
# Final Environmental Assessment

## Loop 1604

From Potranco Road to FM 471
Bexar County, Texas
CSJ# 2452-01-056

May 2016

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

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**AADT** – Average Annual Daily Traffic

**ACS** – American Community Survey

**ACM** – Asbestos Containing Material

**AOI** – Area of Influence

**APE** – Area of Potential Effect

**BA –** Biological Assessment

**BO –** Biological Opinion

**BMP** – Best Management Practice

**CEQ** – Council on Environmental Quality

**CFR** – Code of Federal Regulations

**CHU** – Critical Habitat Unit

**CWA** – Clean Water Act

**DHHS** – Department of Health and Human Services

**DOT** – Department of Transportation

**DPM** – Diesel Particulate Matter

**EA** – Environmental Assessment

**EO** – Executive Order

**EPA** – Environmental Protection Agency

**FEMA** – Federal Emergency Management Agency

**FHWA** – Federal Highway Administration

**FONSI** – Finding of No Significant Impact

**FM** – Farm-to-Market

**FWCA** – Fish and Wildlife Coordination Act

**ISA** – Initial Site Assessment

**LEP** – Limited English Proficiency

**MBTA –** Migratory Bird Treaty Act

**MOU** – Memorandum of Understanding

**MPO** – Metropolitan Planning Organization

**MSAT** – Mobile Source Air Toxics

**MTP** – Metropolitan Transportation Plan

**NAAQS** – National Ambient Air Quality Standards

**NEPA** – National Environmental Policy Act

**NOI** – Notice of Intent

**NRHP** – National Register of Historic Places

**NWP** – Nationwide Permit

**PCB** – Polychlorinated Biphenyls

**PCN** – Preconstruction Notification

**POM** – Polycyclic Organic Matter

**RSA** – Resource Study Area

**RTHL** – Recorded Texas Historic Landmark

**TAC** – Texas Administrative Code

**TCEQ** – Texas Commission on Environmental Quality

**THC** – Texas Historical Commission

**TIP** – Transportation Improvement Program

**TMDL** – Total Maximum Daily Load

**TPDES** – Texas Pollutant Discharge Elimination System

**TPWD** – Texas Parks and Wildlife Department

**TSS** – Total Suspended Solids

**TxDOT** – Texas Department of Transportation

**SAL** – State Antiquities Landmark

**SGCN** – Species of Greatest Conservation Need

**SH** – State Highway

**SHPO** – Texas State Historic Preservation Officer

**SW3P** – Stormwater Pollution Prevention Plan

**USACE** – United States Army Corps of Engineers

**USFWS** – United States Fish and Wildlife Service

**VMT** – Vehicle Miles Traveled

# 1.0 INTRODUCTION

## 1.1 PURPOSE OF THIS DOCUMENT

The San Antonio District of the Texas Department of Transportation (TxDOT) proposes an expansion of Loop 1604 from Potranco Road (Farm-to-Market [FM] 1957) to FM 471 (Culebra Road) in San Antonio, Bexar County, Texas (see **Figure 1**). Improvements would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations; the existing roadway would be converted to a four-lane expressway. This Environmental Assessment (EA) has been developed in order to study the potential environmental consequences of construction of the proposed project. This project was initially evaluated with a State EA; however, based on the recent inclusion of federal funding, 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 for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); Environmental Impact and Related Procedures (23 CFR Part 771); and Environmental Review of Transportation Projects (Texas Administrative Code [TAC] Title 43, Part 1, Chapter 2).

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 the Federal Highway Administration (FHWA) and TxDOT.

## 1.2 PUBLIC REVIEW OF THE ENVIRONMENTAL ASSESSMENT

During the evaluation of the project during the State EA, a public hearing was held on October 8, 2014 at the Dolph Briscoe Middle School in San Antonio, Texas. A total of five verbal comments and nine written comments were received and addressed in a Public Hearing Summary and Analysis. The comment/response portion of that summary is available in **Appendix D**, and the full summary is available on the TxDOT website (http://www.txdot.gov/inside-txdot/projects/studies/san-antonio.html). None of the comments required modifications to the design of the proposed project.

During the current EA process for the now federally funded project, a notice affording the opportunity for a public hearing was made available along with the notice of the availability of the draft EA. The notice was published in the *San Antonio Express News* and on the TxDOT website. TxDOT received no comments from the public or agencies on the draft EA, and no requests for a public hearing were received (see **Appendix D**). Therefore, based on information contained in this EA, TxDOT determined that the environmental effects of the project are not sufficiently substantial to warrant preparation of an Environmental Impact Statement. TxDOT determined that there are no significant adverse effects and will prepare and sign a Finding of No Significant Impact (FONSI), which will be made available to the public.

# 2.0 PROJECT DESCRIPTION

## 2.1 EXISTING FACILITY

The existing roadway is a four-lane divided roadway with two 12-foot lanes in each direction and shoulders ranging in width from four feet to ten feet (see **Figure 2**). The width of the existing facility ranges from approximately 38 to 44 feet with a total right of way width ranging from 340 to 400 feet.

## 2.2 BUILD ALTERNATIVE

The Build Alternative would convert the existing roadway to a four-lane expressway, and would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations. The length of the proposed project is approximately 4.1 miles. The proposed improvements would be constructed primarily within existing right of way and to the north of the existing roadway. Approximately 3.7 acres of new right of way would be required, between Kilmarnoch Road and Reed Road. The proposed construction limits extend from approximately 4,500 feet south of Potranco Road to State Highway (SH) 151.

The proposed action would reconstruct the main lanes of Loop 1604 slightly north of their current alignment, retaining two 12-foot lanes in each direction. The proposed improvements also include the construction of two-lane, one-way northbound and southbound frontage roads, with auxiliary lanes and turn lanes at intersection locations (see **Figure 3**). The frontage roads would include a 15-foot outside lane and 12-foot inside lane(s). The inside shoulder width would range from four feet to nine feet and the outside shoulder would be 15 feet wide with a six-foot wide sidewalk. The 15-foot outside, shared-use lane would accommodate bicyclists. The typical section would match that of the Loop 1604 expansion project currently under construction directly to the north of the project area.

At the intersection of Loop 1604 with Potranco Road, West Military Drive, and Wiseman Boulevard, Loop 1604 would be elevated to span the intersections with the east-west roadways. With the exception of the northbound lanes over Potranco Road, the proposed bridge sections would have two 12-foot travel lanes and an auxiliary lane in each direction with inside shoulder widths of four feet and typical outside shoulder widths of six feet. At the Potranco Road bridge, there would be two northbound travel lanes and no auxiliary lane.

The logical termini for the proposed project include Potranco Road and FM 471, major east-west thoroughfares connecting to Loop 1604. The proposed project would have independent utility, serving to improve mobility in the project area, regardless of other improvements. Based on the findings of this EA, the Build Alternative is recommended as the preferred alternative.

## 2.3 NO BUILD ALTERNATIVE

Under the No Build Alternative, the proposed project would not be constructed. The No Build Alternative would not require the conversion of approximately 3.7 acres from existing land uses to

transportation use. However, the No Build Alternative would not result in increased mobility. Selection of the No Build Alternative would be expected to result in worsening traffic congestion. Although this alternative does not meet the need and purpose of the proposed project, the No Build Alternative was considered for comparison purposes.

# 3.0 PURPOSE AND NEED FOR THE PROPOSED PROJECT

## 3.1 PURPOSE OF THE PROPOSED PROJECT

The purpose of the proposed project is to improve mobility and maintain safety for the traveling public. By converting the roadway to a freeway and building grade separations at major intersections within the project limits, the proposed project would increase mobility and limit the interaction of high volume traffic traveling along Loop 1604 and turning traffic from Potranco Road, West Military Drive and Wiseman Boulevard.

## 3.2 NEED FOR THE PROPOSED PROJECT

Transportation improvements for Loop 1604 are needed between Potranco Road and FM 471 due to high traffic counts and congestion along Loop 1604. According to the City of San Antonio Department of Planning and Community Development, the population of San Antonio increased by about 16 percent between 2000 and 2010; the population grew from 1.1 million people to 1.3 million people. The project area spans City Council Districts 4 and 6, where the population is growing more rapidly than in the city as a whole. The population of these two districts combined increased 21 percent from 2000 to 2010. Loop 1604 is currently the outermost loop around the City of San Antonio and provides access for project area neighborhoods and commercial development as well as a route for regional travelers.

The mobility needs are substantiated by the growing traffic volumes on Loop 1604 within the project limits. Based on data collected by TxDOT, at the intersection of Loop 1604 and FM 471, the Annual Average Daily Traffic (AADT) counts have increased from 40,000 to 85,000 AADT between 2007 and 2012. Traffic counts at the intersection of Loop 1604 and Potranco Road have increased from 22,000 to 34,000 AADT during the same period. The demand for travel on Loop 1604 within the project limits is also expected to increase in the future. The projected AADT for the section of the proposed project containing the FM 471 intersection would increase to 95,700 and 155,400 in 2017 and 2037, respectively, while the section of the roadway containing the Potranco Road intersection would increase to 36,600 and 59,700 AADT.

The 2012 statewide crash rate per 100 million vehicle miles traveled (VMT) for urban facilities with four or more lanes (divided) was 125.01. There were 246 crashes reported to have occurred along Loop 1604 within the project limits in 2012. As the estimated 2012 VMT for the project limits is 357,000, this crash rate is substantially higher than the rate for similar facilities statewide. Approximately 35 percent of the TxDOT-recorded crashes within the project limits between 2008 and 2012 were reported to be intersection-related. Of these intersection-related crashes during this time period, approximately 68

percent occurred at intersections that would be improved with grade separations under the proposed project (Potranco Road, West Military Drive, and Wiseman Boulevard).

# 4.0 PLANNING AND PROGRAMMING STATUS

The proposed action is consistent with the San Antonio-Bexar County Metropolitan Planning Organization's (MPO) 2040 Metropolitan Transportation Plan (MTP), Mobility 2040, and the 2015–2018 Transportation Improvement Plan (TIP), November 2015 revision, (see **Appendix B**). The estimated total project cost is $93,000,000 as of November 2015.

# 5.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The project objectives and environmental issues were a primary focus in the planning, design, and environmental analysis processes. In support of this EA, the following technical reports were prepared and are available for review at the TxDOT San Antonio District office:

TxDOT, 2014a. Socioeconomic Impacts Technical Report.
TxDOT, 2014b. Indirect and Cumulative Impacts Analysis Report.
TxDOT, 2014c. Archeological Resources Background Study.
TxDOT, 2014d. Historical Resources Project Coordination Request.
TxDOT, 2014e. Hazardous Materials Technical Report.
TxDOT, 2015a. Water Resources Technical Report. -
TxDOT, 2015b. Quantitative MSAT Analysis.
TxDOT, 2015c. Traffic Noise Technical Report.
TxDOT, 2015d. Biological Resources Technical Report.
TxDOT, 2015f. Biological Assessment

Based on the above technical studies, scoping, and thorough analysis, it was determined that the proposed project would have no impact on the following resource categories: Farmland; Groundwater; Wetlands; Navigable Waters; Wild and Scenic Rivers; Coastal Coordination; Section 6(f) Properties; and Section 4(f) Properties. Resource categories with the potential to be affected by the implementation of the proposed project are summarized in the following sections.

## 5.1 RIGHT OF WAY/DISPLACEMENTS SUMMARY

The proposed project would require approximately 3.7 acres of new right of way, none of which has been previously acquired through early acquisition (TxDOT 2014a). The proposed project would require new right of way from four parcels, according to data obtained from the Bexar County Appraisal District.

Two of the parcels are zoned as residential. The other two parcels from which right of way would be acquired are undeveloped. One of the parcels is zoned for multifamily residential use; approximately

3.4 acres would be acquired from the 22-acre site. The other undeveloped parcel is zoned as commercial; approximately 0.13 acres of the 0.89-acre site would be acquired.

All right of way acquisition would be completed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The proposed project would not require the displacement of any residences or businesses.

Under the No Build Alternative, no additional right of way would be acquired.

## 5.2 LAND USE SUMMARY

The project area is located on the far northwest side of the city of San Antonio; in the project area, the city limits extend just to the west of Loop 1604. The project area vicinity was annexed by the city beginning in the 1980s, and most development dates from this period or later. Land in the project area vicinity is characterized by a mixture of residential, commercial, and vacant land. The current and proposed ROW does not contain any publicly owned, significant and accessible parks, recreation areas, and wildlife and waterfowl refuges.

The proposed project was evaluated for consistency with local plans, including the City of San Antonio's West/Southwest Sector Plan and Major Thoroughfare Plan/Map. The proposed project is not anticipated to alter the current trend of suburban development in the project area (TxDOT 2014b). The conversion of the existing roadway to a four-lane expressway under the proposed project would be consistent with the City's current Major Thoroughfare Plan.

The implementation of the No Build Alternative would not directly affect land use and would not be inconsistent with local plans.

## 5.3 GROWTH SUMMARY

The City of San Antonio grew by about 16 percent between 2000 and 2010, for a 2010 population of 1,326,528 (TxDOT 2014a). The project area, including some areas outside of San Antonio's city limits, is also growing rapidly. According to the City of San Antonio Department of Planning and Community Development, the City's population increased by about 16 percent between 2000 and 2010 while the two City Council Districts encompassing the project area experienced an increase in population of 21 percent during the same period. The growth rate in Bexar County was even higher than the City of San Antonio, suggesting that growth in Bexar County is concentrated outside of the city limits. The proposed project would accommodate continued growth in the project area by improving mobility for increasing AADT within the project limits.

The selection of the No Build alternative would not directly influence growth patterns, but the project area may become less attractive to development if the roadway congestion continues to increase as the population and AADT grow over time.

## 5.4 SOCIOECONOMIC IMPACTS SUMMARY

### 5.4.1 Economic Impacts

The construction of the proposed project would have a positive impact on the local and regional economies. The investment in the construction industry would result in additional jobs (short-term) and income benefits. Estimations of the proposed project's economic effects can be made using the U.S. Department of Commerce Bureau of Economic Analysis RIMS II Multipliers. When multiplied by the proposed project's estimated construction cost of approximately $69.1M, the RIMS II multipliers produce an estimated direct household earnings effect of $24M and an estimated 486 jobs (TxDOT 2014a). As these positions would be related to the investment in the construction sector, employment effects are expected to last about as long as the construction period for the project. The proposed improvements would also increase mobility, a benefit to project area businesses; however, as discussed in **Section 5.11.1**, the proposed project would not create or increase access along the roadway when compared to the existing condition.

If the No Build Alternative is selected, the predicted economic impacts of the proposed project construction on the local and regional economies would not occur. The household earnings and employment effects expected to be directly supported by the proposed project would also not be realized.

### 5.4.2 Community Impacts

The proposed project would not require any displacements and would not separate or divide neighborhoods. The existing Loop 1604 facility predates most development in the area. The proposed project alignment would be similar to the current condition relative to the location of existing neighborhoods and would not introduce a new barrier or affect neighborhood connectivity or cohesion (TxDOT 2014a). Crossings at major intersections would be maintained, and the proposed project would provide bicycle accommodations and new sidewalks in the project area.

Under the No Build Alternative, community cohesion would also not be affected. New bicycle and pedestrian accommodations would not be constructed.

### 5.4.3 Environmental Justice

An environmental justice analysis was completed in accordance with Executive Order (EO) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." All transportation projects conducted by recipients of federal funds are required to study community impacts for compliance with Title VI, including addressing environmental justice. As TxDOT is a recipient of federal funding from the Federal Highway Administration (FHWA), TxDOT projects address

these topics following FHWA procedures. There are no low-income populations in the project area, based on a comparison of the median household income of project area block groups as reported in the 2008-2012 American Community Survey (ACS) to the 2014 Department of Health and Human Services (DHHS) poverty guideline for a family of four (TxDOT 2014a). The median household income is also above the 2016 DHHS poverty guideline for a family of four, which is $24,300. According to the 2010 Census, minority populations in project area blocks range from 36.9 percent to 100 percent, and 14 of the total 18 populated blocks have a minority population of 50 percent or more (TxDOT 2014a). These blocks are considered minority populations for the purposes of the environmental justice analysis.

Although there are minority populations in the project area, the project would not have adverse community impacts—no displacements, no major changes in access, and no effects to community cohesion. Therefore, the Build Alternative would not cause disproportionately high and adverse effects on minority populations and is consistent with EO 12898.

The No Build Alternative would also not cause disproportionately high and adverse effects on minority populations or low-income populations.

### 5.4.4 Limited English Proficiency

Based on data from the 2008-2012 ACS for project area block groups, the percentage of persons with limited English proficiency (LEP) in the project area ranges from 1.1 percent to 16.0 percent. Overall, 2,486 persons in the project area block groups are considered LEP, representing 12.7 percent of the project area's total block group population over five years old. The language most often spoken by LEP persons in the project area is Spanish (83 percent); 6.3 percent speak Other languages, 5.4 percent speak Asian and Pacific Island languages, and 5.0 percent speak Other Indo-European languages (TxDOT 2014a).

To ensure full and fair public participation, meeting notifications for the open house held March 18, 2014, and the public hearing held October 8, 2014 were published in both and English and Spanish and Spanish-speaking TxDOT and project team representatives were available at the meeting and hearing.

## 5.5 UTILITIES/EMERGENCY SERVICES SUMMARY

The proposed project may require the relocation of underground or overhead utilities. At this stage of the project, the locations of utilities potentially requiring adjustment or relocation have not been identified. Subsurface and overhead utility locating would be an element of the detailed design, and coordination with the utility owners on possible relocation options would take place at that time. Utility relocations and adjustment would be accomplished with the minimum practicable disruption in service to customers.

The project area is served by City of San Antonio Fire Station 45, located east of Loop 1604, off State Highway (SH) 151, at 3415 Rodgers Road. The proposed project would not affect the Loop 1604 interchange with SH 151, and emergency access would be preserved.

The No Build Alternative would not affect utilities or the provision of emergency services.

## 5.6 TRAFFIC AND TRANSPORTATION/PEDESTRIAN AND BICYCLE FACILITIES SUMMARY

There would be minor changes in travel patterns as a result of the proposed project. Traffic from adjacent parcels and intersecting roadways would utilize the frontage roads to access the main lanes of Loop 1604 rather than accessing the main lanes directly. The grade separations at the intersections of Loop 1604 with Potranco Road, Military Drive, and Wiseman Boulevard would make traffic movements more efficient, as through-traffic on Loop 1604 would not have to stop at the intersections.

Route 620 and Route 64 of the San Antonio Metropolitan Transit VIA utilize Loop 1604 and have stops along the roadway. The existing bus service would be maintained along the proposed Loop 1604 frontage roads.

The proposed project would comply with the March 2011 TxDOT "Guidelines Emphasizing Bicycle and Pedestrian Accommodations" and the March 11, 2010, U.S. Department of Transportation (DOT) Policy Statement on Bicycle and Pedestrian Accommodations, Regulations and Recommendations. The proposed project would include 6-foot wide sidewalks on the outside of the proposed frontage roads and would accommodate bicycle traffic with a 15-foot outside, shared-use lane on the frontage roads.

There would be no changes in access under the No Build Alternative; new bicycle and pedestrian accommodations would not be constructed.

## 5.7 VISUAL/AESTHETICS SUMMARY

The proposed project would generally follow the existing alignment of Loop 1604 and would primarily be contained within the existing right of way corridor. The construction of grade separations at Potranco Road, West Military Drive, and Wiseman Boulevard could potentially make portions of the roadway more visible from the surrounding area, although the line of sight would likely be below existing utility lines and the tree line. The relationship between the transportation facility and the surrounding environment under the Build Alternative would not be substantially different visually or aesthetically than the existing condition.

The No Build Alternative would not change the existing visual and aesthetic qualities in the project area.

## 5.8 CULTURAL RESOURCES SUMMARY

Evaluation of cultural resources for the proposed project have been conducted in accordance with TxDOT's Memorandum of Understanding (MOU) with the Texas Historic Commission (THC) (13 Texas Administrative Code §26.25) and the First Amended Programmatic Agreement among FHWA, TxDOT,

the Texas State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU).

### 5.8.1 Archeological Resources

Based on the results of the archeological background study, the proposed project will have no effect on archeological historic properties and no further archeological investigations are needed. An archeological background study of the area of potential effect (APE) determined it is unlikely any archeological historic properties are in the APE (TxDOT 2014c). A finding of No Effect on archeological historic properties was issued on April 9, 2014, under terms of the MOU and the PA-TU. The proposed project will not affect any cemeteries. Based upon the results from public involvement, there is no controversy regarding project effects on archeological sites and cemeteries.

The No Build Alternative would have no impacts on archeological resources in the project area.

### 5.8.2 Historic Resources

Based on the results of a Historical Studies Project Coordination Request (TxDOT 2014d), which included a review of the National Register of Historic Places (NRHP), the list of State Archeological Landmarks (SAL), and the list of Recorded Texas Historic Landmarks (RTHL), no historically significant resources have been previously documented within the APE. It has been determined that the APE for the proposed project is the current right of way and 150 feet beyond the right of way. A site visit and subsequent investigation has determined that there are no historic properties located within the project APE.

A finding of No Effect on historic properties was issued on March 3, 2014, under terms of the MOU between TxDOT and the THC. Individual project coordination with the State Historic Preservation Officer (SHPO) is not required under the terms of the PA-TU.

The No Build Alternative would not affect historic properties listed on or eligible for listing on the National Register of Historic Places.

## 5.9 PHYSICAL ENVIRONMENT SUMMARY

### 5.9.1 Water Quality

*Sections 404 and 401 of the Clean Water Act: Waters of the U.S. and Water Quality Certification*

As detailed in the Water Resources Technical Report (TxDOT 2015a), no potential wetland sites were observed in the field; however, two potential waters of the U.S. were identified within the proposed project limits. These include Caracol Creek and an unnamed tributary to Caracol Creek. Preliminary drainage design indicates that Caracol Creek would be channelized from the existing culvert at Loop 1604 west to a point downstream of Potranco Road matching a channel improvement project being implemented by Bexar County independent of the Loop 1604 project. The new proposed southbound frontage road and main lanes would then be bridged over the channelized portion of Caracol Creek. The

drainage design at the unnamed tributary to Caracol Creek would include the expansion of the existing box culverts under the proposed southbound frontage road and main lanes.

As also detailed in the Water Resources Technical Report (TxDOT 2015a), approximately 503 linear feet and 0.46 acre of Caracol creek and 267 linear feet and 0.33 acre of the unnamed tributary to Caracol Creek would be permanently impacted by the construction of the proposed project. The placement of permanent dredge or fill material into potentially jurisdictional waters of the U.S. would be authorized under a United States Army Corps of Engineers (USACE) Nationwide Permit (NWP) 14. Temporary fills, if necessary, would be removed in their entirety and the affected area returned to pre-construction elevations, and revegetated as appropriate. Because the proposed permanent impacts would exceed 0.10 acre, a preconstruction notification (PCN) for NWP 14 would be required for each feature.

The proposed project would be authorized under a USACE Section 404 NWP; therefore construction activities would require compliance with the State of Texas Water Quality Certification Program. Compliance with Section 401 of the Clean Water Act requires the use of Best Management Practices (BMPs) to manage water quality on sites affecting jurisdictional waters. The 401 Certification requirements for a NWP 14 would be met by implementing BMPs from the Texas Commission on Environmental Quality's (TCEQ) 401 Water Quality Certification Conditions for NWPs. These BMPs would address each of the following categories: 1) erosion control, 2) post construction total suspended solids (TSS) control, and 3) sedimentation control. Water quality BMPs that would be implemented include the following:

- Approved temporary vegetation
- Blankets/matting or mulch filter berms
- Vegetated filter strips
- Silt fence, sand bag and/or compost filter berms and socks

Under the No Build Alternative, there would be no fill impacts to waters of the U.S. or project-related erosion, sedimentation, or runoff impacts to project area waterways.

