project Sponsor
 Department delegate

Description of revised provision: Dec. 2014

Section number and title: <Identify Section and title>

- Project Sponsor
 Department delegate

Description of revised provision: <Describe revisions>

Section number and title: <Identify Section and title>

- Project Sponsor
 Department delegate

Description of revised provision: <Describe revisions>

Section number and title: <Identify Section and title>

- Project Sponsor
 Department delegate

Description of revised provision: <Describe revisions>

Section number and title: <Identify Section and title>

- Project Sponsor
 Department delegate

Description of revised provision: <Describe revisions>



X. Project Scope Amendment Approval Signatures

The department delegate's approval is based on information about the project provided by the project sponsor either on this form or by separate written correspondence to the department delegate.

By signing below, the project sponsor's and department delegate's authorized representatives each indicate approval of the project scope, as amended, as fulfilling the requirements of 43 T.A.C. §2.44, relating to Project Scope.

Project sponsor

Central Texas Mobility Authority



Signature of Project Sponsor

9-17-14

Date

Department delegate

Texas Department of Transportation



Signature of Department delegate

10/30/14

Date

FHWA (to be completed at FHWA's option for FHWA transportation project)

FHWA's approval is based on information about the project provided by the project sponsor either on this form or by separate written correspondence to FHWA, and is subject to revocation if warranted by the results of surveys or studies or other new information.

By signing below, FHWA's authorized representative indicates approval of the anticipated project classification and planned coordination with participating agencies; state and federal approval authorities and permits; public involvement; and surveys, studies and other tasks described herein.

Justin Ham, P.E.

Signature of FHWA Authorized Representative

Date



Project Scope Amendment

Section number and title: <Identify Section and title>

Project Sponsor

Department delegate

Description of revised provision: <Describe revisions>

Unified Transportation Program (UTP) Projects

Unified Transportation Program (UTP) Projects <input checked="" type="radio"/> 2015 <input type="radio"/> 2014 <input type="radio"/> 2013 <input type="radio"/> 2012							
Project	District	County	Highway	Let Year	Category	Category Amount	
3136-01-015	Austin					>=	
3136-01-015	Austin	Travis	SL 1	2019	CATEGORY 2M - METRO CORRIDOR	\$45,874,993	

Unified Transportation Program (UTP) Projects

Unified Transportation Program		
Project	District	County
3136-01-015	Austin	
3136-01-015	Austin	Travis

Project Detail 3136-01-015

Detail

District	Austin
County	Travis
Highway	SL 1
Length	2.44
Let Year	2019
Estimate	\$45,874,993
Work From	N/A
Work To	N/A
Category	CATEGORY 2M - METRO CORRIDOR
Category Amount	\$45,874,993
Local Amount	\$0
Other Category Amount	\$0
Level of Authority	CONSTRUCT
Existing	URBAN DIVIDED
Proposed	URBAN DIVIDED
Non-Traditional Fund Source	N/A
Description	CONSTRUCT ROADWAY UNDERPASSES FOR A 6-LANE FACILITY

Map

TEXAS DEPARTMENT OF TRANSPORTATION

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM

STIP 2015-2018

AUSTIN DISTRICT 2015-2018 TIP

HIGHWAY



Initial 2015-2018 STIP



May 20, 2014

Mr. Greg Malatek, P.E.
District Engineer
Texas Department of Transportation - Austin District
P.O. Drawer 15426
Austin, TX 78761 – 5426

Dear Mr. Malatek:

On May 12, 2014, the CAMPO Transportation Policy Board approved for submission to TxDOT the attached *FYs 2015 – 2018 Transportation Improvement Program*. We have attached a copy of the *FYs 2015 – 2018 Transportation Improvement Program* and a copy of the signed resolution approving the *FYs 2015 – 2018 Transportation Improvement Program* with this letter.

We ask that the State Transportation Improvement Program be updated to include the *FYs 2015 – 2018 Transportation Improvement Program*.