*Section 303(d) of the Clean Water Act*

The State of Texas is required, under Sections 305(b) and 303(d) of the federal Clean Water Act (CWA), to prepare biennial statewide water quality assessments that identify the status of use attainment for water bodies, and to identify water bodies for which effluent limitations are not stringent enough to implement water quality standards. Based on the assessments, the areas of potential effect are accounted for on the 303(d) list. According to the provisions of the TxDOT-TCEQ MOU, coordination with TCEQ is required for environmental review documents if all or part of the project is within five miles of an impaired assessment unit and in the same watershed as the project.

The proposed project is within five miles and within the same watershed of impaired assessment unit 1906_05 in Segment 1906, Lower Leon Creek (TxDOT 2015a). This unit is listed as threatened/impaired for depressed dissolved oxygen and polychlorinated biphenyls (PCBs) in edible tissue on the 2012 303(d)

list. This impaired assessment unit does not have an Environmental Protection Agency (EPA)-approved Total Maximum Daily Load (TMDL). The project and associated activities would be implemented, operated, and maintained using the BMPs described above to control the discharge of pollutants from the project site.

As the project is within five miles of, and within the same watershed as, an impaired assessment unit, coordination with TCEQ was conducted. This coordination concluded on September 4, 2014; TCEQ did not have any comments on the proposed project.

Under the No Build Alternative, there would be no impacts to the project area impaired assessment unit.

### 5.9.2 Floodplains

As detailed in the Water Resources Technical Report (TxDOT 2015a), portions of the proposed project are located within a Federal Emergency Management Agency (FEMA) designated 100-year floodplain. The hydraulic design for this project would be in accordance with current FHWA and TxDOT design policies. The facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the facility, stream or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. Coordination with the local Floodplain Administrator would be required.

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

### 5.9.3 Hazardous Materials

A review of environmental regulatory databases and an Initial Site Assessment (ISA) was performed in November and December 2013 to identify sites or facilities that might pose a potential for hazardous materials impacts to the proposed project (TxDOT 2014e). A total of 19 records at eight sites were identified in the regulatory database search. An evaluation of the sites in the project area that were identified in the database searches found that all of the site-specific hazardous materials issues are expected to have a low potential for impacts. Two leaking underground storage tanks were identified, but the sites are located at least 0.5 mile outside the right of way and the TCEQ has issued final concurrence on the closure of the cases. The other sites are also outside of the right of way and are considered low-risk types of sites (for example, Resource Conservation and Recovery Information System Generators).

During the field visit for the ISA, several trash dump locations were identified along the vehicle access road that exists along the western limit of the existing right of way. At least 24 trash dump locations were identified during the field survey (TxDOT 2014e). The materials in the dump sites generally consist of household demolition material (tile, roofing shingles, counters, fencing materials, PVC piping, sheet rock, shower enclosures, concrete, brick, and wood), household trash, paint cans, brick, and brush. All trash and debris would require proper transportation and disposal during right of way clearing activities.

Asbestos-containing material (ACM) may be present within some materials within the dump sites. A survey for the presence of ACM is recommended for the materials within the dump sites prior to relocation or disposal.

No impacts to potential hazardous materials sites would occur from construction if the No Build Alternative were selected.

### 5.9.4 Air Quality

The project is located in Bexar 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. As the proposed project is not adding capacity in a nonattainment or maintenance area of the state, coordination with TCEQ for air quality is not required.

A quantitative analysis provides a basis for identifying and comparing the potential differences among mobile source air toxics (MSAT) emissions, if any, from the various alternatives. The quantitative assessment (TxDOT 2015b) presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

For each alternative in this document, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables, such as fleet mix, are the same for each alternative. The VMT estimated for the Build Alternative is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would not lead to higher MSAT emissions for the Build Alternative relative to the No Build in this case because the VMT increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES model, emissions of all of the priority MSAT decrease as speed increases. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the Build Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be constructed for the Build Alternative along Loop 1604 north

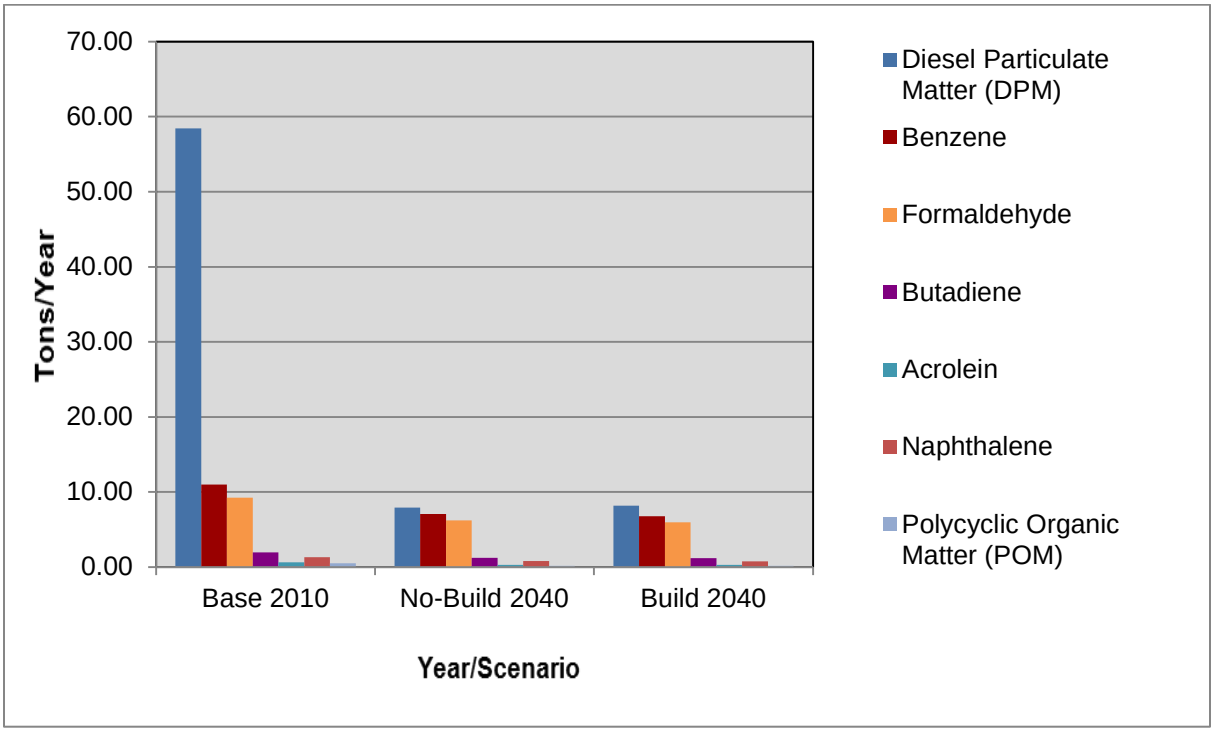
of SH 151 to FM 471. However, the magnitude and the duration of these potential increases compared to the No Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

For the Loop 1604 project MSAT modeling, a base year of 2010 and a design year of 2040 were used; no interim year was chosen for analysis. The numeric results of the MSAT modeling are shown below in **Table 5.9-1**. These results are represented graphically in **Illustration 1**, which shows emissions for each primary MSAT for each affected network (i.e., base year and design year for Build and No Build scenarios), and **Illustration 2**, which shows total MSAT emissions as compared to total vehicle VMT for each affected network.

| Table 5.9-1 MSAT Emissions by Alternative (Tons/Year) | | | | | |
|---|---|---|---|---|---|
| Compound | Year/Scenario | | | Percent Change 2010-2040 | |
| | 2010 Base Year | 2040 Design Year | | No Build | Build |
| | | No Build | Build | | |
| Diesel Particulate Matter (DPM) | 58.448 | 7.929 | 8.190 | -86% | -86% |
| Benzene | 10.981 | 7.074 | 6.775 | -36% | -38% |
| Formaldehyde | 9.224 | 6.219 | 5.957 | -33% | -35% |
| Butadiene | 1.953 | 1.199 | 1.158 | -39% | -41% |
| Acrolein | 0.629 | 0.281 | 0.269 | -55% | -57% |
| Naphthalene | 1.309 | 0.774 | 0.737 | -41% | -44% |
| Polycyclic Organic Matter | 0.478 | 0.165 | 0.158 | -65% | -67% |
| **Total MSAT (Tons)** | **83.022** | **23.640** | **23.244** | **-72%** | **-72%** |
| **Total VMT (Miles/Year)** | **1,377,966,766** | **3,408,762,986** | **3,533,279,764** | **147%** | **156%** |

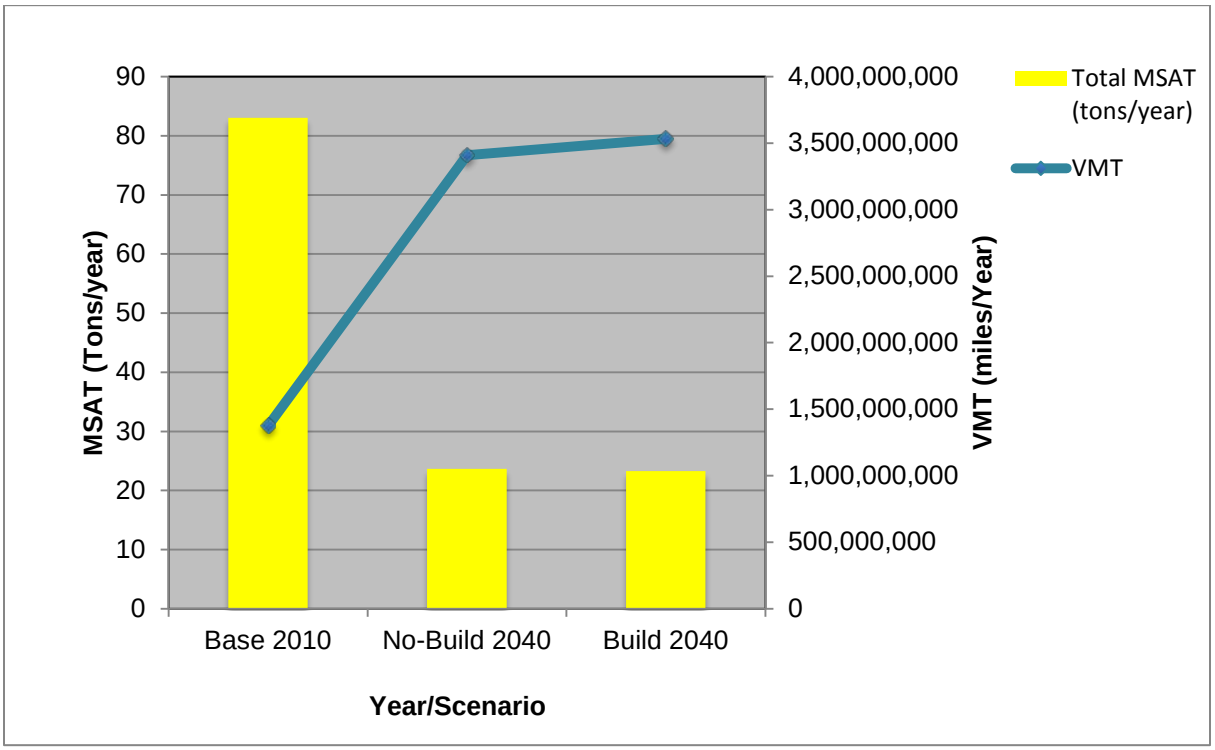
Source: Alamo Area MPO data and Loop 1604 EA Study Team 2015.

**ILLUSTRATION 1: Projected Changes in MSAT Emissions By Project Scenario Over Time**




Source: Alamo Area MPO data and Loop 1604 EA Study Team 2015.

**ILLUSTRATION 2: Total MSAT Emissions and Vehicle Miles Traveled By Alternative (Tons/Year)**




Source: Alamo Area MPO Data and Loop 1604 EA Study Team 2015.

The analysis indicates a decrease in total MSAT emissions can be expected for both the Build and No Build Alternatives (2040) relative to the base year (2010). Emissions of total MSAT are predicted to decrease by approximately 72% in the 2040 Build Alternative compared with 2010 levels.

Of the seven priority MSAT compounds, DPM contributes the most to the emissions total in 2010 as well as in 2040 (see **Table 5.9-1** and **Illustration 1**). In future years, a substantial decline in DPM is anticipated (86% reduction from 2010 to 2040 Build and No Build Alternatives). The amount of benzene is expected to decrease by 38% for the 2040 Build Alternative and 36% for the 2040 No Build.

When total emissions are plotted over time, a substantially decreasing level of MSATs can be seen (**Illustration 2**) while overall VMT continues to rise. The 2040 Build Alternative is expected to generate a 72% decrease in total MSAT emissions while the total VMT increases by 156%; the 2040 No Build Alternative has a similar 72% decrease in total MSAT and a 147% increase in VMT.

*Traffic Air Quality Analysis*

Design year (2037) traffic for this project is 155,400 vehicles per day therefore triggering the need for a traffic air quality analysis (TxDOT 2015b). Topography and meteorology of the area in which the project is located would not seriously restrict dispersion of the air pollutants. The traffic data used in the analysis was obtained from TxDOT's Transportation Planning and Programming Division for the

estimated time of completion year (2017) and design year (2037); 2017 traffic is estimated to be 95,700 vehicles per day while 2037 traffic is estimated to be 155,400 vehicles per day. These traffic volumes correspond to the section between SH 151 and FM 471, which is projected to be the highest volume portion of the project area.

Carbon monoxide concentrations for the proposed action were modeled using the CALINE3 and MOVES2010B models and factoring in adverse meteorological conditions and sensitive receptors at the right of way line in accordance with the TxDOT Air Quality Guidelines. Local concentrations of carbon monoxide are not expected to exceed national standards (see **Table 5.9-2**).

**Table 5.9-2 Projected Carbon Monoxide Concentrations**

| Year | 1-hour CO Standard 35 ppm | 1-hour % NAAQS | 8-hour CO Standard 9 ppm | 8-hour % NAAQS |
|---|---|---|---|---|
| 2017 | 2.5 | 7.1% | 1.6 | 17.8% |
| 2037 | 2.5 | 7.1% | 1.6 | 17.8% |

Note: The National Ambient Air Quality Standard (NAAQS) for CO is 35 ppm for one-hour and 9 ppm for eight hours. Analysis includes a one-hour background concentration of 1.7 ppm and an 8-hour background concentration of 1.1 ppm.

### 5.9.5 Traffic Noise

A traffic noise analysis was conducted for the proposed project in accordance with TxDOT's (FHWA approved) 2011 *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (TxDOT 2015c). The traffic noise analysis determined that there would be traffic noise impacts at six modeled receivers, representing 22 impacted receivers.

Three of the impacted receivers represent ten impacted single-family residences within the Westcreek Oaks subdivision located on the west side of Loop 1604 between West Military Drive and Potranco Road. Two separate noise walls were modeled along the Loop 1604 right of way at a height of eight feet. These noise walls would be both feasible and reasonable and are therefore proposed for incorporation into the project. The other three impacted receivers represent 12 impacted receivers within the Westover Hills Apartments located on the east side of Loop 1604, south of Wiseman Boulevard. A noise wall was modeled along the Loop 1604 right of way at a height of 16 feet. This wall would be acoustically feasible, however, the construction of this wall is not practicable and is not proposed for inclusion in the project for several reasons: 1) the proximity of underground utilities, 2) an existing retaining wall and 3) foundations for the Westover Hills Apartment complex.

A traffic noise workshop was held on February 5, 2015, with the property owners adjacent to the proposed walls to determine whether the adjacent owners would, by majority vote, opt for the walls to be incorporated into the final design. The adjacent property owners in the Westcreek Oaks subdivision by simple majority vote have elected to have noise walls constructed and TxDOT would include these as part of the project.

Under the No Build Alternative, the proposed project would not be constructed. Traffic noise levels at modeled receiver locations would be expected to increase due to the increase in traffic volumes.

## 5.10 BIOLOGICAL ENVIRONMENT SUMMARY

### 5.10.1 Vegetation

The Biological Resources Technical Report (TxDOT 2015d) describes thirteen different vegetation communities that were mapped within and adjacent to the proposed project area. These are shown below in **Table 5.10-1**.

**Table 5.10-1 Vegetation Within the Proposed Project Area**

| Vegetative Community | MOU Vegetation Type[1] | Vegetation Within the Existing Right of way (acres) | Vegetation Within the Proposed Right of way (acres) | Total Area (acres) |
|---|---|---|---|---|
| Barren | Agriculture | 0.00 | 0.00 | 0.00 |
| | | | Agriculture Total | 0.00 |
| Disturbance Grassland | Disturbed Prairie | 63.17 | 0.00 | 63.17 |
| | | | Disturbed Prairie Total | 63.17 |
| Floodplain: Disturbance Grassland | Floodplain | 0.01 | 0.00 | 0.01 |
| | | | Floodplain Total | 0.01 |
| Live Oak/Ashe Juniper Savannah | Edwards Plateau Savannah, Woodland, and Shrubland | 1.03 | 0.00 | 1.03 |
| Live Oak/Ashe Juniper Woodland | Edwards Plateau Savannah, Woodland, and Shrubland | 21.49 | 0.00 | 21.49 |
| Mesquite/Live Oak Savannah | Edwards Plateau Savannah, Woodland, and Shrubland | 26.19 | 0.00 | 26.19 |
| Mesquite/Live Oak Woodland | Edwards Plateau Savannah, Woodland, and Shrubland | 1.10 | 0.00 | 1.10 |
| | | | Edwards Plateau Savannah, Woodland, and Shrubland Total | 49.81 |
| Mixed Brush | Scrub, Thornscrub, Shrubland | 0.14 | 3.57 | 3.71 |
| | | | Scrub, Thornscrub, Shrubland Total | 3.71 |
| Riparian Herbaceous | Riparian | 2.29 | 0.00 | 2.29 |
| Riparian Hardwood | Riparian | 1.86 | 0.00 | 1.86 |
| | | | Riparian Total | 4.15 |
| Mowed and Maintained Right of Way | Urban | 98.48 | 0.00 | 98.48 |
| Urban High Intensity | Urban | 87.34 | 0.00 | 87.34 |
| Urban Low Intensity | Urban | 4.82 | 0.13 | 4.95 |
| | | | Urban Total | 190.77 |

Source: Loop 1604 EA Study Team 2015.

Additionally, unusual vegetation features or special habitat features occurring within the proposed project area were identified and described during field investigations in accordance with the 2013 TxDOT-Texas Parks and Wildlife Department (TPWD) MOU. Unusual vegetation features identified during field investigations include unmaintained vegetation, fencerow vegetation, trees that are ecologically significant or locally important and riparian vegetation. Special habitat features identified during field investigations include bottomland hardwoods, water bodies, and a bluff. These features are described in detail in the Biological Resources Technical Report (TxDOT 2015d).

Impacts to vegetation would be avoided or minimized by limiting disturbance to only that which is necessary to construct the proposed project. The removal of native vegetation, particularly mature native trees and shrubs, would be avoided to the greatest extent practicable. An approved seed mix would be used in the landscaping and revegetation of disturbed areas.

The Threshold Table Programmatic Agreement groups vegetation types into broader MOU types and sets a disturbance threshold for each type by ecoregion that, if met or exceeded, triggers coordination with the TPWD. For projects that have vegetation impacts in multiple ecoregions and the thresholds differ between these regions for a single MOU type, the average of the thresholds for that MOU type is used to determine coordination requirements with the TPWD. A review of the Threshold Table Programmatic Agreement determined that vegetation within the proposed project falls into six MOU types:

- Disturbed Prairie
- Floodplain
- Edwards Plateau Savannah, Woodland, and Shrubland
- Scrub, Thornscrub, Shrubland
- Riparian
- Urban

As shown above on **Table 5.10-1**, Disturbed Prairie consists of the disturbance grassland vegetation type; Floodplain consists of the floodplain: disturbance grassland vegetation type; Edwards Plateau Savannah, Woodland, and Shrubland consists of the live oak/Ashe juniper savannah, live oak/Ashe juniper woodland, mesquite/live oak savannah and mesquite/live oak woodland vegetation types; Scrub, Thornscrub, Shrubland consists of the mixed brush vegetation type; Riparian consists of the riparian herbaceous and riparian hardwood vegetation types; and Urban consists of the mowed and maintained right of way, urban high intensity and urban low intensity vegetation types. Based on an average of the Edwards Plateau and the Blackland Prairies Ecoregions disturbance thresholds, the Threshold Table Programmatic Agreement sets a disturbance threshold of 2.5 acres for Disturbed Prairie; 0.5 acre for Floodplain; 2.0 acres for Edwards Plateau Savannah, Woodland, and Shrubland; 2.0 acres for Scrub, Thornscrub, Shrubland; and 0.1 acre for Riparian. There is no threshold for Urban. Vegetation impacts quantified on **Table 5.10-1** show that the proposed project would exceed the relevant threshold for all MOU types except Floodplain. Coordination between TxDOT and TPWD was initiated on October 8, 2014, and TPWD responded on November 20, 2014.

If the No Build Alternative were implemented, the proposed project would not be constructed. No effects to vegetation and wildlife habitat related to the construction of the project would occur. Existing land use and activities, including periodic mowing and cultivation, would continue to periodically affect vegetation communities.

### 5.10.2 Wildlife

*Migratory Bird Treaty Act (MBTA)*

Migratory birds were observed during November 21, 2013, field investigations and may arrive in the project area to breed during construction of the proposed project. Appropriate measures would be taken to avoid adverse impacts on migratory birds (see **Section 8.1**).

Migratory birds protected under the Migratory Bird Treaty Act would not be impacted by the No Build Alternative.

*Fish and Wildlife Coordination Act (FWCA)*

The proposed project would be authorized under a USACE Section 404 NWP; therefore, no coordination under the FWCA would be required.

### 5.10.3 Threatened and Endangered Species

*Federally-listed Species*

As detailed in the Biological Resources Technical Report (TxDOT 2015d), desktop analysis and field investigations conducted in November/December 2013 indicated that potential habitat for four federally- listed endangered species occurs in the vicinity of the proposed project. Two of these are karst invertebrates, the Bracken Bat Cave meshweaver (*Cicurina venii*) and a ground beetle (*Rhadine infernalis*). Additionally, designated critical habitat for *R. infernalis* occurs directly adjacent to the proposed project and within the existing right of way of Loop 1604 in Caracol Creek Coon Cave. This area has been designated as Critical Habitat Unit (CHU) 16 by the US Fish and Wildlife Service (USFWS). In addition to the two karst invertebrates, the Biological Resources Technical Report (TxDOT 2015d) indicated that potential habitat for two federally-listed endangered birds, the Black-capped Vireo (*Vireo atricapilla*) and the Golden-cheeked Warbler (*Setophaga chrysoparia*), occurred in the vicinity of the proposed project. A subsequent TxDOT re-survey of the action area in 2015 determined that Golden-cheeked Warbler habitat was no longer present due to ongoing development. As neither Golden-cheeked Warbler habitat nor individuals were encountered, it was determined that the proposed action would have ***no effect*** on this species (TxDOT 2015f).

<u>Karst Invertebrates</u>

In accordance with USFWS regulations for projects proposed in potential habitat for listed karst species (USFWS 2011), a karst feature survey was performed within the proposed right of way to identify

species habitat in late December 2013, early January 2014 (TxDOT 2015d). Previous surveys of the existing right of way were conducted in 2010 and 2011 (TxDOT 2015d and 2015f).

The project area is within the range of the unnamed ground beetle, *R. infernalis* and this species is known to occur in Caracol Creek Coon Cave adjacent to the project area; however, the species was not documented in any of the other features surveyed. An unidentified immature eyeless Cicurina was collected from Feature 1604-Z01 and may represent *C. venii* (Zara 2014). Although direct impacts resulting from excavation activities are restricted to areas outside of the subsurface drainage basin of known occupied features and CHU 16, previously undetected karst voids containing listed karst invertebrate species or habitat may be encountered during ground disturbing activities. Other direct impacts are anticipated within the cricket foraging area (345 feet) surrounding Feature 1604-Z01. Because of this, the project ***may affect***, ***and is likely to adversely affect***, *R. infernalis* and *C. venii*. The proposed project would not adversely modify CHU 16. A Biological Assessment (BA) for these species was developed and was submitted to the USFWS to initiate formal consultation under Section 7 of the Endangered Species Act (TxDOT 2015f). A Biological Opinion (BO) was provided by the USFWS on February 18, 2016 (USFWS 2015; see **Appendix C**).

The BA presents the anticipated impacts of the proposed project on the *R. infernalis* and *C. venii* and proposes conservation measures that would be implemented during project design, during construction, as well as other range-wide conservation measures. The USFWS BO, dated February 18, 2016, concluded that the action, as proposed, is not likely to jeopardize the continued existence of *R. infernalis* and *C. venii*, nor result in the adverse modification or destruction of designated critical habitat. The incidental take of all *R. infernalis* and *C. venii* in any karst features underlying the 710 acre action area, in the form of harm or harassment, may occur as a result of the proposed project. The USFWS determined that this level of anticipated take is not likely to jeopardize the continued existence of *R. infernalis* and *C. venii*, and would not result in destruction or adverse modification of designated critical habitat within CHU 16 for *R. infernalis*. Several reasonable and prudent measures will be implemented to minimize the impacts. Conservation measures proposed for the federally-listed karst invertebrates are presented in **Section 8.2** (Commitments for) Threatened and Endangered Species and in further detail in the BA and BO (see **Appendix C)**.

Black-capped Vireo

Marginal habitat for this species occurs in the vicinity of the proposed project. Habitat within the proposed project area is generally of low quality in part due to the urbanization, fragmentation and past and present land uses (see the Biological Resources Technical Report [TxDOT 2015d] for detailed habitat descriptions). Presence/absence surveys for this species was conducted in 2009, 2010, and 2011 along the entire length of the proposed project area, including a 500 foot buffer on either side, where potential habitat areas were identified (Blanton and Associates 2011). A single migratory male was heard within the project area during presence/absence surveys in 2009. No Black-capped Vireos were observed during 2010 surveys. TxDOT conducted an additional presence/absence survey during the 2015 breeding survey (TxDOT 2015e). No Black-capped Vireos were detected. Given the low quality of

potential habitat, urbanization of the area and the negative findings of three years of recent surveys, the proposed project ***may affect***, ***but is not likely to adversely affect*** this species. The potential effects for this species were included in the BA submitted to the USFWS for review. The USFWS BO, dated February 18, 2016, concurred that the action, as proposed, ***may affect***, ***but is not likely to adversely affect*** this species (USFWS 2015). Conservation measures proposed for the Black-capped Vireos are presented in **Section 8.2** (Commitments for) Threatened and Endangered Species and in further detail in the BA and BO (see **Appendix C**).

The No Build Alternative would not result in effects to any federally-listed threatened, endangered, or rare species.

*State-listed Species*

Potential habitat for one state-listed threatened reptile species, the Texas horned lizard (*Phrynosoma cornutum*), was identified within the proposed project area. In accordance with TPWD regulations and the BMPs Programmatic Agreement between TxDOT and TPWD, contractors would be advised of the potential occurrence of this species in the project area and care would be taken to avoid direct harm. Additionally, this species' primary food source is harvester ants. Though no harvester ant mounds were observed during field investigations, they should also be avoided to the extent practicable if they are observed during the selection of Project Specific Locations and construction-related activities.

*Species of Greatest Conservation Need*

Additionally, there is suitable habitat within the project area for eight other species that are considered Species of Greatest Conservation Need (SGCN) by the State of Texas. The TPWD tracks these species as rare resources, though they have no formal regulatory status. These include three plant species, big red sage (*Salvia pentstemonoides*), Correll's false dragon-head (*Physostegia correllii*), and Hill country wild-mercury (*Argythamnia aphoroides*); two reptile species, the spot-tailed earless lizard (*Holbrookia lacerata*) and the Texas garter snake (*Thamnophis sirtalis annectens*) and three mammal species, the cave myotis bat (*Myotis velifer*), ghost bat (*Mormoops megalophylla*) and plains spotted skunk (*Spilogale putorius interrupta*).

In accordance with the BMPs Programmatic Agreement between TxDOT and TPWD, contractors would be advised of the potential occurrence of the spot-tailed earless lizard, Texas garter snake and plains spotted skunk in the project area and care would be taken to avoid direct harm to these species as well as unnecessary impacts to skunk dens, if encountered. Impacts to the cave myotis and ghost bats would be avoided or minimized by implementing the following BMPs:

- During construction, appropriate measures, including exclusion or timing of activities in the immediate vicinity of a colony, would be implemented as practicable. For maternity colonies, exclusion activities would be timed to avoid the spring/summer breeding season to the extent practicable to avoid separating lactating females from nursing pups.

- Structures or features used by bats that would be removed as a result of construction would be replaced by structures that incorporate bat-friendly design or artificial roosts would be constructed to replace these structures as practicable.

State-listed threatened, endangered, or rare species would not be impacted by the No Build Alternative.

## 5.11 INDIRECT AND CUMULATIVE IMPACTS SUMMARY

The indirect and cumulative impacts analysis for the proposed project was developed using TxDOT's September 2010 *Revised Guidance on Preparing Indirect and Cumulative Impact Analyses*, which is based on the 2002 National Cooperative Highway Research Program (NCHRP) Report 466 entitled *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects.* A separate technical report has been developed to document the analysis of the potential indirect and cumulative effects of the proposed project. This separate technical report (TxDOT 2014b) is on file at the TxDOT San Antonio District office.

### 5.11.1 Indirect Impacts

The indirect effects of the proposed project were identified using a planning judgment approach supported by the planning assumptions and predictions made by the San Antonio-Bexar County MPO in the 2035 MTP. The proposed project is not intended to serve an explicit economic development purpose, nor is it planned to serve a specific land development. The proposed improvements include construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations. These improvements would serve to improve mobility and maintain safety for the traveling public. However, when compared to the existing condition, no new access would be created and no major changes in access to adjacent land uses (either developed or undeveloped) would result from the proposed project.

The Area of Influence (AOI) for the proposed project is bounded to the west by the San Antonio city limits (see **Figure 4**). This boundary was delineated based on the development plans described in the City of San Antonio's Comprehensive Plan Framework (2011, A-25) and Master Plan Policies (1997, 9), which cite goals to encourage future growth to occur inside the city limits. The AOI boundary is also consistent with the San Antonio-Bexar County MPO's combined transit-oriented development/infill development growth scenario, in which the majority of future growth is anticipated to occur within the city limits. The western boundary of the AOI also encompasses the North San Antonio Hills neighborhood and Alamo Ranch Market toward the northern project terminus. The boundary then turns east to follow the southern bank of Culebra Creek, incorporating the commercial development located directly north of the proposed project terminus. The eastern portion of the AOI follows Rogers Road to encompass the Culebra Market shopping center and continues south to Wiseman Boulevard, after which it follows the eastern boundary of the Oak Creek Estates neighborhood. From here, the AOI follows the boundaries of residential and commercial developments with direct access to Loop 1604, incorporating undeveloped land along a tributary to Medio Creek. South of the project area, the AOI

boundary follows the creek west across Loop 1604 to meet with the city limits on the west side of the roadway.

The temporal boundary for the indirect effects analysis extends from 2015 (the year construction would begin) to 2035, the planning horizon for the San Antonio-Bexar County MPO's current MTP.

*Encroachment-Alteration Effects*

Potential encroachment-alteration effects to socioeconomic resources were evaluated based on changes to the condition of the local and regional economies, to employment, and to community resources. The indirect effects analysis determined that no substantial encroachment-alteration effects to socioeconomic resources would be anticipated to occur as a result of the proposed project (TxDOT 2014b).

Encroachment-alteration effects to ecological resources were evaluated in terms of potential impacts to water resources and wildlife habitat and vegetation, including habitat for threatened and endangered species. Surface and ground water resources would potentially undergo encroachment-alteration effects as a result of increased impervious cover within the project area, which could lead to increased non-point source (vehicle-related) pollution from runoff during rain and flooding events. In addition, increased localized erosion as a result of roadway placement and vegetation removal could contribute to minor increases in sediment loads within project area watersheds. The 2012 303(d) list approved by the TCEQ indicates that one impaired assessment unit is located within five miles of the AOI and within the same watershed: unit 1906_05 in Segment 1906, Lower Leon Creek. However, the proposed project would contribute a relatively minor amount of impervious cover within the project area, and implementation of appropriate BMPs would control constituents of concern at these locations. In addition, appropriate implementation of state and federal regulatory controls (including the Texas Water Code and Clean Water Act) would further minimize impacts to water resources. Portions of the AOI are located over the Artesian Zone of the Edwards Aquifer (considered by the EPA as a sole-source aquifer for Region 6). However, the AOI is not located within the Edwards Aquifer Recharge, Contributing, or Transition Zones as defined and monitored by the TCEQ and Edwards Aquifer Protection Program. The indirect impacts analysis determined that encroachment-alteration effects to surface and ground water resources would not be substantial (TxDOT 2014b).

The majority of the proposed project would be constructed within the existing right of way, with a total of 3.7 acres of new right of way required for construction. Encroachment-alteration effects to vegetation and to wildlife habitat in the form of habitat fragmentation during vegetation clearing would be expected to be minimal. These minimal effects could occur in areas that serve as habitat for threatened and endangered species, including the state-listed threatened Texas horned lizard and nine federally-listed endangered karst invertebrates (see **Section 5.10.3**). However, when considered within the context of the carrying capacity of the ecosystem, encroachment-alteration effects to potential habitat for the Texas horned lizard would not be substantial (TxDOT 2014b). Karst features surveys conducted in 2014 indicated that potential habitat for two federally listed karst species, the Bracken Bat

Cave meshweaver and *R. infernalis*, exists within the project area and therefore within the AOI. However, the proposed project would not adversely modify critical habitat for these species.

Potential habitat for the federally-listed Black-capped Vireo occurs in the vicinity of the proposed project area within the AOI. However, no instances of the species were recorded during presence/absence surveys conducted in 2010 and 2015 along the entire length of the proposed project area, including a 500-foot buffer on either side (Blanton and Associates 2010). Moreover, as discussed in the Biological Resources Technical Report (TxDOT 2015d), habitat in the project area is considered to be of low quality and has been previously affected by urbanization of the area, and no direct effects are anticipated to occur as a result of the proposed project. Therefore, no encroachment-alteration effects are anticipated to occur with regard to potential habitat for the Black-capped Vireo.

*Induced Growth Effects*

The proposed improvements to the existing facility may serve to further increase attractiveness within the AOI by improving mobility; however, the proposed project would not create or increase access to adjacent land uses when compared to the existing condition. Ongoing development in west and northwest San Antonio demonstrates that the condition of the existing facility does not prevent continued development from occurring. When considered within the context of recent growth, the proposed project would not change the course of development trends in this area. The nature of the proposed project (modifications to an existing highway in an already-developing area) indicates that the proposed improvements would not induce growth within the AOI.

### 5.11.2 Cumulative Impacts

Resources included in the cumulative effects analysis were identified based on the direct and indirect impacts identified as a result of the proposed project; the current health of each resource; and past, present, and reasonably foreseeable future actions anticipated to occur within the area. Following consideration of these criteria, it was determined that analysis of the cumulative effects to water resources and threatened and endangered species (including the state-listed threatened Texas horned lizard and nine federally-listed endangered karst invertebrates) was warranted. These potential effects were analyzed within specific Resource Study Areas (RSAs), defined as the Leon Creek and Lower Medina River Watersheds for water resources, the two watersheds traversed by the project area and underlain by the Edwards Aquifer (see **Figure 5**), and Bexar County for threatened and endangered species (see **Figure 6**). Bexar County provides a large enough RSA to account for potential project effects and coincides with the boundaries for which threatened and endangered species information is collected and distributed by the USFWS and TPWD. This also allows for the use of a general RSA to account for all threatened and endangered species potentially affected by the proposed project. The temporal boundaries for these RSAs extend from 1980, the approximate date in which development began to spread into the west and northwest portions of San Antonio toward Loop 1604, to 2035, the planning horizon year for the San Antonio-Bexar County MPO's 2035 MTP.

As detailed in the Indirect and Cumulative Impacts Analysis Report (TxDOT 2014b), cumulative effects on water resources would be primarily related to increases in impervious cover and altered hydrology associated with construction of the proposed project as well as future transportation and development projects. The TCEQ reports two impaired stream segments within the RSA on its 2012 303(d) List: Segment 1903, the Medina River below Medina Diversion Lake; and Segment 19806, lower Leon Creek. Both of these impaired segments are currently being monitored and further decline of the health of these resources is not anticipated. While the health of these specific resources (impaired segments) is considered to be impaired, water resources within the much larger RSA are not considered to be in decline (e.g., stable) and are in good health overall.

Increased runoff into receiving waters as a result of increased impervious cover and altered hydrology could negatively affect both surface and ground water quality; however, the proposed project would contribute a relatively minor amount of impervious cover within the RSA, and it is not anticipated that the proposed project would alter the currently stable condition of water resources. Anticipated shifts in development trends, such as the transit-oriented/infill development scenario adopted by the San Antonio-Bexar County MPO, would encourage maximization of existing infrastructure and, as a result, would be expected to temper increases in impervious cover and altered hydrology resulting from construction of new transportation facilities and development independent of the proposed improvements. In addition, the proposed project would be constructed in full compliance with state and federal requirements, and BMPs would be implemented to further minimize potential degradation of water resources. In light of the stable health of the water resource within the RSA and the minimization measures discussed above, cumulative impacts to water quality would not be expected to be substantial (TxDOT 2014b).

Within the threatened and endangered species RSA, a total of 225,700 acres of vegetation could serve as potential habitat for the Texas horned lizard. Cumulative impacts to this species could include habitat fragmentation as well as loss and other alteration of vegetation cover types. While conversion of potential habitat for this species is likely to occur in areas slated for future development, considering the large quantity of habitat within the RSA and the species' larger range, the cumulative impacts to this species would not be substantial (TxDOT 2014b). Moreover, contractors working on the project would be educated on identifying the Texas horned lizard as part of the pre-construction conference and would be instructed not to harm any individuals encountered.

Cumulative effects to federally-listed karst invertebrates in Bexar County could potentially occur due to increases in impervious cover associated with construction of the proposed project and other future projects. However, the proposed project would not adversely modify critical habitat for federally-listed karst species and would not be expected to result in a "tipping point" scenario in which an individually minor action results in collectively significant impacts to karst invertebrates in Bexar County. Additionally, these species fall under the regulatory authority of the USFWS, the federal authority responsible for enforcing the Endangered Species Act of 1973 and its subsequent amendments. Also, the presence of CHU 16 within the AOI and RSA would require any activities that involve a federal permit, license, or funding and are likely to destroy or adversely affect the area of a CHU to work with USFWS to

protect the resource of concern. These regulations, along with the City of San Antonio regulations aimed at protecting karst features and their inhabitants, would be expected to aid in minimization of any cumulative effects that would potentially occur to these species.

## 5.12 CONSTRUCTION IMPACTS SUMMARY

### 5.12.1 Noise Impacts—Construction Phase

Noise associated with the construction of the proposed project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers are expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

### 5.12.2 Air Quality Impacts—Construction Phase

The construction activity phase of this project may generate a temporary increase in air pollutant emissions. However, considering the temporary and transient nature of construction-related emissions, as well as the mitigation actions to be utilized (TxDOT 2015b), it is not anticipated that emissions from construction of this project will have any significant impact on air quality in the area.

### 5.12.3 Biological Impacts—Construction Phase

Temporary impacts to natural resources due to construction could result from the implementation of the proposed project and include disturbances to wildlife and vegetative communities. Implementation the Build Alternative would involve the removal of grasses and shrubs during the construction phase, affecting the natural, erosion-inhibiting ground cover and resulting in the loss of habitat for both resident and migratory species. Disturbed areas would be restored, reseeded, and recontoured as necessary according to TxDOT specifications, making these effects largely temporary.

### 5.12.4 No Build Alternative

As there would be no construction under the No Build Alternative, there would be no construction phase effects.

# 6.0 COMMENTS AND COORDINATION

Public involvement for the proposed project consisted of a public meeting, a public hearing for the State EA, and a notice affording the opportunity for a public hearing on the federal EA. A public open house meeting was held on March 18, 2014, and accommodated affected property owners. Approximately 142 people attended the meeting, and attendees were generally supportive of the project. A public hearing for the State EA was held on October 8, 2014, and accommodated affected property owners and

elected officials. Approximately 110 people attended the hearing. The hearing began in an open-house format followed by a formal presentation. The court reporter recorded five verbal comments of the attendees; nine written comments were recorded. None of the comments required modifications to the design of the proposed project. A summary of the hearing is available for public review at the TxDOT San Antonio District office and on the TxDOT website (http://www.txdot.gov/inside-txdot/get-involved/about/hearings-meetings.html). A notice affording the opportunity for a public hearing was published on the TxDOT website and in the *San Antonio Express News* on September 27, 2015. TxDOT received no requests for a public hearing (see **Appendix D**).

The proposed project includes work within a FEMA-designated 100-year floodplain; therefore, coordination with the local Floodplain Administrator would be required. As the project is within five miles of, and within the same watershed as, an impaired assessment unit, coordination with TCEQ was conducted. This coordination concluded on September 4, 2014; TCEQ did not have any comments on the proposed project.

Coordination with the TPWD was conducted because the proposed project would disturb habitat in areas equal to or greater than the areas of disturbance indicated in the TxDOT-TPWD Threshold Table Programmatic Agreement. Coordination between TxDOT and TPWD was initiated on October 8, 2014, and TPWD responded on November 20, 2014. Preliminary drainage design indicates that the proposed project would be authorized under a USACE Section 404 NWP with a PCN. Additionally, the proposed project would include the channelization of approximately 503 linear feet of Caracol Creek. Coordination with the USACE for the PCN is ongoing.

A Biological Assessment for the project was developed and submitted to the USFWS to initiate formal consultation under Section 7 of the Endangered Species Act. A Biological Opinion (BO) was provided by the USFWS on February 18, 2016 (USFWS 2015; see **Appendix C**)

## 7.0 PERMITS AND APPROVALS NEEDED

The placement of temporary or permanent dredge or fill material into potentially jurisdictional waters of the U.S. would be authorized under NWP 14. Because the proposed permanent impacts would exceed 0.10 acre, a PCN for NWP 14 would be required for each feature.

The 401 Certification requirements for a NWP 14 would be met by implementing BMPs from the TCEQ's 401 Water Quality Certification Conditions for NWPs. These BMPs would address each of the following categories: 1) erosion control, 2) post construction TSS control, and 3) sedimentation control. Water quality BMPs that would be implemented include the following:

- Approved temporary vegetation
- Blankets/matting or mulch filter berms
- Vegetated filter strips
- Silt fence, sand bag and/or compost filter berms and socks

# 8.0 COMMITMENTS

## 8.1 Vegetation and Wildlife Habitat

Impacts to vegetation and wildlife habitat would be avoided or minimized by limiting disturbance to only that which is necessary to construct the proposed project. The removal of native vegetation, particularly mature native trees and shrubs, would be avoided to the greatest extent practicable. An approved seed mix would be used in the landscaping and revegetation of disturbed areas.

Upon completion of earthwork operations, disturbed areas would be restored and reseeded in accordance with TxDOT's Vegetation Management Guidelines and in compliance with the intent of Executive Order 13112 on Invasive Species and the FHWA Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices.

Appropriate measures would be taken to avoid adverse impacts on migratory birds and would include the following:

- The removal or destruction of active migratory bird nests (nests containing eggs and/or young) at any time of the year would be prohibited until the nests become inactive, usually between October 1 and February 15.
- If colonial nesting (i.e. swallows) occurs on or in structures, nests would not be removed until all nests in the colony become inactive.
- Measures would be utilized, to the extent practicable, to prevent or discourage migratory birds from building nests within portions of the project area scheduled for immediate construction.
- Inactive nests would be removed from the project area to minimize the potential for reuse by migratory birds.
- When practicable, construction or demolition activities would be scheduled outside the typical nesting season (February 15 to October 1), noting that the prohibitive provisions of the MBTA apply year-round.

## 8.2 Threatened and Endangered Species

Karst Invertebrates

Impacts to *R. infernalis* and *C. venii* would be minimized by restricting construction impacts to the proposed project area. In addition, the following voluntary conservation measures, which have been developed by TxDOT to avoid and minimize impacts to these species, CHU 16, or other federal trust resources, will be implemented. See the BO in **Appendix C** for more detailed descriptions of each measure. TxDOT will:

- comply with the TCEQ Edwards Aquifer Rules for development within the Contributing and Recharge Zones of the Edwards Aquifer. The proposed project would meet the TSS removal

requirement by providing 80 percent TSS removal at each storm water outfall (see Appendix K3);
- minimize impacts to CHU 16 and to native vegetation, especially woodland impacts;
- comply with the TCEQ's Texas Pollutant Discharge Elimination System Construction General Permit by preparing a Storm Water Pollution Prevention Plan (SW3P), Water Pollution Abatement Plan (WPAP) and other construction plans;
- require that all construction staging and access areas be located at least 300 feet from any potential listed species habitat or the outer boundary of CHU 16 unless it has already been surveyed and determined that the habitat is not occupied.
- Install sediment control or construction fencing around the exterior boundary of the CHU 16 within the Loop 1604 ROW.
- require contractor to follow the specified procedures if voids are discovered during construction.
- partner with resource agencies to create educational and professional development opportunities related to karst habitat and species;
- advance the scientific knowledge of Cicurina spiders by conducting biota surveys and genetic testing;
- reassess and revise the boundaries of karst zones as applicable;
- revegetate all disturbed areas in accordance with standard practices; and,
- monitor and report on the voids encountered and surveys conducted during and post construction.

The USFWS believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of *R. infernalis* and *C. venii*. TxDOT will:

- fully implement the Voluntary Conservation Measures proposed in their BA for this project.
- provide information and training to all employees and contractors working on the project on the measures proposed to avoid impacts to karst invertebrate habitat.
- monitor the take of *R. infernalis* and *C. venii* and provide periodic monitoring reports to the USFWS.

Black-capped Vireo

To avoid/minimize any potential impacts to the Black-capped Vireo, the following guidelines would be followed during construction:

- Limiting removal of vegetation to that necessary for constructing the project
- Clearing will also be limited to existing and newly acquired ROW.