Please call me at 512.974.1861 or Art Zamorano at 512.974.2275 if you have questions regarding the adoption of the *FYs 2015 – 2018 Transportation Improvement Program*.

Sincerely,

A handwritten signature in black ink that reads "Cathy Stephens". The signature is written in a cursive, flowing style.

Cathy Stephens
Planning and Environmental Program Manager

copy: Ed Collins, TxDOT – Austin District
Lori Morel, TxDOT – TPP
Jose Campos, FHWA



FYs 2015 - 2018 Transportation Improvement Program

Adopted: May 12, 2014



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CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION

Bastrop • Burnet • Caldwell • Hays • Travis • Williamson

**FY 2015-2018 Transportation Improvement Program (TIP)
Appendix C**

Projects in this list are anticipated to be constructed after the current TIP timeframe, but are currently undergoing environmental evaluation.

District	Project Sponsor	Project Name	Project County	Project City	CSJ Number (if available)	Limits		Project Description	Revision Date	Project History (if applicable)
						From	To			
Austin	TxDOT	IH 35	Williamson, Travis, Hays	various	unknown	SH 130	Posey Road	study for various operational improvements on mainlanes and frontage roads, plus potential future transportation corridor (added capacity)		
Austin	TxDOT	US 183 N	Williamson, Travis	Austin	0151-05-100	Lp 1	SH 45/RM620	managed lane study		
Austin	TxDOT	Loop 1 S	Travis	Austin	3136-01-015	Cesar Chavez	Slaughter Ln	ROW acquisition and construction of managed lanes		
Austin	TxDOT	FM 2304	Travis	Austin	2689-01-023	RAVENSC ROFT	FM 1626	RECONSTRUCT 5 LANE URBAN ROADWAY		
Austin	TxDOT	RM 1431	Williamson	Cedar Park	1378-02-038	COTTON WOOD CREEK TR IN CEDAR PARK	FM 734 (RONALD REAGAN)	WIDEN TO 6-LN DIVIDED ROADWAY		

Grouped Projects CSJs
Definition of Grouped Project for Use in the STIP

Proposed CSJ	Grouped Project Category	Definition
5000-00-950	PE - Preliminary Engineering	Preliminary Engineering for any project except added capacity projects in a nonattainment area. Includes activities which do not involve or lead directly to construction, such as planning and research activities; grants for training; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed.
5000-00-951	Right of Way Acquisition	Right of Way acquisition for any project that is not added capacity in a nonattainment area. Includes relocation assistance, hardship acquisition and protective buying.
5000-00-952 5000-00-957 5000-00-958	Preventive Maintenance and Rehabilitation	Projects to include pavement repair to preserve existing pavement so that it may achieve its designed loading. Includes seal coats, overlays, resurfacing, restoration and rehabilitation done with existing ROW. Also includes modernization of a highway by reconstruction, adding shoulders or adding auxiliary lanes (e.g., parking, weaving, turning, climbing, non-added capacity) or drainage improvements associated with rehabilitation.
5000-00-953	Bridge Replacement and Rehabilitation	Projects to replace and/or rehabilitate functionally obsolete or structurally deficient bridges.
5000-00-954	Railroad Grade Separations	Projects to construct or replace existing highway-railroad grade crossings and to rehabilitate and/or replace deficient railroad underpasses, resulting in no added capacity.
5800-00-950	Safety	Projects to include the construction or replacement/rehabilitation of guard rails, median barriers, crash cushions, pavement markings, skid treatments, medians, lighting improvements, highway signs, curb ramps, railroad/highway crossing warning devices, fencing, intersection improvements (e.g., turn lanes), signalization projects and interchange modifications. Also includes projects funded via the Federal Hazard Elimination Program, Federal Railroad Signal Safety Program, or Access Management projects, except those that result in added capacity.
5000-00-956	Landscaping	Project consisting of typical right-of-way landscape development, establishment and aesthetic improvements to include any associated erosion control and environmental mitigation activities.