In addition to those items stated above relating specifically to the Black-capped Vireo, to ensure impacts to other migratory bird species are avoided, typical measures would be in place to comply with the Migratory Bird Treaty Act. As stated above, vegetation clearing would take place outside nesting season to the extent practicable, and if possible, in the year prior to construction and the contractor would be required to remain vigilant for the presence of early nesting species if vegetation clearing occurs in mid-

winter. In the event that migratory birds are encountered on-site during construction, every effort would be made to avoid harm of protected birds, active nests, eggs, and/or young. The contractor would remove any old migratory bird nests between September 1 and February 28 from any structure where work would be done. The contractor would be prepared to prevent migratory birds from building nests between February 15 and August 31.

In accordance with the BMPs Programmatic Agreement between TxDOT and TPWD, contractors would be advised of the potential occurrence of the spot-tailed earless lizard, Texas garter snake and plains spotted skunk in the project area and care would be taken to avoid direct harm to these species as well as unnecessary impacts to skunk dens, if encountered. Additionally, care would be taken to avoid harvester ant mounds, the Texas horned lizard's primary food source, to the extent practicable if they are observed during the selection of Project Specific Locations and construction-related activities. Impacts to the cave myotis and ghost bats would be avoided or minimized by implementing the following BMPs:

- During construction, appropriate measures, including exclusion or timing of activities in the immediate vicinity of a colony, would be implemented as practicable. For maternity colonies, exclusion activities would be timed to avoid the spring/summer breeding season to the extent practicable to avoid separating lactating females from nursing pups.
- Structures or features used by bats that would be removed as a result of construction would be replaced by structures that incorporate bat-friendly design or artificial roosts would be constructed to replace these structures as practicable.

## 8.3 Water Quality

Water quality BMPs would be implemented and include the following:

- Approved temporary vegetation
- Blankets/matting or mulch filter berms
- Vegetated filter strips
- Silt fence, sand bag and/or compost filter berms and socks

Because this proposed project would disturb more than one acre, the contractor would be required to comply with the TCEQ-Texas Pollutant Discharge Elimination System (TPDES) General Permit for Construction Activity. The proposed project would disturb more than five acres; therefore, a Notice of Intent (NOI) would be filed and posted on site and a Stormwater Pollution Prevention Plan (SW3P) would be in place during construction of proposed project. This SW3P would utilize the temporary control measures as outlined in TxDOT's manual "Standard Specifications for the Construction of Highways, Streets, and Bridges."

The TPDES requirements would be met by implementing approved erosion controls, sediment controls, and post-construction total suspended solids controls. All temporary erosion controls, such as silt fences and rock berms, would be in compliance with TxDOT Standard Specifications and would be in

place, according to the construction plans, prior to commencement of construction related activities and inspected on a regular basis.

## 8.4 Archeological Resources

In the unlikely event that significant cultural resources are discovered during construction of the proposed project, TxDOT would immediately initiate cultural resource discovery procedures. All work in the vicinity would immediately cease until a specialist from TxDOT and/or the THC could arrive on site and assess the discovery's significance and the potential need for additional investigation (if necessary).

## 8.5 Hazardous Materials

Any unanticipated hazardous materials and/or petroleum contamination encountered during construction would be handled according to applicable federal and state regulations per TxDOT Standard Specifications. Section 6.10 of the "General Provisions of the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges," which applies to all highway projects, includes guidelines addressing the contractor's responsibilities regarding the discovery of hazardous materials.

During the field visit for the ISA, several trash dump locations were identified along the vehicle access road that exists along the western limit of the existing right of way. At least 24 trash dump locations were identified during the field survey (TxDOT 2014e). The materials in the dump sites generally consist of household demolition material (tile, roofing shingles, counters, fencing materials, PVC piping, sheet rock, shower enclosures, concrete, brick, and wood), household trash, paint cans, brick, and brush. All trash and debris would require proper transportation and disposal during right of way clearing activities. ACM may be present within some materials within the dump sites. A survey for the presence of ACM is recommended for the materials within the dump sites prior to relocation or disposal.

## 8.6 Construction

The contractor would observe proper maintenance and idling of construction equipment to control emissions of particulate matter. The contractor would control the generation of dust by site watering.

Disruptions would be minimized to the extent possible by the timely notification of affected residents and business owners through posted notices, personal contact, or other notification procedures. These procedures could include rerouting the traffic, barricading, using traffic cones, or any other measures deemed necessary and prudent by TxDOT and the construction contractor to comply with all local, state, and federal traffic and safety regulations.

Signage and barrier placement should be alert to the inevitable reordering of travel patterns, both during construction and in the long term, as drivers find cut-through routes to shorten travel times. During construction, procedures to minimize traffic congestion, noise, dust and risk to public safety should be specifically adapted to the circumstances of the proposed project.

Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

# 9.0 Conclusion

## 9.1 Preferred Alternative

This EA has been developed in order to study the potential environmental consequences of construction of the proposed project. This project was evaluated in accordance with the procedural provisions of NEPA; the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); Environmental Impact and Related Procedures (23 CFR Part 771); and Environmental Review of Transportation Projects (TAC Title 43, Part 1, Chapter 2). TxDOT determined that the environmental effects are not sufficiently substantial to warrant preparation of an Environmental Impact Statement. Based on the findings of this EA, the Build Alternative is identified as the preferred alternative. As there are no significant adverse effects, a FONSI is recommended for the Loop 1604 from Potranco Road to FM 471 project.

## REFERENCES

Blanton & Associates. 2011. Habitat Assessments and Presence/Absence Surveys for the Golden-cheeked Warbler and Black-capped Vireo within the Study Area of Proposed Improvements to Loop 1604 from IH 35 to US 90 in Bexar County, Texas. Prepared for the Texas Department of Transportation. October 5, 2011.

Texas Department of Transportation (TxDOT), 2014a. Socioeconomic Impacts Technical Report.
2014b. Indirect and Cumulative Impacts Analysis Report.
2014c. Archeological Resources Background Study.
2014d. Historical Resources Project Coordination Request.
2014e. Hazardous Materials Technical Report.
2015a. Water Resources Technical Report.
2015b. Quantitative MSAT Analysis.
2015c. Traffic Noise Technical Report.
2015d. Biological Resources Technical Report.
2015e. Black-capped Vireo Presence/Absence Survey SL 1604, Blocks 44 & 45 and Block 49.
2015f. Biological Assessment.

U.S. Fish and Wildlife Service (USFWS) 2011b. Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys for endangered karst invertebrate species. Revised September 8, 2011. USFWS Ecological Services Field Office, Austin, Texas.
2015. Biological Opinion

Zara Environmental, LLC (Zara). 2014. Karst invertebrate technical report Loop 1604 from Potranco Road to Culebra Road, Bexar County, Texas. Report prepared for Texas Department of Transportation. 125 East 11th Street, Austin, Texas 78701. March 2014.

# APPENDIX A

# FIGURES

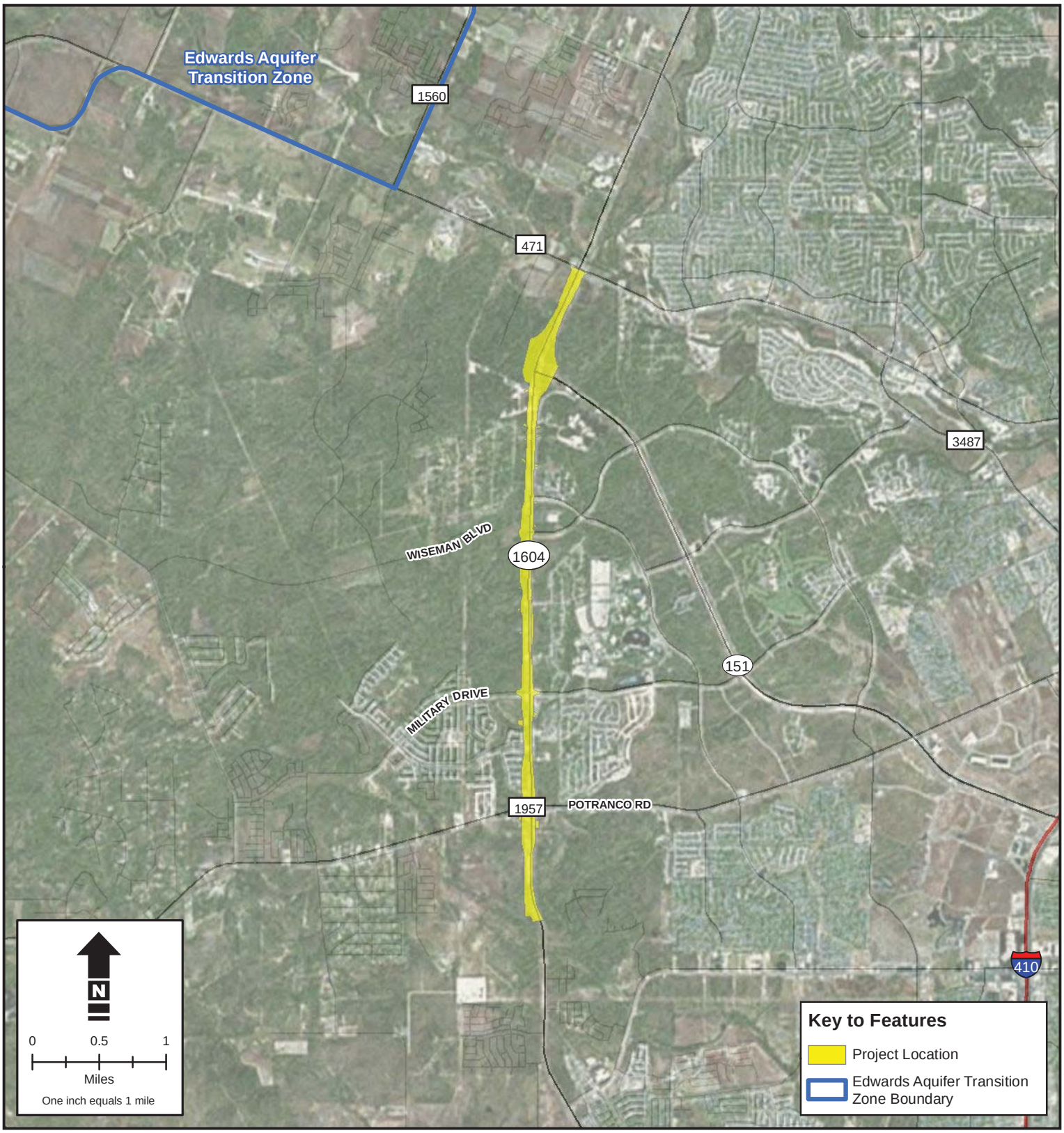
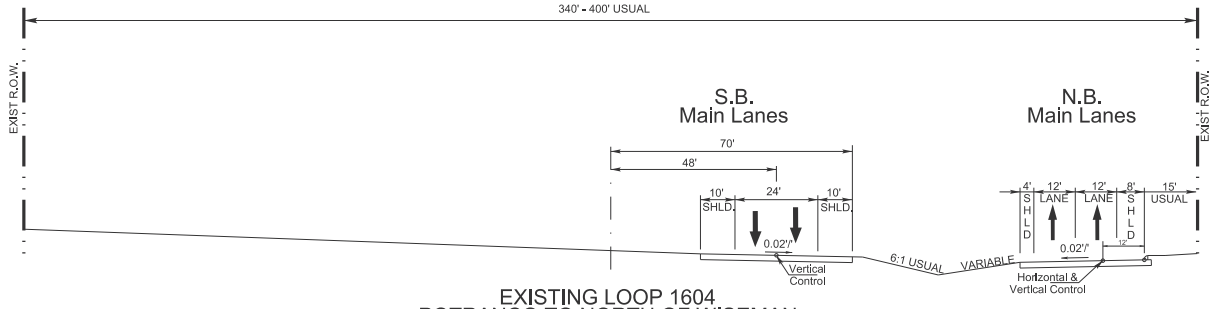




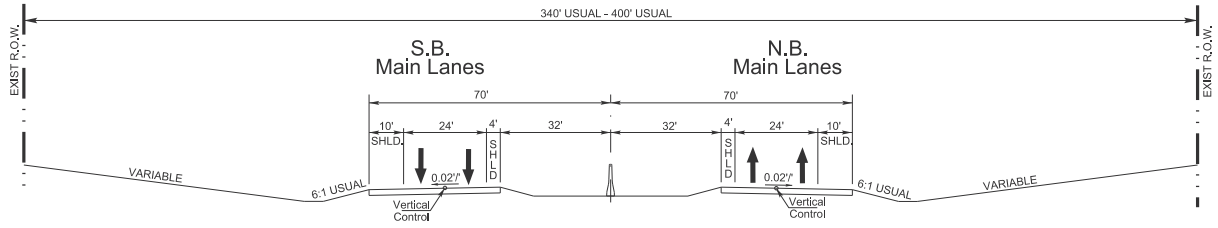
**Figure 1**

Project Location

Loop 1604 - Potranco Road to FM 471
CSJ# 2452-01-056



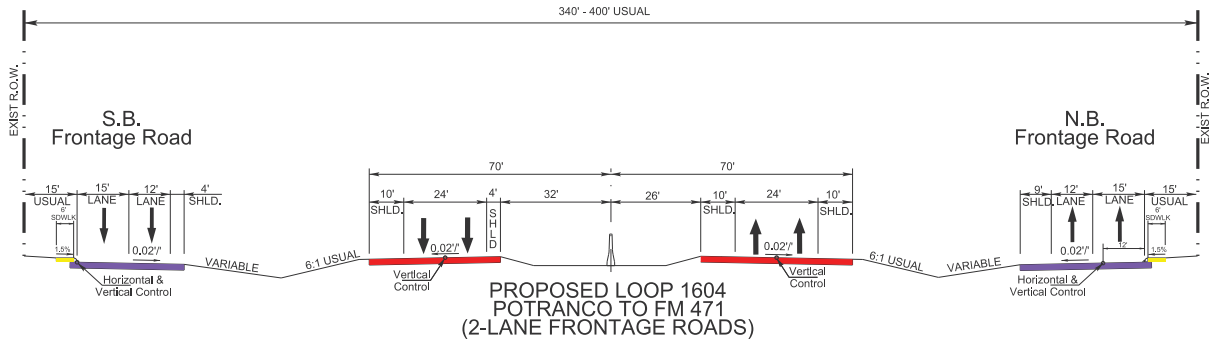

EXISTING LOOP 1604
POTRANCO TO NORTH OF WISEMAN

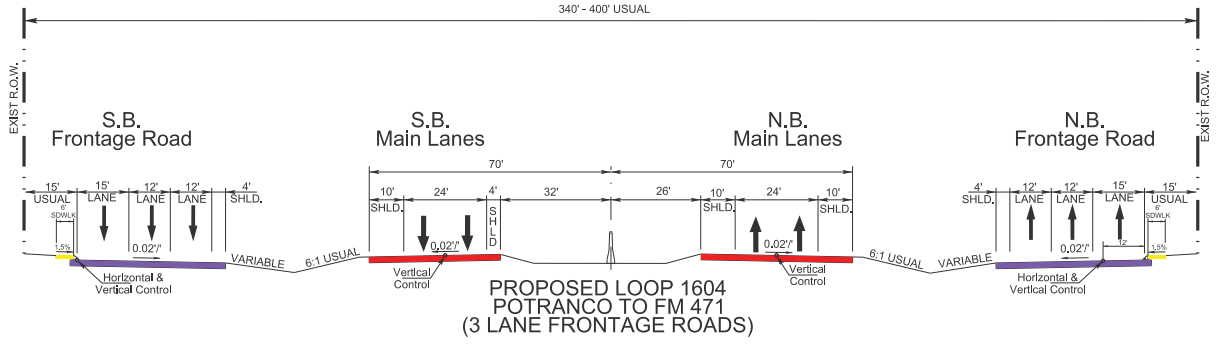



EXISTING LOOP 1604
NORTH OF WISEMAN TO FM 471

**Figure 2**

Existing Typical Sections
Loop 1604 - Potranco Road to FM 471
CSJ# 2452-01-056



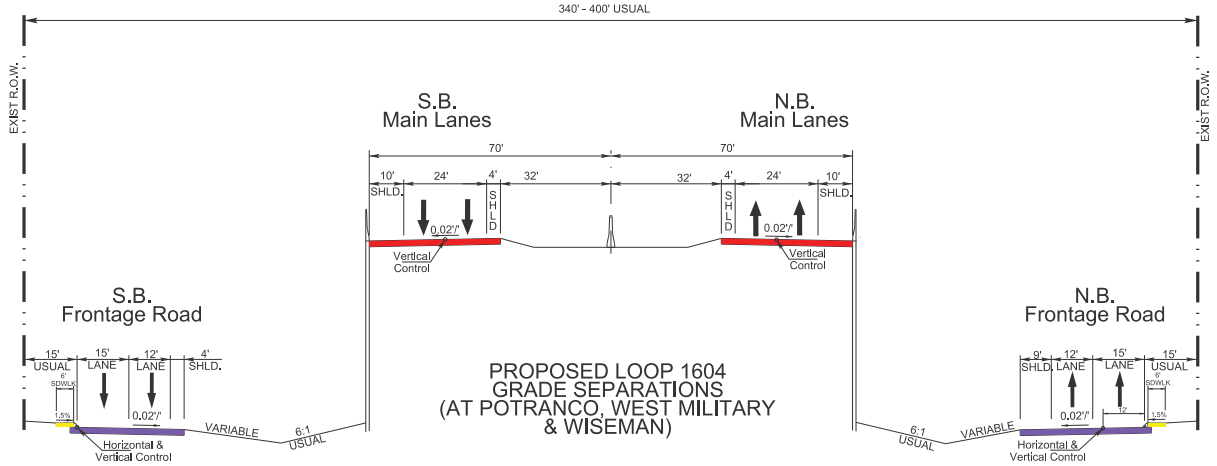




**Figure 3**

Proposed Typical Sections
Loop 1604 - Potranco Road to FM 471
CSJ# 2452-01-056

Frontage Roads Construction
Main Lanes Construction

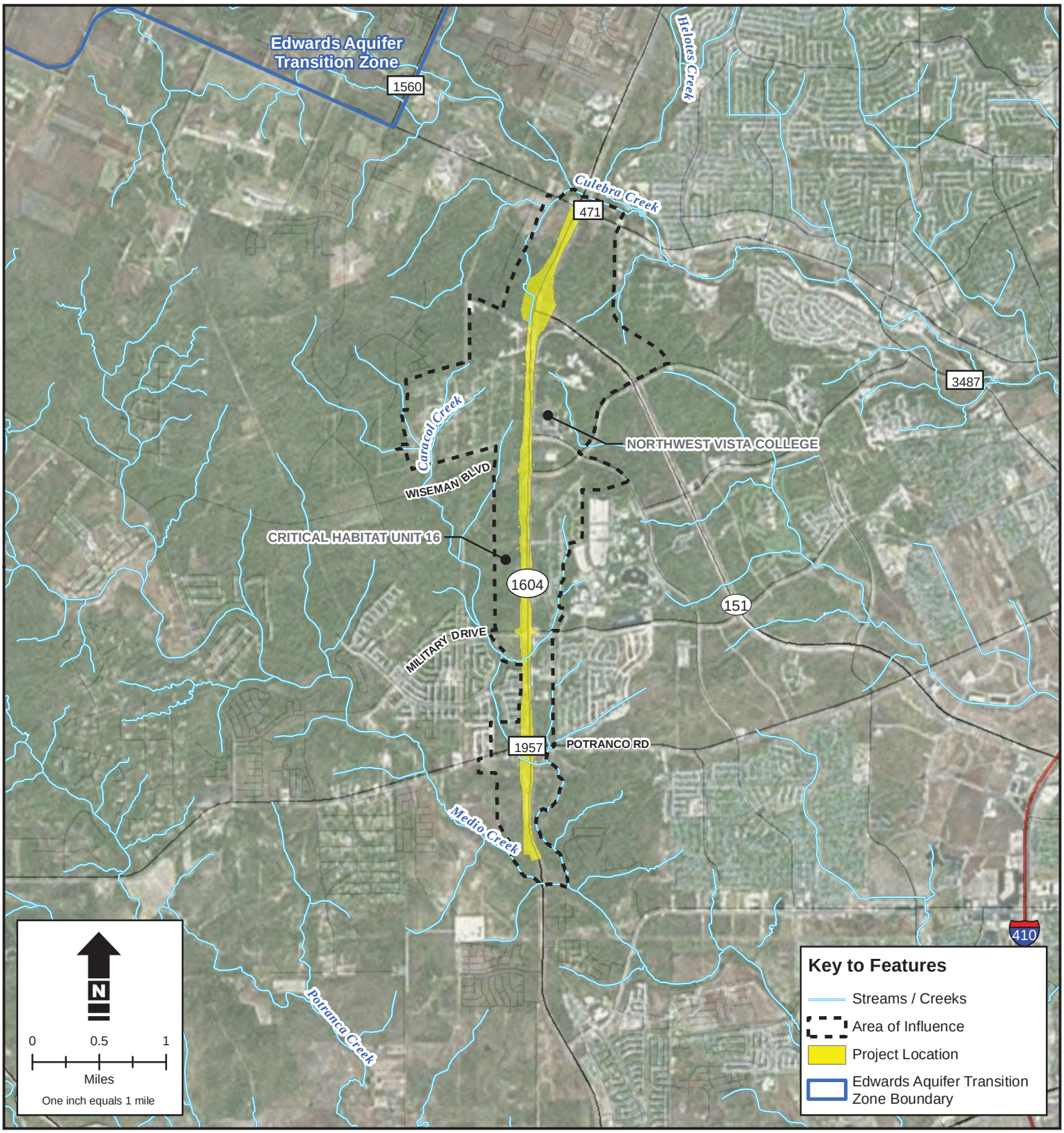
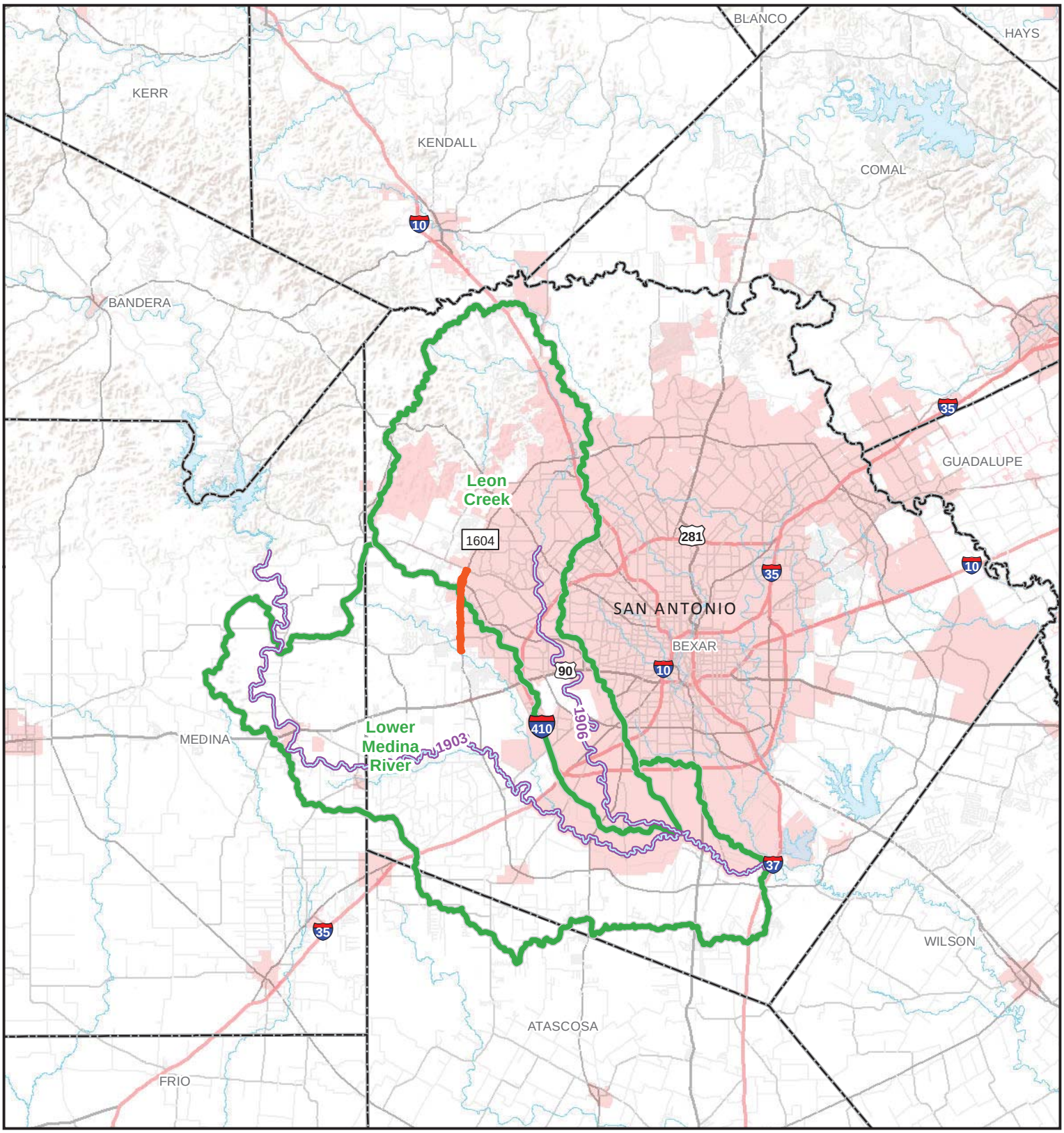




**Figure 4**

Area of Influence

Loop 1604
Potranco Road (FM 1957) to FM 471 (Culebra Road)
CSJ# 2452-01-056




N

0 8

Miles

One inch equals 8 miles

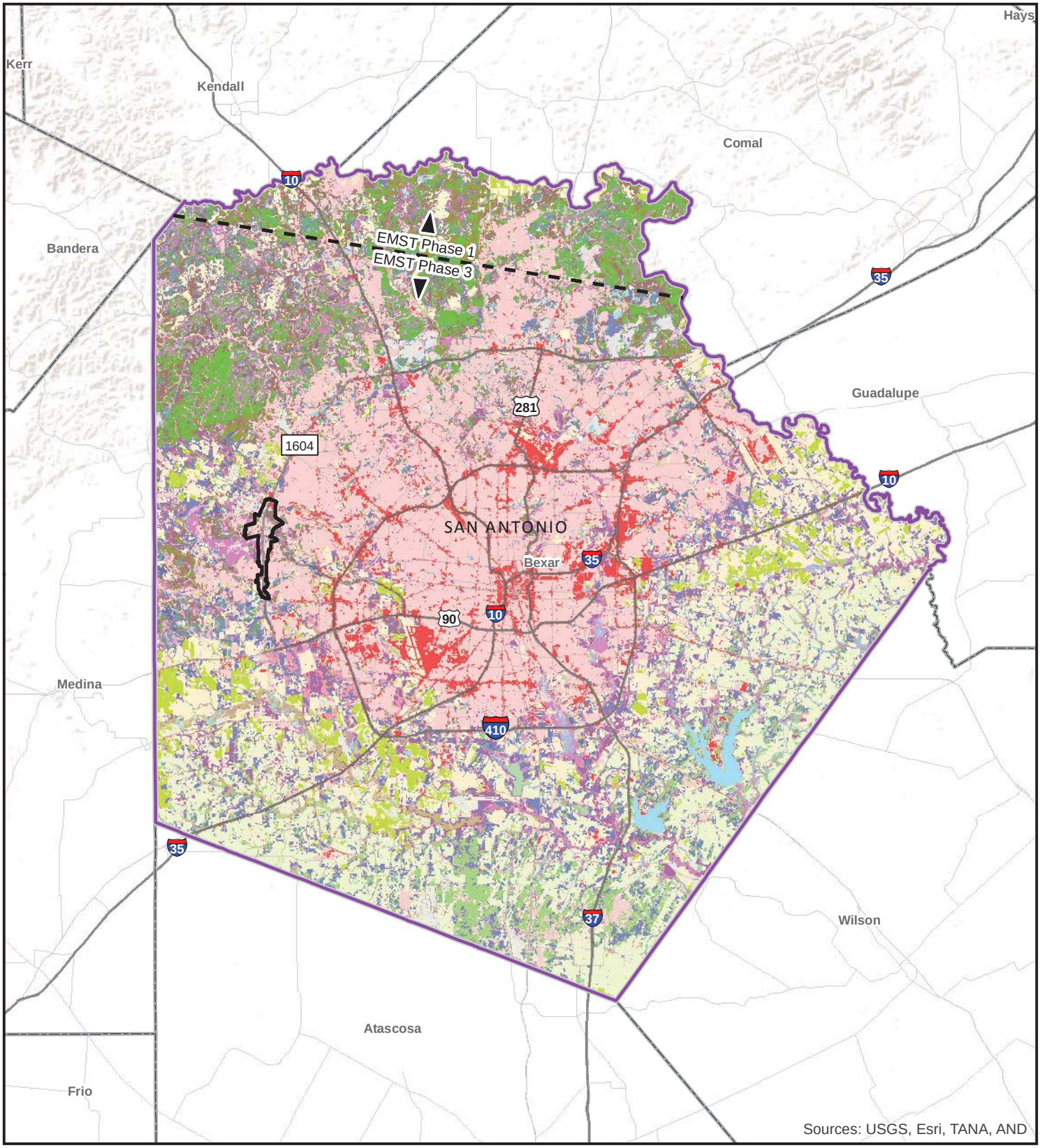
**Figure 5**

Water Resources Study Area

Loop 1604
Potranco Road (FM 1957) to FM 471 (Culebra Road)
CSJ# 2452-01-056

**Key to Features**

- 303d Impaired Streams
- Major Rivers / Streams
- Water RSA (Lower Medina River & Leon Creek Watersheds)
- Project Location
- County Boundaries
- City Boundaries




N

0 3.5 7

Miles

One inch equals 7 miles

## Figure 6

Threatened & Endangered Species
Resource Study Area

Loop 1604
Potranco Road (FM 1957) to FM 471 (Culebra Road)
CSJ# 2452-01-056

**Key to Features**

- EMST Phase Boundary
- Area of Influence
- Bexar County Boundary (RSA)

*EMST - Phases 1 & 3 Vegetation Types - See next page*

## Key to Features

### Ecological Management Systems of Texas (EMST)

### Vegetation Types (Phases 1 & 3)

- Barren
- Blackland Prairie: Disturbance or Tame Grassland
- Central Texas: Floodplain Deciduous Shrubland
- Central Texas: Floodplain Evergreen Forest
- Central Texas: Floodplain Evergreen Shrubland
- Central Texas: Floodplain Hardwood / Evergreen Forest
- Central Texas: Floodplain Hardwood Forest
- Central Texas: Floodplain Herbaceous Vegetation
- Central Texas: Floodplain Herbaceous Wetland
- Central Texas: Floodplain Live Oak Forest
- Central Texas: Riparian Deciduous Shrubland
- Central Texas: Riparian Evergreen Shrubland
- Central Texas: Riparian Hardwood / Evergreen Forest
- Central Texas: Riparian Hardwood Forest
- Central Texas: Riparian Herbaceous Vegetation
- Central Texas: Riparian Herbaceous Wetland
- Central Texas: Riparian Live Oak Forest
- Edwards Plateau: Ashe Juniper / Live Oak Shrubland
- Edwards Plateau: Ashe Juniper / Live Oak Slope Shrubland
- Edwards Plateau: Ashe Juniper Motte and Woodland
- Edwards Plateau: Ashe Juniper Slope Forest
- Edwards Plateau: Deciduous Oak / Evergreen Motte and Woodland
- Edwards Plateau: Floodplain Ashe Juniper Forest
- Edwards Plateau: Floodplain Ashe Juniper Shrubland
- Edwards Plateau: Floodplain Deciduous Shrubland
- Edwards Plateau: Floodplain Hardwood / Ashe Juniper Forest
- Edwards Plateau: Floodplain Hardwood Forest
- Edwards Plateau: Floodplain Herbaceous Vegetation
- Edwards Plateau: Floodplain Herbaceous Wetland
- Edwards Plateau: Floodplain Live Oak Forest
- Edwards Plateau: Live Oak Motte and Woodland
- Edwards Plateau: Live Oak Slope Forest
- Edwards Plateau: Oak / Ashe Juniper Slope Forest
- Edwards Plateau: Oak / Hardwood Motte and Woodland
- Edwards Plateau: Oak / Hardwood Slope Forest
- Edwards Plateau: Post Oak Motte and Woodland
- Edwards Plateau: Riparian Ashe Juniper Forest
- Edwards Plateau: Riparian Ashe Juniper Shrubland
- Edwards Plateau: Riparian Deciduous Shrubland
- Edwards Plateau: Riparian Hardwood / Ashe Juniper Forest
- Edwards Plateau: Riparian Hardwood Forest
- Edwards Plateau: Riparian Herbaceous Vegetation
- Edwards Plateau: Riparian Herbaceous Wetland
- Edwards Plateau: Riparian Live Oak Forest
- Edwards Plateau: Savanna Grassland
- Edwards Plateau: Shin Oak Shrubland
- Edwards Plateau: Shin Oak Slope Shrubland
- Grass Farm
- Marsh
- Native Invasive: Deciduous Woodland
- Native Invasive: Huisache Woodland or Shrubland
- Native Invasive: Juniper Shrubland
- Native Invasive: Juniper Woodland
- Native Invasive: Mesquite Shrubland
- Open Water
- Post Oak Savanna: Live Oak Motte and Woodland
- Post Oak Savanna: Live Oak Slope Forest
- Post Oak Savanna: Oak / Hardwood Slope Forest
- Post Oak Savanna: Post Oak / Live Oak Motte and Woodland
- Post Oak Savanna: Post Oak / Yaupon Motte and Woodland
- Post Oak Savanna: Post Oak Motte and Woodland
- Post Oak Savanna: Sandyland Grassland
- Post Oak Savanna: Sandyland Woodland and Shrubland
- Post Oak Savanna: Savanna Grassland
- Row Crops
- South Texas: Calcareous Dense Shrubland
- South Texas: Calcareous Shrubland
- South Texas: Calcareous Sparse Shrubland
- South Texas: Clayey Blackbrush Mixed Shrubland
- South Texas: Clayey Mesquite Mixed Shrubland
- South Texas: Disturbance Grassland
- South Texas: Floodplain Deciduous Shrubland
- South Texas: Floodplain Evergreen Forest and Woodland
- South Texas: Floodplain Evergreen Shrubland
- South Texas: Floodplain Grassland
- South Texas: Floodplain Hardwood Forest and Woodland
- South Texas: Ramadero Dense Shrubland
- South Texas: Ramadero Evergreen Woodland
- South Texas: Ramadero Shrubland
- South Texas: Ramadero Woodland
- South Texas: Sandy Mesquite Dense Shrubland
- South Texas: Sandy Mesquite Savanna Grassland
- South Texas: Sandy Mesquite Woodland
- Urban High Intensity
- Urban Low Intensity

# APPENDIX B

# MTP/TIP PAGES

| TxDOT District | County | CSJ | Hwy | Phase | City | Project Sponsor | MPO Proj ID No. | Year of Expenditure Cost |
|---|---|---|---|---|---|---|---|---|
| 15 - San Antonio | Bexar | 2452-01-056 | Loop 1604 | E,R,C | San Antonio | TxDOT | 4012.0 | $93,001,000 |

Limits From: FM 1957 - Potranco Road
Limits To: FM 471 - Culebra Road
Last Revision Date: 11/2015
Description: Expand to 4 lane expressway - 4 non-toll lanes
Project History: 10/15 - revise cost and funding; 4/15 - move from FY 2015 to FY 2016; 4/14 - rev cost; 1/13 - rev limits, cost & fund cats

| Total Project Cost Information (TxDOT %): | |
|---|---|
| Preliminary Engineering: | $3,769,668 |
| ROW Purchase: | $1,444,213 |
| Construction Cost: | $76,932,012 |
| Construction Engineering | $3,654,270 |
| Contingencies: | $2,123,324 |
| Indirect Costs: | $0 |
| Other Field | $5,077,513 |
| Total Project Cost: | $93,001,000 |

Cost of Approved Phases: $76,932,012

Type of Work: Added Capacity: Non - Toll

**Authorized Funding by Category/Share**

| Funding Categories | Federal | State | Local | Local Contrib | Total |
|---|---|---|---|---|---|
| 3 - ATD | $0 | $0 | $0 | $28,200,000 | $28,200,000 |
| 1 - Prvnt Mnt/Rehab | $800 | $200 | $0 | $0 | $1,000 |
| 3- BC Local | $0 | $0 | $0 | $64,800,000 | $64,800,000 |
| Other | $0 | $0 | $0 | $0 | $0 |
| **Totals** | $800 | $200 | $0 | $93,000,000 | $93,001,000 |

| TxDOT District | County | CSJ | Hwy | Phase | City | Project Sponsor | MPO Proj ID No. | Year of Expenditure Cost |
|---|---|---|---|---|---|---|---|---|
| 15 - San Antonio | Bexar | 2452-01-059 | Loop 1604 | E,R,C | San Antonio | TxDOT | 5127.0 | $93,801,000 |

Limits From: US 90
Limits To: FM 1957 - Potranco Road
Last Revision Date: 11/2015
Description: Expand to 4 lane expressway - 4 non-toll lanes
Project History: 10/15 - revise cost and funding; 4/14 - reconfigured from current projects

| Total Project Cost Information (TxDOT %): | |
|---|---|
| Preliminary Engineering: | $3,862,070 |
| ROW Purchase: | $0 |
| Construction Cost: | $78,817,746 |
| Construction Engineering | $3,743,843 |
| Contingencies: | $2,175,370 |
| Indirect Costs: | $0 |
| Other Field | $5,201,971 |
| Total Project Cost: | $93,801,000 |

Cost of Approved Phases: $78,817,746

Type of Work: Added Capacity: Non - Toll

**Authorized Funding by Category/Share**

| Funding Categories | Federal | State | Local | Local Contrib | Total |
|---|---|---|---|---|---|
| 3 - ATD | $0 | $0 | $0 | $23,800,000 | $23,800,000 |
| 3 - BC Local | $0 | $0 | $0 | $70,000,000 | $70,000,000 |
| 1 - Prvnt Mnt/Rehab | $800 | $200 | $0 | $0 | $1,000 |
| Other | $0 | $0 | $0 | $0 | $0 |
| **Totals** | $800 | $200 | $0 | $93,800,000 | $93,801,000 |

| TxDOT District | County | CSJ | Hwy | Phase | City | Project Sponsor | MPO Proj ID No. | Year of Expenditure Cost |
|---|---|---|---|---|---|---|---|---|
| 15 - San Antonio | Bexar | 2452-02-087 | Loop 1604 | E,R,C | San Antonio | TxDOT | 5125.0 | $110,000,000 |

Limits From: at IH 10 West
Limits To: -
Last Revision Date: 2/2015
Description: Construct managed lane direct connectors
Project History: 1/15 - revise funding distribution; 4/14 - reconfigured from current projects; project has $71.8M in Cat 2 (years 2016-2020)

| Total Project Cost Information (TxDOT %): | |
|---|---|
| Preliminary Engineering: | $4,421,659 |
| ROW Purchase: | $0 |
| Construction Cost: | $90,237,900 |
| Construction Engineering | $4,232,158 |
| Contingencies: | $2,698,113 |
| Indirect Costs: | $4,358,490 |
| Other Field | $4,051,682 |
| Total Project Cost: | $110,000,000 |

Cost of Approved Phases: $90,237,900

Type of Work: Interchange

**Authorized Funding by Category/Share**

| Funding Categories | Federal | State | Local | Local Contrib | Total |
|---|---|---|---|---|---|
| 2 - Metro Corridor | $1,452,871 | $256,389 | $0 | $0 | $1,709,260 |
| 3 - SIB/TIFIA | $0 | $0 | $0 | $38,200,000 | $38,200,000 |
| 3 - LC | $0 | $0 | $0 | $70,090,740 | $70,090,740 |
| Other | $0 | $0 | $0 | $0 | $0 |
| **Totals** | $1,452,871 | $256,389 | $0 | $108,290,740 | $110,000,000 |

**STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM**

**SAN ANTONIO MPO - HIGHWAY PROJECTS**

**FY 2016**



| DISTRICT | MPO | COUNTY | CSJ | HWY | PHASE | CITY | YOE COST |
|---|---|---|---|---|---|---|---|
| SAN ANTONIO | SAN ANTONIO | BEXAR | 2452-01-056 | Loop 1604 | C,E,R | SAN ANTONIO | $ 93,001,000 |

**LIMITS FROM** FM 1957 - Potranco Road
**LIMITS TO** FM 471 - Culebra Road
**PROJECT SPONSOR** TxDOT
**REVISION DATE** 11/2015
**MPO PROJ NUM** 4012
**FUNDING CAT(S)** 1,3LC
**PROJECT DESCR** Expand to 4 lane expressway - 4 non-toll lanes
**REMARKS** 1st Qtr 16 - revise cost and funding
**P7**
**PROJECT HISTORY** 10/15 - revise cost and funding; 4/15 - move from FY 2015 to FY 2016; 4/14 - rev cost; 1/13 - rev limits, cost & f und cats

**TOTAL PROJECT COST INFORMATION**

| | | | |
|---|---|---|---|
| **PREL ENG** | $ | 3,769,668 | |
| **ROW PURCH** | $ | 1,444,213 | **COST OF** |
| **CONSTR** | $ | 76,932,012 | **APPROVED** |
| **CONST ENG** | $ | 3,654,270 | **PHASES** |
| **CONTING** | $ | 2,123,324 | $ 93,001,000 |
| **INDIRECT** | $ | 0 | |
| **BOND FIN** | $ | 0 | |
| **PT CHG ORD** | $ | 5,077,513 | |
| **TOTAL CST** | $ | 93,001,000 | |

**AUTHORIZED FUNDING BY CATEGORY/SHARE**

| CATEGORY | FEDERAL | STATE | REGIONAL | LOCAL | LC | TOTAL |
|---|---|---|---|---|---|---|
| 3LC | $ 0 | $ 0 | $ 0 | $ 0 | $ 28,200,000 | $ 28,200,000 |
| 1 | $ 800 | $ 200 | $ 0 | $ 0 | $ 0 | $ 1,000 |
| 3LC | $ 0 | $ 0 | $ 0 | $ 0 | $ 64,800,000 | $ 64,800,000 |
| TOTAL | $ 800 | $ 200 | $ 0 | $ 0 | $ 93,000,000 | $ 93,001,000 |

**PHASE: C = CONSTRUCTION, E = ENGINEERING, R = ROW, T = TRANSFER**

# APPENDIX C

## Agency Correspondence

Texas Department of Transportation
125 EAST 11TH STREET | AUSTIN, TEXAS 78701-2483 | (512) 463-8588 | WWW.TXDOT.GOV

October 8, 2014

**Request for Administrated Coordination**
**Roadway:** Loop 1604
**CSJ:** 2452-01-056
**Limits:** from FM 1957 to FM 471
**County:** Bexar

Sue Reilly
Texas Parks & Wildlife Department
Wildlife Division – Wildlife Habitat Assessment Program
4200 Smith School Road
Austin, Texas 78744

Dear Mrs. Reilly,

Consistent with the memorandum of understanding signed by our two agencies, attached is the coordination document which includes a copy of the Biological Resources Technical Report that addresses the information required by the Tier II Site Assessment [as required by 43 TAC §2.208(c)]. Any comments you may have on this document will assist the Texas Department of Transportation (Department) in ensuring that the Department's projects are sensitive to the natural resources of the state. Please include the above CSJ number in your correspondence.

Please submit any comments you may have within 45 days from the date of this letter to the Contact identified below. If you do not have any comments on the document, please sign and date the bottom of this letter and return a copy to the Environmental Affairs Division. If no response is received after the 45 days have expired per the requirements of the MOU [43 TAC §2.208(f)], we will proceed with project development. If you have any questions regarding this project please contact Michael Chavez at 512-416-2514 or Mike.Chavez@txdot.gov.

Sincerely,

Meghan Pawlowski
Natural Resources Section
Environmental Affairs Division

Enclosure

☐ NO COMMENT:_____
Wildlife Habitat Assessment Program

TEXAS PARKS & WILDLIFE

Life's better outside.®

Commissioners

Dan Allen Hughes, Jr.
Chairman
Beeville

Ralph H. Duggins
Vice-Chairman
Fort Worth

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Houston

Roberto De Hoyos
Austin

Bill Jones
Austin

James H. Lee
Houston

Margaret Martin
Boerne

S. Reed Morian
Houston

Dick Scott
Wimberley

Lee M. Bass
Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

November 20, 2014

Ms. Meghan Pawlowski
Environmental Affairs Division
Texas Department of Transportation
125 E. 11th Street
Austin, TX 78701-2483

RE: Administrated Coordination for Loop 1604 from Potranco Road (FM 1957) to FM 471 (Culebra Road), Bexar County, Texas (CSJ 2452-01-056)

Dear Ms. Pawlowski:

Texas Parks and Wildlife Department (TPWD) has reviewed the above-referenced project located in Bexar County, Texas. TPWD would like to offer the following information, comments, and recommendations to minimize impacts to fish and wildlife resources.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number ERCS-9907 in any return correspondence regarding this project.

## Project Description

The proposed action would include the expansion of Loop 1604 from Potranco Road to FM 471 in San Antonio, Bexar County, Texas. Improvements would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations. The existing roadway would be converted to a four-lane expressway. The length of the proposed project is approximately 4.1 miles. The proposed improvements would be constructed primarily within existing right-of-way (ROW) and to the west or north of the existing roadway. Approximately 3.7 acres of new ROW would be required, between Kilmarnoch Road and Reed Road.

## Impacts to Vegetation/Wildlife Habitat

The project description includes 311.62 acres of vegetation that is in the project footprint. Disturbed Prairie (63.18 acres); Edwards Plateau Savanna,

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

Woodland, and Shrubland (53.52 acres); and Riparian (4.15 acres) make up the unmaintained portion of the vegetation. Mowed and maintained ROW (98.48 acres), Urban High Intensity (87.34 acres) and Urban Low Intensity (4.95 acres) comprise the remainder. Unusual vegetation features within the project area include unmaintained vegetation (120.85 acres), fencerow vegetation, trees that are ecologically significant or locally important, and riparian vegetation (4.15 acres). Special habitat features observed in the project area include bottomland hardwoods, water bodies, and a bluff.

**Recommendation:** TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. If on-site mitigation for tree removal is not practicable, TPWD recommends off-site mitigation for removed trees.

**Recommendation**: TPWD recommends adhering to the City of San Antonio's 2010 tree preservation ordinance, which includes specific mitigation measures for removal of trees.

**Recommendation:** To minimize adverse effects, activities should be planned to preserve any mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation are high value to wildlife as food and cover.