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CAMPO 2040 REGIONAL TRANSPORTATION PLAN

Adopted

May 11, 2015



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Grouped Projects (continued)

ID	Sponsor	Cosponsor	County	Project	Limits/Location	Description	Let Year	YOE Cost (In Millions)
BUDA39	Buda	Hays	Hays	Old Goforth Rd	Glennview Ln	Intersection study and reconstruction	2023	\$0.6
BUDA41	Buda	Hays	Hays	Old San Antonio Rd	Main St - Cabela's Dr	Add sidewalk on one side	2018	\$0.1
BUDA42	Buda	Hays	Hays	Old San Antonio Rd	SH 45 - Main St	Reconstruct, add sidewalks	2028	\$3.4
BUDA45	Buda	Hays	Hays	Robert Light Blvd	FM 1626	Traffic signal warrant and potential signal	2023	\$0.2
RR25	Round Rock	Williamson	Williamson	Round Rock Avenue	Deepwood Drive - IH-35	Reconstruct MAD-4 with RR grade separation and access roads	2020	\$26.7
BUDA53	Buda	Hays	Hays	S Main St trail extension	300' north of Goforth Rd - 700' south of Goforth Rd	New hike/bike trail parallel to S Main St	2015	\$0.1
BUDA52	Buda	Hays	Hays	W Goforth Rd	RM 967 - Cedar St	Add sidewalks - one side	2018	\$-
85	TxDOT	Travis	Travis	IH-35 / Slaughter Creek Overpass	Slaughter Creek Overpass	Reconstruct bridge and restore second lane on frontage road	2015	\$7.8
86	TxDOT	Hays	Hays	IH-35 Operational Improvements in Hays County	RM 150 to north of Blanco River - at Posey Road	From RM 150 to north of Blanco River - operational improvements through the reversing of northbound and southbound ramps. At Posey Road - replacement of bridge and approaches (1-35 main lanes will be constructed to go over Posey Road). Construction of bicycle and pedestrian facilities in areas that they currently don't exist, using a shared use path within existing right-of-way, and improved storm water management infrastructure.	2015	\$28.7
87	TxDOT	Travis	Travis	IH-35 Operational Improvements in Travis County	north of Stassney Lane - south of William Cannon Drive	Replacement of the frontage road bridges over Williamson Creek to allow for addition of bicycle and pedestrian facilities, reconstruction of the existing underpass structures at Stassney Lane and William Cannon Drive and the addition of U-turn bridges at these locations, widening of the existing main lanes to incorporate shoulders and auxiliary lanes, and reconfiguration of existing ramps. Construction of bicycle and pedestrian facilities in areas that they don't currently exist using a shared use path within existing right of way, and improved storm water management infrastructure.	2015	\$64.0
88	TxDOT	Williamson	Williamson	IH-35 Operational Improvements in Williamson County	RM 620 - SH 45 N	North bound operational improvements through the construction of a north bound auxiliary lane and reconfiguration of existing ramps to improve main lane and frontage road operations. Construction of bicycle and pedestrian facilities in areas that they currently don't exist, using a shared use path within the existing right-of-way and improved storm water management infrastructure.	2015	\$28.0
101	TxDOT	Travis	Travis	Loop 1	north of Slaughter - south of LaCrosse	Construct underpasses at Slaughter and LaCrosse	2016	\$43.5
121	TxDOT	Hays	Hays	SH 80	SH 21 - FM 1984	Complete gap in shoulder for bicycle travel	2017	\$5.0
135	TxDOT	Hays	Hays	SH 123	IH-35 - DeZavalla Dr	Construct sidewalks	2017	\$0.7
162	TxDOT	Travis	Travis	FM 969	Tannehill Lane - FM-3177/Decker Lane	Bicycle/Pedestrian Accommodation	2016	\$1.6
	TxDOT	Travis	Travis	SH 71	West of US 183 - Presidential Blvd	Construct collector distributor road	2019	\$24.6
	TxDOT	Travis	Travis	IH-35	Woodward - Woodland	Operational improvements	2016	\$48.0

5. Action Plan and Projects

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