## Federal Laws

*Endangered Species Act*

Federally-listed animal species and their habitats are protected from "take" on any property by the Endangered Species Act (ESA). Take of a federally-listed species can be allowed if it is "incidental" to an otherwise lawful activity and must be permitted in accordance with Section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal/state jurisdiction or for which a federal/state nexus (i.e., permits or funding) exists. Any take of a federally-listed species or its habitat without the required take permit (or allowance) from the United States Fish and Wildlife Service (USFWS) is a violation of the ESA.

### Black-capped Vireo and Golden-cheeked Warbler

The Biological Evaluation Form states that potential habitat for both of these songbirds exist within the project area, but that no birds of either species were observed during surveys in 2009 and 2010. USFWS has provided a letter dated May 11, 2011, stating that the two years of negative findings are sufficient.

**Recommendation**: TPWD recommends completing additional surveys for these songbird species. The USFWS letter recommends that surveys be conducted if construction is delayed more than three years from the date of the letter in order to make sure that the areas are still unoccupied. The letter is dated May 11, 2011. Three years have passed since the date of the letter, therefore additional surveys should be completed per the recommendation of USFWS.

**Recommendation**: TPWD recommends contacting USFWS directly regarding the songbird species and their habitats within the project area.

**Karst Invertebrates**

The project area is within the Karst Fauna Region (KFR) known as the Culebra Anticline, where the federally endangered *Rhadine infernalis* and *Cicurina venii* are known to occur. Critical Habitat Unit 16 for *R. infernalis* was established around Caracol Creek Coon Cave and extends into the existing ROW adjacent to the proposed southbound frontage road. *Cicurina venii* has been found within the project area at the SH 151 crossing. An unidentified *Cicurina* specimen has also been collected from Feature 1604-Z01, with date and exact location not given.

**Recommendation**: TPWD recommends contacting USFWS directly for technical assistance regarding the karst invertebrates in the area, given the location of the project and the plans for excavation activities within the Culebra Anticline.

*Clean Water Act*

The project documentation states that under Section 404 of the Clean Water Act, a Nationwide Permit (NWP) 14 will be necessary for impacts to creeks within the project area. Current plans include channelizing approximately 527 linear feet of Caracol Creek and 159 linear feet of an unnamed tributary of Caracol Creek.

**Recommendation**: Under General Condition 18 of the 2012 Nationwide Permits, no activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation has already been completed. General Condition 18 further states that "non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project...and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied." The condition lists requirements for the pre-

construction notification. Please be aware that this General Condition applies to this project and the four federally listed species discussed in project documentation.

**Recommendation**: It is unclear how the channelization of 527 linear feet of Caracol Creek relates to the project, since it is beyond the limits of the project (i.e. it is south of Potranco Road). The information provided for review does not explain why it is necessary to channelize this creek if the project does not cross it. If the project does cross the creek, TPWD recommends exploring alternatives to channelizing the creek which will impact many functions of the creek and could impact conditions downstream in Caracol Creek Park. Natural channel design and bridging the creek are alternatives worth exploring.

## TxDOT Commitments

In the Biological Evaluation Form and Technical Report, information was included on Best Management Practices (BMPs) to be implemented in the project. These include:

- Bird BMPs as enumerated in the BMP Programmatic Agreement (PA) between TxDOT and TPWD signed April 17, 2014 (the 2014 BMP PA).
- Minimization of impacts to vegetation by limiting disturbance to only that which is necessary to construct the proposed project. The removal of native vegetation, particularly mature native trees and shrubs, would be avoided to the greatest extent practicable. An approved seed mix would be used in the landscaping and revegetation of disturbed areas.
- Species BMPs as found in the 2014 BMP PA for horned lizard, spot-tailed earless lizard, Texas garter snake, and plains spotted skunk.

**Recommendation**: The Biological Resources Technical Report states that habitat is present and the project may impact Cave Myotis Bat and Ghost-faced Bat. Both of these species have BMPs in the 2014 BMP PA. TPWD recommends applying the Bridge Bat BMPs and Cave/Cliff Bat BMPs as found in the 2014 BMP PA in order to minimize impacts to these species.

## Rare Species

In addition to state- and federally-protected species, TPWD tracks special features, natural communities, and rare species that are not listed as threatened or endangered. These species and communities are tracked in the Texas Natural Diversity Database (TXNDD), and TPWD actively promotes their conservation. TPWD considers it important to evaluate and, if necessary,

minimize impacts to rare species and their habitat to reduce the likelihood of endangerment.

Project documentation notes that three rare plant species have suitable habitat in the project area: Big Red Sage, Correll's False Dragon-head, and Hill Country Wild-Mercury.

> **Recommendation**: If individuals of these species are found in areas to be impacted by the project, TPWD requests that TxDOT contact TPWD in order to document the plants and possibly collect seeds. Regardless of whether plants or propagules can be salvaged, TPWD requests that TxDOT document the occurrence with the TXNDD.

TPWD strives to respond to requests for project review within the 45 day comment period. Responses may be delayed due to workload and lack of staff. Failure to meet the 45 day review timeframe does not constitute a concurrence from TPWD that the proposed project will not adversely impact fish and wildlife resources.

TPWD advises review and implementation of these recommendations. Please confirm that TxDOT's commitments are correctly identified above and respond to indicate whether TxDOT will commit to implementing the additional recommendations provided. If you have any questions, please contact me at (512) 389-8021 or sue.reilly@tpwd.texas.gov.

Sincerely,

Sue Reilly
Wildlife Habitat Assessment Program
Wildlife Division

SMR:gg.ERCS-9907

Texas Department of Transportation
125 EAST 11TH STREET | AUSTIN, TEXAS 78701-2483 | (512) 463-8588 | WWW.TXDOT.GOV

August 24, 2015

Mrs. Sue Reilly
Wildlife Habitat Assessment Program
Wildlife Division
4200 Smith School Road
Austin, TX 78744

RE: ERCS-9907 - Administrated Coordination for Loop 1604 from Portranco Road (FM 1957) to FM 471 (Culebra Road), Bexar County, Texas (CSJ: 2452-01-056)

Dear Mrs. Reilly:

Thank you for your November 20, 2014 comment letter on the Loop 1604 project. The Texas Department of Transportation (TxDOT) requested review of the subject project under Administrated Coordination on October 8 2014. Your comments are summarized below with the TxDOT response in italics.

TPWD Comment – Impacts to Vegetation/Wildlife Habitat

- TPWD recommends in-kind on-site replacement/restoration of the native vegetation wherever practicable. If on-site mitigation for tree removal is not practical, TPWD recommends off-site mitigation for removed trees.

*TxDOT is committed to minimizing and avoiding impacts to vegetation on this project. Any vegetation or tree removal will be limited to the amount necessary for the construction of the project. TxDOT will follow the Executive Oder on Invasive Species and the Executive Memorandum on Beneficial Landscaping practices to further support the growth of native species and minimize the spread of invasive plants. TxDOT does not commit to non-regulatory mitigation for replacement of trees on this project.*

- TPWD recommends adhering to the City of San Antonio's 2010 tree preservation ordinance, which includes specific mitigation measures for removal of trees.

*Although TxDOT is not subject to local or county laws, TxDOT is committed to minimizing impacts to native trees within the Loop 1604 project area and will commit to removing only those trees necessary to implement the proposed project. TxDOT is not proposing specific mitigation measures for non- federally regulated resources on this project. If mitigation opportunities are discussed, TxDOT will coordinate our efforts with Laura Zebehazy, the Conservation Coordinator at TPWD.*

- To minimize adverse effects, activities should be planned to preserve any mature trees, particularly acorn, nut or berry producing varieties. These types of vegetation are high value to wildlife as food and cover.

*Occasionally TxDOT must remove mature trees to maintain a safe and clear roadway for the traveling public or to accommodate additional roadway. TxDOT will avoid and minimize impacts to*

*trees and vegetation as practical for construction of this project. All tree removal will be limited to the amount necessary for the project. If any landscaping is designed for this project, the species that are noted as "high value" according to TPWD's recommendation will be considered.*

Black-capped Vireo and Golden-cheeked Warbler

- TPWD recommends completing additional surveys for these songbird species. The USFWS letter recommends that surveys be conducted if construction is delayed more than three years from the date of the letter in order to make sure that the areas are still unoccupied. The letter is dates May 11, 2011. Three years have passed since the date of the letter; therefore additional surveys should be completed per the recommendation of the USFWS.

*TxDOT conducted additional surveys for the Black-capped Vireo during the 2015 breeding season. No birds were identified or heard. There was no Golden-cheeked Warbler habitat identified during the 2015 survey season. Formal consultation with the USFWS is ongoing and TxDOT will address federally-protected species with the USFWS.*

- TPWD recommends contacting the USFWS directly regarding the songbird species and their habitats within the project area.

*Consultation with the USFWS is ongoing; TxDOT will address federally-protected species with the USFWS during the formal consultation process under our obligations for Section 7 of the Endangered Species Act.*

Karst Invertebrates

- TPWD recommends contacting USFWS directly for technical assistance regarding the karst invertebrates in the area, given the location of the project and the plans for excavation activities within the Culebra Anticline.

*Consultation with the USFWS is ongoing; TxDOT will address federally-protected species with the USFWS during the formal consultation process under our obligations for Section 7 of the Endangered Species Act.*

Clean Water Act

- Under General Condition 18 of the 2012 Nationwide Permits, no activities is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation has already been completed. General Condition 18 further states that "non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project... and shall not begin work on the activities until notified by the district engineer that the requirements of the ESA have been satisfied." The condition lists requirements for the pre-construction notification. Please be aware that this General Condition applied to this project and the four federally listed species discussed in project documentation.

*TxDOT is aware of General Condition 18 and the PCN requirement for non-federal permittees. For projects cleared under NEPA assignment, including this one, TxDOT is a federal permittee, and the PCN requirement for non-federal permittees does not apply. It should be noted that, although TxDOT is not submitting a PCN, Section 7 consultation with the USFWS is underway for the four referenced species.*

- It is unclear how the channelization of 527 linear feet of Caracol Creek relates to the project, since it is beyond the limits of the project (i.e. it is south of Potranco Road). The information provided for review does not explain why it is necessary to channelize this creek if the project does not cross it. If the project does cross the creek, TPWD recommends exploring alternatives to channelizing the creek which will impact many functions of the creek and could impact conditions downstream in Caracol Creek Park. Natural channel design and bridging the creek are alternatives worth exploring.

*TxDOT is committed to minimizing impacts at Caracol Creek and provides the following clarification about the project impacts at this crossing: There is an existing 228-foot long box culvert at Caracol Creek that consists of 10 barreled concrete boxes, each measuring 10 by 10 feet. The westernmost 151 feet (0.51 acre) of the existing box culvert will be removed in favor of creating 151 feet (0.51+ acres) of natural-bottom creek channel and Loop 1604 will be bridged at this crossing. Immediately west of the box culvert removal, the centerline of the stream will be re-aligned and side slopes contoured in order to create a better-defined stream channel that will accommodate high flows, reduce flooding, and effectively align the channel with modifications being made upstream (just south of Potranco Road) by Bexar County.*

TxDOT Commitments

- The Biological Resources Technical Report states that habitat is present and the project may impact Cave Myotis Bat and Ghost-faced Bat. Both of these species have BMPs in the 2014 BMP PA. TPWD recommends applying the Bridge Bat BMPs and Cave/Cliff Bat BMPs as found in the 2014 BMP PA in order to minimize impacts to these species.

*TxDOT will implement the Bridge Bat and Cave/Cliff Bat BMPs as referenced in the 2014 BMP PA.*

Rare Species

- If individuals of these species are found in areas to be impacted by the project, TPWD requests that TxDOT contact TPWD in order to document the plants and possibly collect seeds. Regardless of whether plans or propagules can be salvaged. TPWD requests that TxDOT document the occurrence with the TXNDD.

*If during project implementation any of the species mentioned in TPWD's response are observed, TxDOT will report their occurrences to the TXNDD. As practical during construction activities, TxDOT will notify TPWD that the aforementioned plants may be present and will facilitate TPWD access to collect/salvage plants.*

TxDOT appreciated TPWD's cooperation and the recommendations provided for the Loop 1604 project. Please feel free to contact me or Mike Chavez (Mike.Chavez@txdot.gov) of the Project Development Section of ENV, if additional questions on this project arise.

Sincerely,

Meghan Pawlowski
Environmental Specialist
Environmental Affairs Division

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
FAX 490-0974

FEB 18 2016

Mr. Carlos Swonke
Texas Department of Transportation
Environmental Affairs Division
125 East 11th Street
Austin, Texas 78701-2483

Consultation Number: 02ETAU00-2015-F-0365

RE: CSJ 2452-01-056

Dear Mr. Swonke:

This document transmits the US Fish and Wildlife Service's (Service) biological opinion (BO), based on our review of the Texas Department of Transportation's (TxDOT) proposed improvements to Loop 1604 (CSJ# 2452-01-056), from SH 151 to Caracol Creek, in San Antonio, Bexar County, Texas. In this document we evaluate the effects of the proposed action on the endangered Bracken Bat Cave meshweaver (*Cicurina venii*) and an unnamed troglobitic beetle, *Rhadine infernalis,* in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). TxDOT's final Biological Assessment (BA) and request for formal consultation was received on August 13, 2015.

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that the actions authorized, funded, or carried out by such agencies do not jeopardize the continued existence of any threatened or endangered species or adversely modify or destroy designated critical habitat of such species. The Federal Highway Administration (FHWA) assigned responsibility for compliance with the National Environmental Policy Act (NEPA) and all federal resource agency consultations, including section 7 formal consultations, to TxDOT in a Memorandum of Understanding (MOU) dated December 16, 2014 (23 U.S.C. 327). Therefore, TxDOT is the Federal agency associated with this proposed project.

This BO is based on information provided in TxDOT's August 13, 2015 formal consultation request and final BA, information in NEPA documents for previous versions of the proposed project, field biological investigation reports, interagency meetings and discussions, Service files and other sources of information. A complete administrative record of this consultation is on file in the Austin Ecological Services Field Office (AUESFO).

TxDOT has determined this project "may affect, and is likely to adversely affect" *C. venii* and *R. infernalis*. Critical habitat (CH) has been designated for these species, but only a small portion of one CH Unit (CHU) occurs within the proposed project action area. This BO does not rely on the regulatory definition of "destruction or adverse modification" of CH in 50 CFR 402.02.

Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to CH.

The Service has reviewed the proposed projects potential effects on the black-capped vireo (*Vireo atricapilla*) (BCVI) and concurs with TxDOT's "may affect, not likely to adversely affect" determination for the BCVI. TxDOT has also determined that the project would result in "no effect" to 17 other federally protected species and 5 candidate species (**Table 1**).

**Table 1**. Federally listed and candidate species that may occur within Bexar County and which TxDOT has determined would not be adversely affected by the proposed project.

| Common Name (Scientific Name) | Federal Status | Effect Call Justification |
|---|---|---|
| **Karst Invertebrates** | | |
| Texas wild rice (*Zizania texana*) | Endangered | The project is outside of the known range for this species. |
| Helotes mold beetle (*Batrisodes venyivi*) | Endangered | The project area is outside of the known range for this species. |
| Cokendolpher Cave harvestman (*Texella cokendolpheri*) | Endangered | The project area is outside of the known range for this species. |
| Government Canyon Bat Cave meshweaver (*Cicurina vespera*) | Endangered | The project area is outside of the known range for this species. |
| Robber Baron Cave meshweaver (*Cicurina baronia*) | Endangered | The project area is outside of the known range for this species. |
| Madla Cave meshweaver (*Cicurina madla*) | Endangered | The project area is outside of the known range for this species. |
| Unnamed ground beetle (*Rhadine exilis*) | Endangered | The project area is outside of the known range for this species. |
| Government Canyon Bat Cave spider (*Neoloptoneta microps*) | Endangered | The project area is outside of the known range for this species. |
| Golden-cheeked warbler (*Dendroica chrysoparia*) | Endangered | No suitable habitat within the project area. |
| Peck's Cave amphipod (*Stygobromus pecki*) | Endangered | The project area is outside of the known range for this species. |
| Comal Springs dryopid beetle (*Stygoparnus comalensis*) | Endangered | The project area is outside of the known range for this species. |

| Common Name (Scientific Name) | Federal Status | Effect Call Justification |
|---|---|---|
| Comal Springs riffle beetle (*Heterelmis comalensis*) | Endangered | The project area is outside of the known range for this species. |
| San Marcos salamander (*Eurycea nana*) | Threatened | The project area is outside of the known range for this species. |
| Texas blind salamander (*Eurycea rathbuni*) | Endangered | The project area is outside of the known range for this species. |
| Interior Least Tern (*Sterna antillarum athalassos*) | Endangered | No suitable habitat within the project area. |
| Whooping Crane (*Grus americana*) | Endangered | No suitable migratory stopover habitat within the project area. |
| Fountain darter (*Etheostoma fonticola*) | Endangered | The project area is outside of the known range for this species. |
| Sprague's pipit (*Anthus spragueii*) | Candidate | The project area is outside of the known range for this species. |
| Bracted twistflower (*Streptanthus bracteatus*) | Candidate | Habitat for this species occurs in the project area but no specimens were observed during on-site habitat assessments. |
| Golden orb (*Quadrula aurea*) | Candidate | The project area is outside of the known range for this species. |
| Texas fatmucket (*Lampsilis bracteata*) | Candidate | The project area is outside of the known range for this species. |
| Texas pimpleback (*Quadrula petrina*) | Candidate | The project area is outside of the known range for this species. |

**Consultation History**

The consultation history for this project is listed below.

September 11, 2006: TxDOT's San Antonio District (SAT) sent a letter to the AUESFO requesting species information on Loop 1604.

September 26, 2006: AUESFO sent an email to TxDOT stating that species location data cannot be provided to outside agencies.

December 14, 2006: TxDOT (SAT) sent the AUESFO a draft BA for the Loop 1604 project.

December 29, 2006: AUESFO provided comments to TxDOT (SAT) on the draft BA.

January 7, 2007: Site visit attended by AUESFO biologist and TxDOT (SAT).

May 1, 2007: Formal submittal of the BA for Loop 1604 by FHWA to the AUESFO requesting formal consultation.

September 17, 2007: FHWA sent a follow-up letter to the AUESFO inquiring about the status of the Loop 1604 consultation.

September 28, 2007: Teleconference between TxDOT's Environmental Affairs Division (ENV), AUESFO, and FHWA. The purpose of the teleconference was to inquire about the status of the BA. The outcome of the conference call was AUESFO indicated they would try and get the Service's karst biologist to San Antonio for a site visit in the next four to six weeks and that the next step might be a BO, which would take two to three months to complete after the site visit.

November 14, 2007: TxDOT (SAT) staff and consultants met with the USFWS karst biologist to discuss the proposed project and review design schematics.

December 14, 2007: Email exchange between TxDOT (SAT) and AUESFO responding to a request for span design.

December 20, 2007: FHWA sent a letter to the AUESFO with a revised BA. The revised document includes the requested change of elevating the proposed Loop 1604 over CHU 16 as part of the permanent conservation measures.

January 2, 2008: Email exchange between the AUESFO and TxDOT (SAT). AUESFO indicated that the revised BA was received. AUESFO asked TxDOT (SAT) to compare the two designs of the spans and the boxes so that they can determine which is better to avoid and minimize impacts.

January 2, 2008: Email exchange between TxDOT (SAT) and the AUESFO with information from the TxDOT project manager and the TxDOT (SAT) Head of Bridge Design regarding the schematic information requested in previous email.

January 8, 2008: Email exchange between TxDOT (SAT) to AUESFO responding to verbal request by the Service to describe any vegetation enhancement in area.

January 10, 2008: Email exchange between the AUESFO and TxDOT (SAT) requesting a quantification of the reduction of impacts and a scan of the page from the

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| | George Veni & Associates (2003) report describing approximation of subsurface drainage basin from notes on Isopit. |
| January 11, 2008: | Email from AUESFO to TxDOT (SAT), TxDOT (ENV) and FHWA acknowledging receipt of the revised BA. |
| February 7, 2008: | Email from AUESFO to TxDOT (SAT), TxDOT (ENV), FHWA, and TxDOT consultants requesting an additional meeting on the 1604 project. |
| March 7, 2008: | Meeting between AUESFO, TxDOT (SAT), FHWA, and Texas Office of the Attorney General to discuss additional project alternatives. |
| May 30, 2008: | FHWA sent letter to the AUESFO with a revised BA. |
| July 1, 2008: | AUESFO sent comments to TxDOT (SAT) on the revised BA. These included requests for specific edits, as well as further studies of *Cicurina* taxonomy, explanation of beneficial effects to *R. infernalis*, pre-construction studies of cave crickets, and a delineation of the drainage basin for Caracol Creek Coon Cave. |
| January 20, 2009: | TxDOT (ENV) completed pre-construction study of cave crickets (TxDOT 2009) in response to AUESFO comments. |
| March 24, 2009: | Coordination meeting between TxDOT (ENV) and AUESFO to review methods for habitat assessment and presence/absence surveys for listed species within the Loop 1604 corridor. |
| April 10, 2009: | TxDOT (SAT) and AUESFO attended a site visit to review potential federally listed species habitat and methods for conducting presence/absence surveys for federally listed species. |
| March 19, 2010: | Coordination meeting between TxDOT (ENV), Alamo Regional Mobility Authority (ARMA) and AUESFO to discuss the status of field surveys and CHUs. |
| September 3, 2010: | Alamo RMA transmitted a report to the AUESFO regarding the 2010 habitat assessments and presence/absence surveys for endangered birds. |
| September 15, 2010: | Coordination meeting between TxDOT (ENV), ARMA and AUESFO providing a status update on biological surveys, discussing indirect and cumulative effects analysis for the Environmental Impact Statement (EIS), and the next steps in terms of section 7 compliance and coordination with the Service. |
| November 18, 2010: | Letter submitted by TxDOT (ENV) to the AUESFO regarding regulatory guidance for endangered bird presence/absence surveys conducted with a |

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| | summary of results to date and requesting concurrence that two years of negative surveys would be sufficient. |
| March 1, 2011: | Coordination meeting between TxDOT (ENV), ARMA and AUESFO to review results of bird and karst surveys, request Service concurrence that two years of bird surveys are adequate, discuss proposed CHU modifications and pre-emptive mitigation opportunities, review timeline and order of operations for submission of a revised BA and subsequent issuance of a BO. |
| April 8, 2011: | Coordination meeting between TxDOT (ENV), ARMA and AUESFO to summarize results of karst surveys and proposed areas of focus for section 7 consultation, discuss draft EIS alternatives and associated impacts to proposed areas of focus, identify acceptable conservation measures, and to gain a mutual understanding of the Loop 1604 section 7 consultation process. |
| May 11, 2011: | AUESFO provided a letter indicating that two years of bird surveys were adequate, but if construction was delayed more than three years from the date of the letter that another round of surveys would be required. |
| 2009-2011 | ARMA performed karst invertebrate studies for Loop 1604, between Interstate Highway 35 to SH 90, including CHU 16 (TxDOT 2015a). These studies included a drainage basin delineation for Caracol Creek Coon Cave. |
| February 10, 2015: | TxDOT informed the AUESFO that they would be seeking formal consultation for this project due to the potential for impacts to listed karst species. |
| August 13, 2015: | TxDOT submitted a revised Loop 1604 BA, limiting construction impacts to between SH 151 and Caracol Creek, and a letter requesting initiation of formal section 7 consultation under the Act. |
| February x, 2016: | The Service provided TxDOT with a draft BO for review and comment. |
| February x, 2016: | TxDOT provided comments on the draft BO. The Service made minor changes to the document and proceeded to finalize the BO. |

## BIOLOGICAL OPINION

### Description of Proposed Action

TxDOT is proposing to expand Loop 1604 to a four lane expressway from SH 151 in the north, past Potranco Road, to Caracol Creek in the south, for a distance of approximately 4.1 miles.

The proposed action would convert the existing roadway to a four-lane expressway and would include the construction of southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and four grade separation overpasses. In addition to the roadway improvements, sections of existing water and sanitary sewer lines, owned and operated by the San Antonio Water System (SAWS), and natural gas lines, owned and operated by City Public Service (CPS) Energy, would be relocated to accommodate the roadway expansion. All proposed roadway improvements and water and sewer relocations would be constructed primarily within existing right of way (ROW) and the proposed 3.7 acres of new ROW. To accomplish the proposed action, approximately 3.7 acres of new ROW would be acquired between Kilmarnoch Road and Reed Road.

The proposed action would reconstruct the main lanes of Loop 1604 slightly west of their current alignment, retaining two 12-foot lanes in each direction. The proposed improvements also include the construction of two to three-lane northbound and southbound frontage roads beginning at the SH 151 interchange, with auxiliary lanes and turn lanes at ramps and intersection locations. The only areas where the northbound and southbound frontage roads would be three lanes are at the intersection approaches. At the departure side of each intersection, the frontage road reduces to two lanes. Each ramp exit brings in the third lane, making it three lanes up until the next intersection.

At the intersection of Loop 1604 with Potranco Road, West Military Drive, and Wiseman Boulevard, Loop 1604 would be elevated to span the intersections with the east-west roadways. With the exception of the northbound lanes over Potranco Road, the proposed bridge sections would have two 12-foot travel lanes and an auxiliary lane in each direction with inside shoulder widths of four feet and typical outside shoulder widths of six feet. The frontage roads would include a 15-foot outside lane and 12-foot inside lane(s), with a six foot sidewalk. The inside shoulder width would be four feet. The 15-foot wide outside, shared-use lane would accommodate bicyclists. The typical section would match that of Loop 1604 expansion project currently under construction directly to the north of the project area.

The proposed project design minimizes disturbance to bedrock by adding fill material in low lying areas prior to construction and maximizes construction on fill where possible; however, some subsurface bedrock removal would be necessary. The proposed project design minimizes the depth of excavation wherever possible to minimize the removal of subsurface limestone resulting in total average depths for roadway excavation ranging from 3.5 to 5.7 feet below the current grade and 0 to 9 feet below current grade for water and wastewater lines. Specific project construction actions that would result in subsurface excavation and disturbance include:

- drilling geotechnical boreholes between 2 and 12 inches wide and 10 to 70 feet deep;
- drilling bridge support shafts between 3 and 15 feet in diameter and 12 to 40 feet deep;
- subsurface milling and grading to provide an even surface for subgrade road fill layers;
- trackhoe or backhoe excavation, typically used to install many types of subsurface utilities (i.e., water, wastewater, stormwater, electric, etc.);
- open trench excavation using a ditch-witch or similar equipment, typically used to install many types of subsurface utilities (i.e., water, wastewater, stormwater, electric, etc.); and,

- jack and bore, which is a type of trenchless horizontal subsurface excavation used to install utilities under existing facilities (roadways, sidewalks, buildings, etc.) without disrupting their use.

As part of the proposed action, SAWS would relocate water lines and sanitary sewer lines within the existing and proposed ROW where they are in conflict with the new roadway alignment. Approximately 9,400 linear feet of 6 to 24-inch lateral and main water lines would be relocated throughout the ROW. Relocated water lines would be installed using open cut trench construction with very small areas using jack and bore methods under paved areas. The existing water lines being replaced by this effort would be abandoned in place or, if they are under pavement, grouted.

Approximately 830 linear feet of 24-inch sanitary sewer main would be replaced along Caracol Creek and one sewer manhole would be replaced near the Loop 1604 intersection with Kilmarnoch Lane. Sanitary sewer lines would be installed using open cut trench construction outside of paved areas and using jack and bore methods under paved areas. The existing 21-inch sewer main along Caracol Creek would be filled with grout and abandoned in place.

CPS Energy would relocate portions of a natural gas line within the existing and proposed ROW where they are in conflict with the new roadway alignment. Relocated gas lines would be installed using open cut trench construction with very small areas of disturbance using trencher, backhoe, or rock saw methods under paved areas. The existing gas lines being replaced by this effort would be removed.

Construction access and staging would occur within the project area, which includes the existing and proposed ROW. Project Specific Locations (PSLs) may also occur outside of the project area if the contractor chooses. Environmental compliance for PSLs located outside of TxDOT's ROW would be the responsibility of the project contractor. Additional details on access and staging would not be available until the project design is finalized and a construction contractor is chosen; however, all PSLs that would be located within the ROW would be located at least 300 feet from any known listed species location or the outer boundary of CHU 16, unless a survey performed in accordance with USFWS protocols demonstrates that the chosen site does not contain listed species habitat.

As the proposed project design is not complete, post-project site restoration has not been finalized; however, all disturbed areas would be revegetated according to TxDOT's standard practices for urban areas and the Texas Commission on Environmental Quality's (TCEQ) Texas Pollutant Discharge Elimination System Construction General Permit (CGP), which to the extent practical, are in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping. The following items would be considered in areas to be revegetated:

- To the extent practicable, topsoil suitable for maintaining native vegetation would be added in areas that need to be revegetated. The topsoil would filter runoff and provide a layer of protection to stabilize subsurface temperatures and prevent moisture loss.
- Native seed and plantings would be used to reestablish vegetative communities near known occupied karst features which would provide some filtration of water and also

insulate the karst system from excessive drying and from extreme subsurface temperature fluctuations (USFWS 2011).

TxDOT's standard practices for roadway operations and maintenance would be implemented following the completion of post-project site restoration activities. SAWS would also implement standard practices for the operation and maintenance of water and sanitary sewer lines following the completion of post-project site restoration activities. The project is set to let in May 2016, construction would start several months later and would take about 29 months to complete.

*Conservation Measures*

Impacts to *C. venii* and *R. infernalis* would be minimized by restricting construction impacts to the proposed action area, described below. In addition, the following voluntary conservation measures have been developed by TxDOT to avoid or minimize impacts to *C. venii* and *R. infernalis,* CHU 16, and other federal trust resources.

The Loop 1604 project was designed to minimize excavation and maximize the use of fill within the ROW; therefore, minimizing impacts to subsurface limestone and potential karst invertebrate habitat. Surveys of the existing and proposed ROW did not identify any habitat occupied by federally listed species.

1. TxDOT would minimize impacts to CHU 16 and to native vegetation, especially woodland impacts, within the proposed construction footprint. The proposed action would require the addition of 3.7 acres of new ROW and TxDOT has adjusted the alignment of the new lanes to the east of the existing Loop 1604 roadway to avoid impacts to Caracol Creek Coon Cave and CHU 16.

2. The project would include five or more acres of earth disturbance; therefore, TxDOT must comply with the TCEQ's Texas Pollutant Discharge Elimination System CGP. Appropriate best management practices (BMPs) to minimize construction phase erosion and sedimentation impacts would be incorporated into the proposed project and related notes and diagrams would be included in required TCEQ permitting documents, such as the Storm Water Pollution Prevention Plan (SW3P) and construction plans. The SW3P would be prepared during the final design stages of the project and implemented prior to initial site disturbance, and a construction site notice would be posted on the construction site.

3. PSLs, including construction access and staging, would be located within the project area and existing ROW to the extent practicable. Details on the locations of PSLs will not be available until the project design is finalized and a construction contractor is chosen; however, all PSLs would be located at least 300 feet from any potential listed species habitat unless it has been surveyed in accordance with Service protocols to determine that the habitat is not occupied.

4. Environmental compliance for PSLs located outside of TxDOT's ROW would be the responsibility of the project contractor. TxDOT will provide an information packet to the

project contractor, including information on the BCVI and karst species that may occur within the ROW or outside of the ROW but within the project action area, their habitat requirements, as well as information on the protection of CHU 16. TxDOT would also notify the contractor of requirements under the Act to avoid effects to listed species and their habitat.

5. If karst voids are encountered during construction, all work would stop within 50 feet of the void site and a qualified karst scientist would perform an initial geologic assessment. The buffer distance may be greater if the karst scientist deems appropriate. If the karst scientist determines that the feature provides potential habitat for listed karst invertebrate species, a karst scientist holding an appropriate Section 10(a)(1)(A) permit would inspect the feature to determine its scientific or conservation value. The surface expression of the void would be covered between the time the void is opened and the time that a karst biologist is available to inspect it, in order to minimize the influence of diurnal variations in surface temperature and to retain moisture. Hazard fencing or barricades would be used to protect the area if there is a fall hazard, such as the case of an open shaft. Appropriate BMPs, including the installation of silt fencing and/or silt socks and immediate area work stoppage, would be implemented to minimize surface runoff from entering the feature.

6. TxDOT would install sediment control or construction fencing around the exterior boundary of CHU 16 within the Loop 1604 ROW. This would help contractors identify the protected location and prevent accidental incursions into the CHU protected area.

7. Recent sampling efforts carried out as a voluntary conservation effort related to roadway improvements at SH 151 successfully identified new *Cicurina* and *Rhadine* populations in CHU 15 (TxDOT 2015c). CHU 15, located in Rolling Oaks, consists of 217 acres of private land in western Bexar County (USFWS 2012). This CHU lies within a subdivision of rural acreage lots, some of which have had houses built upon them. Other lots have not been built on, and some of those are known to contain karst features with karst invertebrate habitat and listed karst invertebrate populations. Eleven caves have been identified in CHU 15 (Bracken Bat Cave, Cave of the Bearded Tree, Cave of the Mad Machete, Horsefly Cave, Isopit, Molar Hole, Niche Cave, Obvious Little Cave, Womly Pit, World Newt Cave, Wurzbach Bat Cave). Six of these (Bracken Bat Cave, Horsefly Cave, Isopit, Obvious Little Cave, Womly Pit, Wurzbach Bat Cave) are known localities for *R. infernalis*, at least three (Cave of the Bearded Tree, Chimney Cricket, and Womly Pit) contain eyeless *Cicurina*, and several others contain potential habitat for eyeless *Cicurina* (TxDOT 2015c). Several of these caves have not been thoroughly mapped, and none of them have had their surface or subsurface drainage basins delineated. Understanding the distribution of these species and their status within protected caves is one of the keys to USFWS recovery goals for these species. In the event a potentially occupied karst feature cannot be avoided during construction, TxDOT will initiate additional sampling efforts in these features to further our understanding of the species that occupy these caves. TxDOT will also map the caves and delineate the surface and subsurface drainage basins for each cave. In addition, TxDOT will investigate mechanisms for implementing protection measures, which may include

fencing around the features, cave gating, and/or educational signs, at as many of these caves as possible to protect them from future degradation and unauthorized entry.

8. TxDOT would work to ensure that impacts to non-listed migratory bird species are avoided, by implementing measures to comply with the Migratory Bird Treaty Act (MBTA). The following conservation measures are proposed: vegetation clearing would take place outside nesting season to the extent practicable, and if possible, in the year prior to construction; the contractor would be required to remain vigilant for the presence of early nesting species if vegetation clearing occurs in mid-winter. In the event that migratory birds are encountered on-site during construction, every effort would be made to avoid harm to protected birds, active nests, eggs, and/or young. The contractor would remove any old migratory bird nests between September 1 and February 28 from any structure where work would be done. In addition, the contractor would be prepared to prevent migratory birds from building nests between February 15 and August 31.

9. TxDOT will seek to partner with TPWD, the Edwards Aquifer Authority, or other suitable organizations for educational and professional development opportunities related to karst habitat and species. TxDOT proposes to develop or enhance existing educational opportunities for local school children, such as field trips or classroom materials. TxDOT also proposes to hold up to three training sessions to educate karst professionals.

10. Different types of subterranean habitat may be utilized by *Cicurina* species versus *Rhadine* species. A preliminary review of species inventories conducted within voids discovered during highway construction in Bexar County indicates that while *Cicurina* spiders do occupy these voids, *Rhadine* beetles have not been detected in them (TxDOT 2015d). This suggests that *Rhadine* may only occur in caves with natural sinkhole entrances, rather than entranceless voids, while *Cicurina* may occur in both. Determining habitat preference for these two taxa will help focus conservation and management efforts for these species and will be informative for quantifying take when considering future transportation projects. Future transportation projects in Bexar County will provide the opportunity for extensive sampling of previously unknown voids discovered during construction within the TxDOT ROW, while caves known to be occupied by listed species can be assessed for comparison. This study would address the following recovery needs listed in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011): (1) refine our understanding of habitat and population relationships and requirements to sustain viable populations, (2) continue to assess the detectability of the listed karst invertebrates, and (3) refine our understanding of natural factors that affect populations.

11. TxDOT is sponsoring an ongoing study into the genetics and distribution of *Cicurina* spiders in Bexar and adjacent counties. This study provides conservation value across the range of all listed *Cicurina* species. While this measure enhances the survival and recovery of *C. venii* by focusing taxonomic resolution of eyeless *Cicurina* at known and suspected *C. venii* locations, *Cicurina* are being analyzed throughout their range, including from caves within the Culebra Anticline KFR, where *C. venii* is known to occur.

12. TxDOT is working with the original karst zone and KFR delineator, George Veni, to re-assess the current boundaries of the karst zones and KFR maps using the most up to date distribution information available. These maps are heavily utilized by researchers and biologists making regulatory decisions and determining the level of rigor required for compliance under the Act. This measure would benefit *Cicurina* and *Rhadine* throughout their range.

13. TxDOT would revegetate all disturbed areas within the Loop 1604 construction zone in accordance with TxDOT's standard practices for urban areas and the CGP, in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping. Re-vegetation efforts would provide appropriate and sustainable cover to prevent erosion and siltation.

14. Project reports would be prepared monthly by TxDOT to document the number and location of voids encountered and at what depth, a summary of the results of any karst invertebrate survey conducted, any observations made with a down-hole camera, a summary of the work actions completed during the reporting period, and the construction actions that are anticipated to be implemented in the next reporting period. These reports will be provided to USFWS semi-annually. Quarterly site monitoring will continue for a period of one year after construction is complete; a single report will be submitted to USFWS at the conclusion of this monitoring.

**Action Area**

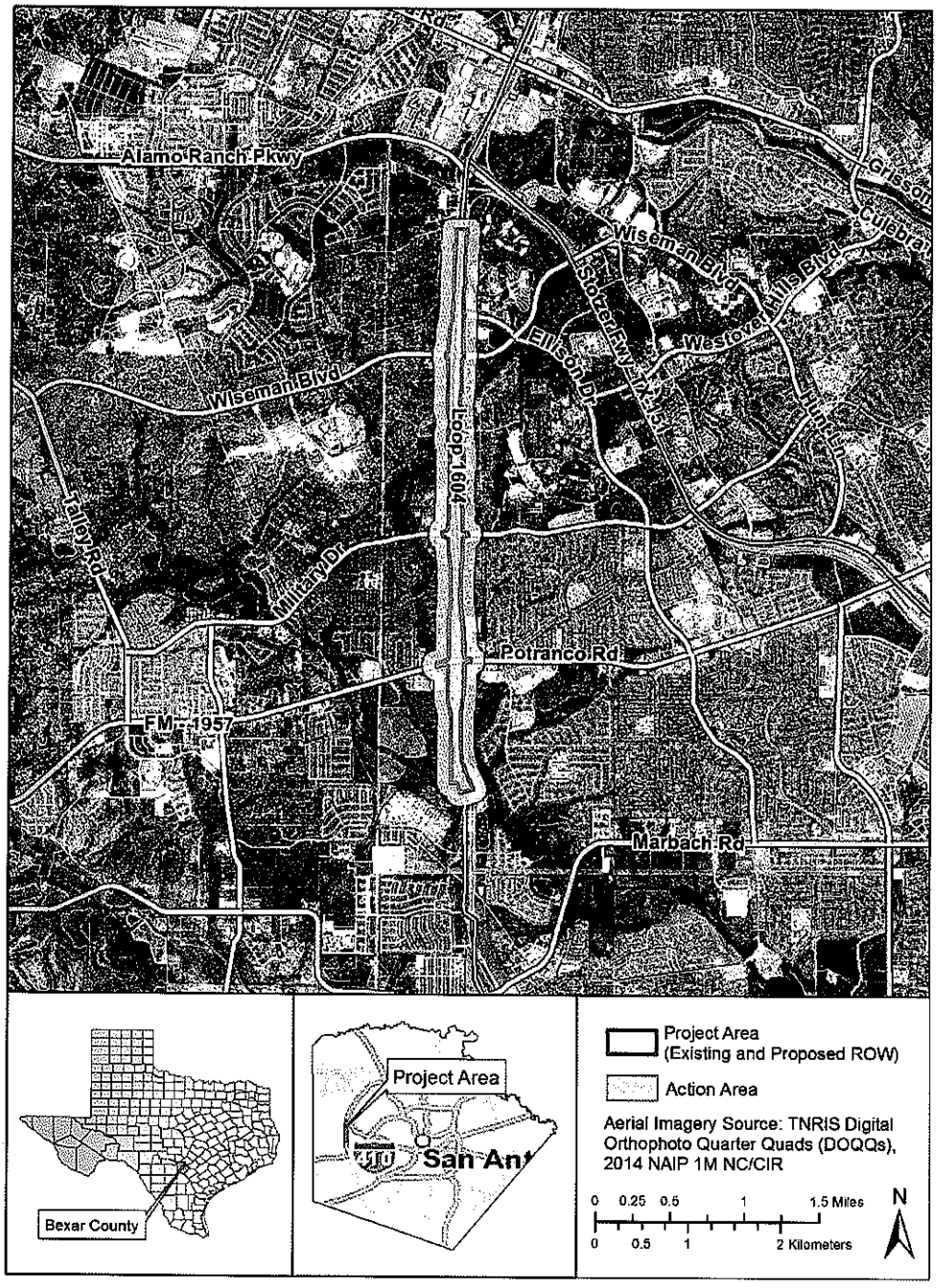
TxDOT's BA refers to both a project area and an action area. The project area is defined as approximately 206 acres of existing and proposed ROW along Loop 1604, from the southernmost extent of the Loop 1604 at the SH 151 interchange project to Caracol Creek, south of Potranco Road. The action area includes the project area and a buffer area extending 500 feet outward from the project area to capture disturbance from construction activities that have the potential to extend beyond the project footprint. For the proposed action, this includes areas where project activities could potentially directly or indirectly affect federally listed threatened and endangered species. The action area covers approximately 710 acres (**Figure 1**). The Service agrees with the extent of the action area as proposed by TxDOT.

**Status of the Species/Critical Habitat**

Species/critical habitat description

Nine Bexar County karst invertebrates were federally listed as endangered species on December 26, 2000 (65 CFR 81419). The nine species listed were *R. exilis, R. infernalis, C. madla*, the Bracken Bat Cave meshweaver *(C. venii)*, the Government Canyon Bat Cave spider (*C. vespera*), the Robber Baron Cave meshweaver (*C. baronia*), the Cokendolpher Cave harvestman (*Texella cokendolpheri*), the Government Canyon Cave spider (*Neoleptoneta microps*), and the Helotes mold beetle (*Batrisodes venyivi*). All of the listed Bexar County karst invertebrates are obligate cave species known as troglobites (animals that complete their life cycle underground and exhibit adaptation to the subsurface environment). These species are characterized by reduced or

**Figure 1**. Action area for the Loop 1604 improvement project, between SH 151 and Caracol Creek.



absent eyes, lack of pigmentation, elongation of sensory appendages, and low metabolic rates. Compared to surface species, troglobitic species generally have small geographic ranges and specific limitations to a particular geographic area, often related to the sub-surface geology, making them biogeographically distinct (Porter 2007, Christman et al. 2005) and particularly susceptible to extinction (Elliott and Reddell 1989, Culver et al. 2000).

Critical habitat includes areas that are essential to the conservation of a threatened or endangered species and that may require special management considerations or protection. Critical habitat for seven of the nine listed Bexar County karst invertebrates was designated in 22 CHUs, covering about 1,063 acres, on April 8, 2003 (68 CFR 17155). Critical habitat was revised on February 14, 2012 for all nine listed karst invertebrates (77 CFR 8450). The revised CH designation includes approximately 4,216 acres, occurring in 30 separate CHUs within Bexar County. Based on our current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life-history processes, the primary constituent elements (PCEs) specific to each of the nine Bexar County invertebrates are:

(1) Karst-forming rock containing subterranean spaces (caves and connected mesocaverns) with stable temperatures, high humidity (near saturation), and suitable substrates (for example, spaces between and underneath rocks for foraging and sheltering) that are free of contaminants; and,
(2) Surface and subsurface sources (such as plants and their roots, fruits, and leaves, and animal (e.g., cave cricket) eggs, feces, and carcasses) that provide nutrient input into the karst ecosystem.

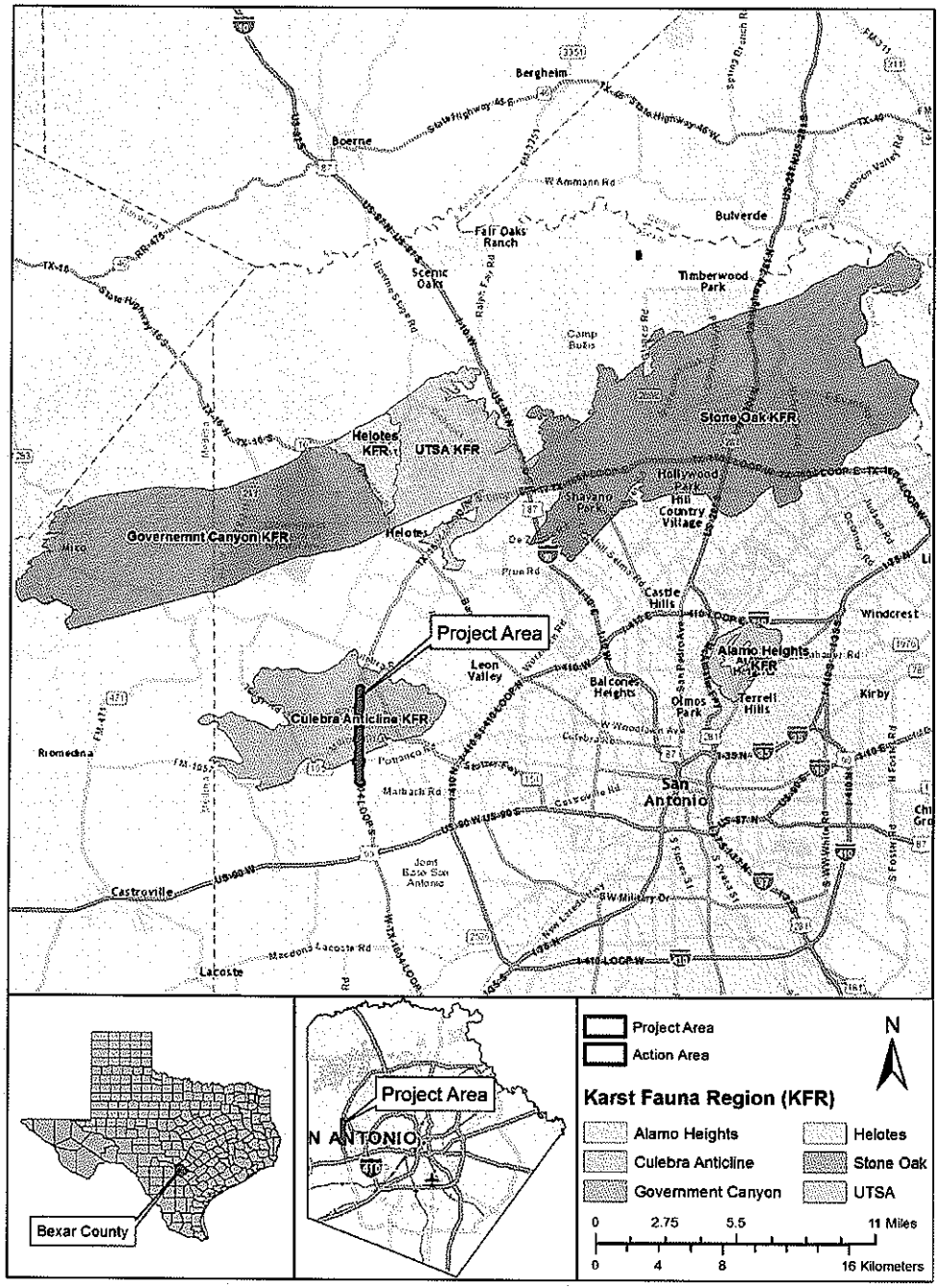
Habitat and Life History

There is little specific information on the life history and habitat requirements of the nine listed Bexar County karst invertebrates. This is largely because troglobites are subterranean, inconspicuous, and difficult to study (Mitchell and Reddell 1971, Chandler 1992). The term "karst" refers to a subterranean terrain that is formed by the slow dissolution of calcium carbonate from limestone bedrock by mildly acidic groundwater. This process creates numerous cave openings, cracks, fissures, fractures, sinkholes, and bedrock resembling Swiss cheese.

The northern portion of Bexar County is located on the Edwards Plateau, a broad and flat expanse of Cretaceous carbonate rock that ranges in elevation from approximately 1,100 feet to 1,900 feet above mean sea level. The principal cave-containing rock units of the Edwards Plateau are the upper Glen Rose, Edwards Limestone, Austin Chalk, and Pecan Gap Chalk formations. One-third of the cavernous rock exposed at the surface in Bexar County is of the Edwards Limestone formation (Veni 1988, Veni 1994).

Veni (1994) delineated six Karst Faunal Regions (KFRs) within Bexar County: Stone Oak, University of Texas at San Antonio, Helotes, Government Canyon, Culebra Anticline, and Alamo Heights (**Figure 2**). These KFRs are bounded by geological or geographical features that may represent obstructions to the movement (on a geologic timescale) of troglobites, which has resulted in the present-day distribution of endemic (restricted to a given region) karst

**Figure 2.** Bexar County Karst Faunal Regions.

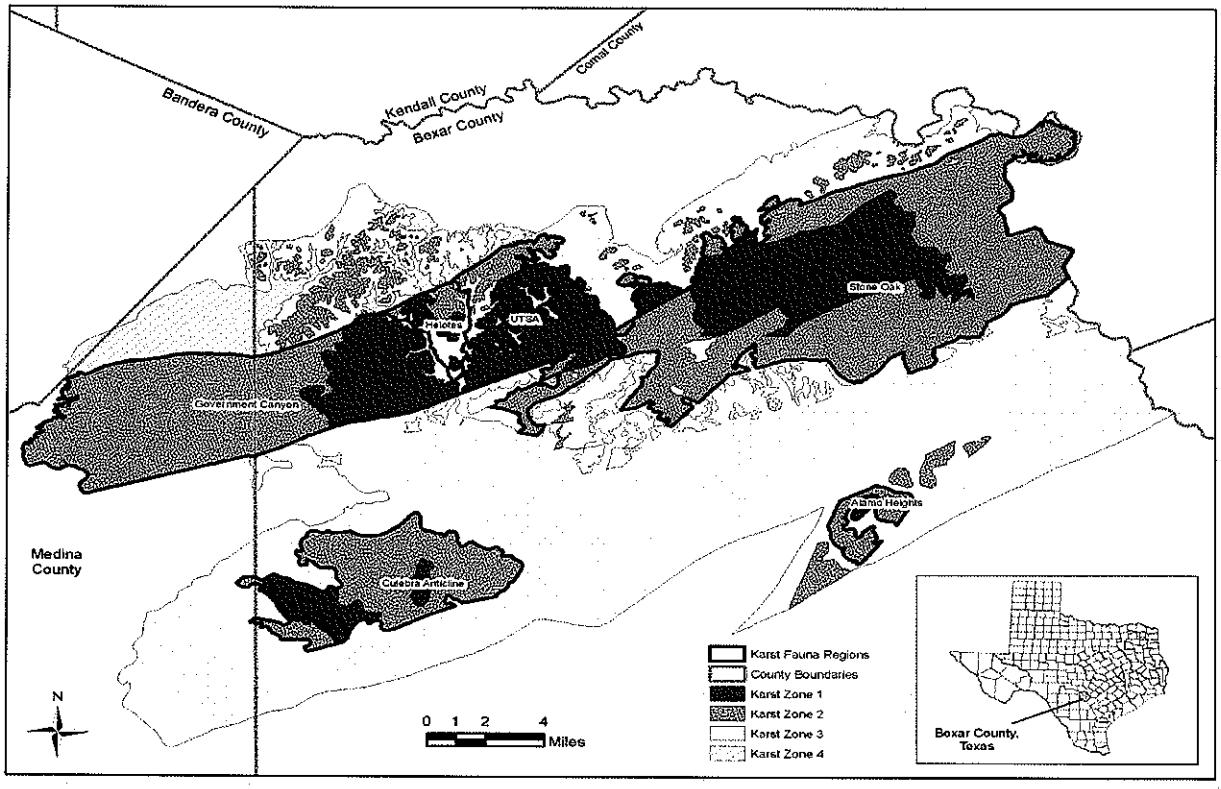


invertebrates in the Bexar County area. The basis for these regions is the lack of continuity between caves, which may form complete barriers or significant restrictions to migration of troglobites over modern or geologic timescales. The KFRs are important because they are used to establish recovery criteria for individual species in the Bexar County Karst Invertebrate Recovery Plan (USFWS 2011). To meet those criteria, specified numbers of preserve areas of a given quality must be protected within each KFR in which they occur.

Veni (2003) also delineated the Bexar County karst habitat into five karst zones (**Figure 3**) that reflect the likelihood of finding a karst feature that would provide habitat for the endangered invertebrates, based on geology, distribution of known caves, distribution of cave fauna, and primary factors that determine the presence, size, shape, and extent of caves with respect to cave development. As described by Veni (2003), these five karst zones are defined as:

Zone 1: Areas known to contain one or more of the nine listed Bexar County karst invertebrates.
Zone 2: Areas having a high probability of containing habitat suitable for listed karst invertebrate species.
Zone 3: Areas that probably do not contain karst invertebrates (may not contain suitable karst habitat).
Zone 4: Areas that require further research, but are generally equivalent to Zone 3, although they may include sections that could be classified as Zone 2 or 5.
Zone 5: Areas that do not contain listed karst invertebrates (no karst habitat present).

**Figure 3.** Karst zones in Bexar County.



The nine Bexar County invertebrates require underground caves and passages with stable temperatures (Howarth 1983, Dunlap 1995) and constant, high humidity (Barr 1968, Mitchell 1971a). In addition to the larger cave passages that are accessible by humans where individuals are normally collected, these species also need mesocaverns (tiny voids that are connected to larger cave passages) (Howarth 1983), which provide additional habitat to sustain viable populations (White 2006). In order to support karst invertebrates, mesocavernous spaces should be a minimum width of 0.2 to 0.4 inch, which also corresponds to the threshold of turbulent groundwater flow that could potentially carry nutrients to karst species (Howarth 1983, Veni 1994). During temperature extremes, small mesocavernous spaces connected to caves may have more favorable humidity and temperature levels than the main cave (Howarth 1983); however, the abundance of food may be less in mesocaverns than in the larger cave passages. Therefore, the nine Bexar County invertebrates may spend the majority of their time in mesocaverns, only leaving during temporary forays into the larger cave passages to forage (Howarth 1987).

Physical factors in caves that affect the life history of the Bexar County karst species include absence of sunlight, low nutrient flow, and a stable environment with uniform temperature and humidity. These parameters favor the evolution of troglomorphic characteristics including reduction or loss of eyes, reduced pigmentation, and attenuated limbs and olfactory organs (USFWS 2011). Additionally, nearly all cave-adapted organisms exhibit the following characteristics: delayed reproduction, larger eggs, relatively small number of total eggs produced, and increased longevity (Culver 1982). Although the average life span of any of the listed troglobitic invertebrates is currently unknown (USFWS 2011), it is likely to be multiple years for some species, such as the *Cicurina* spiders (Bennett 1985, Cokendolpher 2004).

The nine Bexar County invertebrates need clean water that is free of pollutants to maintain stable humidity and temperatures. To maintain stable humidity, the amount of clean water varies depending on the size of the drainage basins, caves, and mesocaverns. Water enters the karst ecosystem through surface and subsurface drainage basins. Well-developed pathways, such as cave openings and fractures, rapidly transport water through the karst with little or no purification. Caves are susceptible to pollution from contaminated water entering the ground because karst has little capacity for self-purification. The potential for pollutants, such as pesticides, fertilizers, and leakage from sewer lines, may be heightened in some karst areas relative to others based on local geologic features (USFWS 1994).

The route that has the greatest potential to carry water-borne contaminants into the karst ecosystem is through the surface and sub-surface drainage basins that supply water to the ecosystem. Because cave fauna require material washed in through entrances (including human inaccessible cracks), and because they require generally high humidity, it is essential to have drainage basins with unpolluted water. The surface drainage basin consists of the area that drains from the surface into the cave entrance and other surface input sources, such as neighboring sinkholes and soil percolation. The subsurface or groundwater drainage basin includes mesocaverns, as well as subterranean streams that have a connection to the surface, but that connection is often not observable from the surface. The surface and subsurface drainage basins do not necessarily overlap, and they may be of different size and direction (Veni 2003).

Due to the absence of sunlight cave organisms rely almost entirely upon surface plant and animal communities for nutrient input. Surface plant communities provide nutrients through leaf litter that enters caves or karst voids and from root masses that may grow directly into caves (Howarth 1983). In caves that do not have an opening at the surface, nutrients probably enter via dissolved organic carbon in droplets of water that pass through very small cracks, root paths, bedding planes, or other very small voids, and the nutrients then enter the cave as drips (Simon et al. 2007). Tiny arthropods, such as springtails, may also feed in the near-to-surface plant-rich soil zone and travel through these passages, ultimately becoming a food source for spiders and other predators. Primary sources of nutrients in the karst ecosystem are leaf litter, cave crickets, small mammals, and other animals that defecate or die in the cave. Because the nine Bexar County invertebrates are at the top of their food chain, habitat changes that affect their food sources (including plants and cave crickets) can affect them (Culver *et al.* 2000).

Cave crickets are an important source of nutrient input for karst ecosystems (Barr 1968, Reddell 1993). The cave crickets forage on the surface at night and roost in the cave during the day. Cave crickets provide food for karst species, which feed on their eggs, young, and feces (Mitchell 1971b, Barr 1968, Poulson *et al.* 1995). Many of the vertebrate species that occasionally use caves bring in a significant amount of energy in the form of scat, nesting material, and carcasses.

The surface plant community supports the karst ecosystem function both directly and indirectly. Dead and decaying plant material can fall or be washed into caves. Root masses reaching cave openings through soil and rock fissures may also provide direct nutrient input to shallow caves (Howarth 1983, 1988). A survey of 21 caves on the Edwards Plateau revealed that roots of six species reached caves (Jackson *et al.* 1999). Indirectly, the plant community supports cave ecosystem dynamics by providing the habitat matrix used by surface animal communities that contribute nutrient input to the karst ecosystem, including habitat needed for food, forage, and shelter by mammals, invertebrates, amphibians, and reptiles. In addition to providing nutrient input, the surface plant community buffers the karst ecosystem from changes in the temperature and moisture regimes, and sedimentation from soil erosion. It also serves to filter pollutants (to a limited degree) before they enter the karst system and protects against nonnative species invasions (Biological Advisory Team 1990, Veni 1988).

Population Dynamics

Population estimates for any of the listed karst species are not currently available due to their rarity, cryptic behavior, lack of adequate sampling techniques, difficulty and/or inaccessibility of karst habitat, including mesocavernous spaces. Generally, no more than one or two individuals are seen on a visit into a cave and often none are observed, even in karst features where they are considered relatively abundant (USFWS 1994).

Krejca and Weckerly (2007) assessed the detection probabilities of three karst invertebrates, including *Rhadine exilis*, during karst faunal surveys. The results of their study suggest that 10 to 22 visits may be required in order to confirm presence for various karst species. For example, while surveying one feature associated with the SH 151 underpass of Loop 1604, the eyeless *Cicurina* specimen was not found until the 12th survey, indicating that in this case 12 visits was

enough to detect the species, but 11 was not (TxDOT 2013). Furthermore, central Texas endangered karst invertebrates have been found in caves that immediately prior to sampling had no humanly accessible entrances (Horizon Environmental Services 1991, Veni 2003, TxDOT 2013).

Status and Distribution

The primary threat to these species is habitat loss due to increased human expansion and urbanization throughout the karst terrain in Bexar County. Threats associated with increased urbanization include filling in and collapsing of caves and interstitial spaces, alteration of drainage patterns, alteration of surface plant and animal communities, introduction of invasive red imported fire ants (RIFA) (*Solenopsis invicta*), contamination, and vandalism (USFWS 2011).

As the population of the San Antonio region has increased more than 75 percent in the past 30 years and is anticipated to increase more than 60 percent over the next 30 years, growth, public infrastructure, and private development related to growth is reasonably certain to occur within the Culebra Anticline (Loomis et al. 2014). Impacts to listed karst species from increased development may result from additional impervious cover, removal of surface vegetation, increased pollution, modification and/or destruction of karst features, and alterations to the surface and subsurface hydrological regimes. Development would remove natural vegetative cover; therefore, reduce cave cricket foraging areas and the potential carrying capacity for karst invertebrate habitat. Removal of woody surface vegetation may result in a reduction of vegetative root matter penetrating into subterranean voids, a potential point source for the introduction of nutrients into karstic ecosystems. Fragmentation of natural areas may result in a decreased occurrence of trogloxene species (e.g. cave crickets) that may dwell in karst features and directly import nutrients from the surface to the subsurface. In addition, development would increase the amount of impervious cover in the area, which would result in increased surface pollution runoff and in alterations to surface and subsurface hydrological regimes as water is redirected to man-made drainage systems. These changes may alter the quality and quantity of water entering karst voids.

Construction and development activities that do not destroy a cave entrance can still result in collapse of the cave ceiling or other adverse effects on the karst environment. On ranch land or in rural areas, it is not uncommon to use caves as trash dumps (Culver 1986, Reddell 1993) or to cover the entrances to prevent livestock from falling in (Elliott 2000). These activities can be detrimental to the karst ecosystem by causing direct destruction of habitat or altering the natural passage of organisms, water, detritus, and other organic matter into a cave. Quarrying of limestone and road base material is a widespread activity that can remove vegetation and destroy karst habitat. A number of occupied caves in Bexar County have been severely impacted in the past, and an examination of recent aerial photography reveals recent impacts to karst habitat near several other occupied caves.

Cave organisms are adapted to live in a narrow range of temperature and humidity. To sustain these conditions, both natural surface and subsurface flow of water and nutrients must be maintained. Decreases in water flow or infiltration may result in reduced humidity, slowing the

rate of decomposition, while increases in water entering voids may flood habitats, cause drowning of void inhabitants and may wash away nutrients (USFWS 2011). Alterations to surface topography, including decreasing or increasing soil depth or adding nonnative fill, can change the nutrient flow into the cave, and affect the cave community (Howarth 1983). Changes in the amount of impermeable cover, collection of water in devices like storm sewers, increased erosion and sedimentation, and irrigation and sprinkler systems can affect water flow to caves and the surrounding karst. Changes in the quantity of water, its organic content, the timing and extent of flood pulses, or droughts may negatively impact the listed species.

Karst ecosystems are heavily reliant on surface plant and animal communities to maintain nutrient input, reduce sedimentation, and resist exotic and invasive species. As the surface around a cave entrance or over the associated karst ecosystem is developed, native plant communities are often replaced with impermeable cover or exotic plants from nurseries. The abundance and diversity of native animals may decline due to decreased food and habitat, combined with increased competition and predation from urban, exotic, and pet species. As surface plant and animal communities are destroyed, food and habitat once available to trogloxenes decreases. Destruction of plant communities can lead to increased erosion that causes sedimentation within caves. Where native woodland and grassland communities are present, a perimeter area is needed to shield the core vegetation habitat from impacts associated with edge effects or disturbance from adjacent urban development (Lovejoy *et al.* 1986, Yahner 1988). Effects from such impacts can include increases in invasive species and pollutants, and changes in microclimates, which can adversely affect the listed species by impacting nutrient cycling processes important in cave/karst dynamics and the overall health of karst invertebrates.

Much of the habitat occupied by the Bexar County invertebrates is particularly sensitive to groundwater contamination, because little or no filtration occurs, and water penetrates rapidly through bedrock conduits (White 1988) and mesocaverns (Cowan et al 2007). The ranges of these species are becoming increasingly urbanized, and, thereby, they are becoming more susceptible to contaminants including sewage, oil, fertilizers, pesticides, herbicides, seepage from landfills, pipeline leaks, or leaks in storage structures and retaining ponds. Activities on the surface, such as disposing of toxic chemicals or motor oil, can contaminate caves (White 1988). Materials like cleaning agents, industrial chemicals, and heavy metals can also easily infiltrate subterranean ecosystems by the pollutants leaching into the karst, for example, from leaking underground storage tanks, or by being washed into the surface or subsurface drainage area. Contamination of karst habitat can also occur from the deposition of air pollutants in the surface or subsurface drainage area and improper disposal of litter, motor oil, batteries, or other household products in or near caves (White 1988).

Continued urbanization would increase the likelihood that karst ecosystems are polluted by contamination from chemical leaks and spills, which often have occurred in Bexar County. The TCEQ (2010) summarized information on groundwater contamination reported by a number of agencies, and listed 109 groundwater contamination cases that occurred in Bexar County between 1980 and 2000; the majority of them were spills or leaks of petroleum products. Groundwater contamination poses a threat to entire karst ecosystems and is particularly difficult to manage because pollutants can originate far from the sensitive karst site and flow rapidly through the subsurface (White 1988).

RIFA are a pervasive, nonnative ant species originally introduced to the United States from South America over 50 years ago and are an aggressive predator and competitor that has spread across the southern United States. Karst invertebrates in central Texas are especially susceptible to RIFA predation because most caves are relatively short and shallow. This threat is exacerbated by activities that accompany urbanization and that result in soil disturbance and disruption to native ant communities. RIFA have been found within and near many caves in central Texas and have been observed feeding on dead troglobites, cave crickets, and other species within caves (Elliott 1992, 1994, Reddell 1993, Taylor *et al.* 2003). They often replace native species, and evidence shows that overall arthropod diversity, as well as species richness and abundance, decreases in infested areas. Hot and dry weather may also encourage RIFA to move into caves during summer months, and cold weather may cause them to seek refuge or prey in the caves during the winter. Besides direct predation, RIFA threaten listed invertebrates by reducing the nutrient input that fuels the karst ecosystem. Taylor *et al.* (2003) found that cave crickets often arrived before RIFA at baits placed above ground at night, but the arrival of RIFA corresponded to the departure of cave crickets, indicating competition for at least some food resources. Lavoie *et al.* (2007) also reported that cave crickets and RIFA ate the same baits. Of 36 caves visited during status surveys for the nine Bexar County karst invertebrates, RIFA were found in 26 of them (Reddell 1993).

Models suggest climate change may cause the southwestern United States to experience the greatest temperature increase of any area in the lower 48 States (IPCC 2007). There is also high confidence that many semi-arid areas like the western United States would suffer a decrease in water resources due to climate change (IPCC 2007), as a result of less annual mean precipitation (Christensen *et al.* 2007). These predictions underscore the importance of special management to maintain karst moisture and temperature levels to ensure survival of the nine karst invertebrates.

In summary, threats to the nine Bexar County invertebrates include clearing of vegetation for commercial or residential development, road building, quarrying, or other purposes. Infestation by nonnative vegetation causes adverse changes in the plant and animal community and possibly in moisture availability. An increase in RIFA can occur with development and cause competition with and predation on other invertebrates in the karst ecosystem. In addition, filling cave features for construction, ranching, or other purposes can adversely affect the listed invertebrate species by reducing nutrient input, reducing small mammal access, and changing moisture regimes. Excavation for construction or operation of quarries can directly destroy karst features occupied by any of the nine Bexar County invertebrates, including the mesocaverns they use.

Analysis of the species/critical habitat likely to be affected

The project area at Loop 1604 falls within the Culebra Anticline KFR in the Austin Chalk geologic unit. Three federally listed endangered karst invertebrate species are known to occur in this KFR: *C. venii, R. infernalis,* and *R. exilis*. Portions of the project area are classified as Karst Zones 1, 2, and 3. Karst Zones 1 and 2 are known to contain, or have a high probability of containing, listed karst species. TxDOT has determined that the proposed Loop 1604 project

"may affect, and is likely to adversely affect" *C. venii and R. infernalis*. TxDOT has also determined that the project "may affect, but is not likely to adversely affect" the BCVI, and would result in "no affect" to *R. exilis* and 10 other listed species. These species will not be considered further in this BO.

*R. infernalis* is a small, robust, reddish-brown beetle with minute eye rudiments and a narrow neck, with a total body length which averages about 7.2 millimeters. *R. infernalis* is known from at least 58 karst features (USFWS 2011, TxDOT 2013) located in five of the six Bexar County KFRs and 20 CHUs, including all four CHUs in the Culebra Anticline KFR. The closest confirmed location of this species is in CHU 16, Caracol Creek Coon Cave, located adjacent to the Loop 1604 ROW. Presence/absence surveys performed in 2009 and 2010 within potential habitat did located one additional feature within the action area (1604-Z01) that is occupied by *R. infernalis*. Feature Z01 is located within the boundary of CHU 16.

*C. venii* is a small eyeless spider with reduced pigment. The species is known from only two caves in the Culebra Anticline KFR. *C. venii* was originally found in Bracken Bat Cave, which is located about two miles west of the action area. The area around Bracken Bat Cave is designated as CHU 15. The CHU contains 11 known caves, with several caves that are occupied by *R. infernalis*. In 2012, TxDOT discovered a new location (Feature 151-Z09) for *C. venii* during construction at the Loop 1604/SH 151 interchange.

TxDOT (2014) has evaluated the existing and proposed impacts related to growth and development within the Culebra Anticline KFR (**Table 2**). The KFR covers about 16,716 acres, all of which is karst zone 1 or 2. Existing development within the KFR is about 9,425 acres (56.4%) and about 7,291 acres (43.6%) are currently undeveloped. There are several proposed master planned developments proposed for construction in the KFR, totaling about 5,567 acres. If they are constructed, total development would be about 14,992 acres, or about 90% of the KFR.

Table 2. Existing conditions and impacts related to growth and development in the Culebra Anticline KFR.

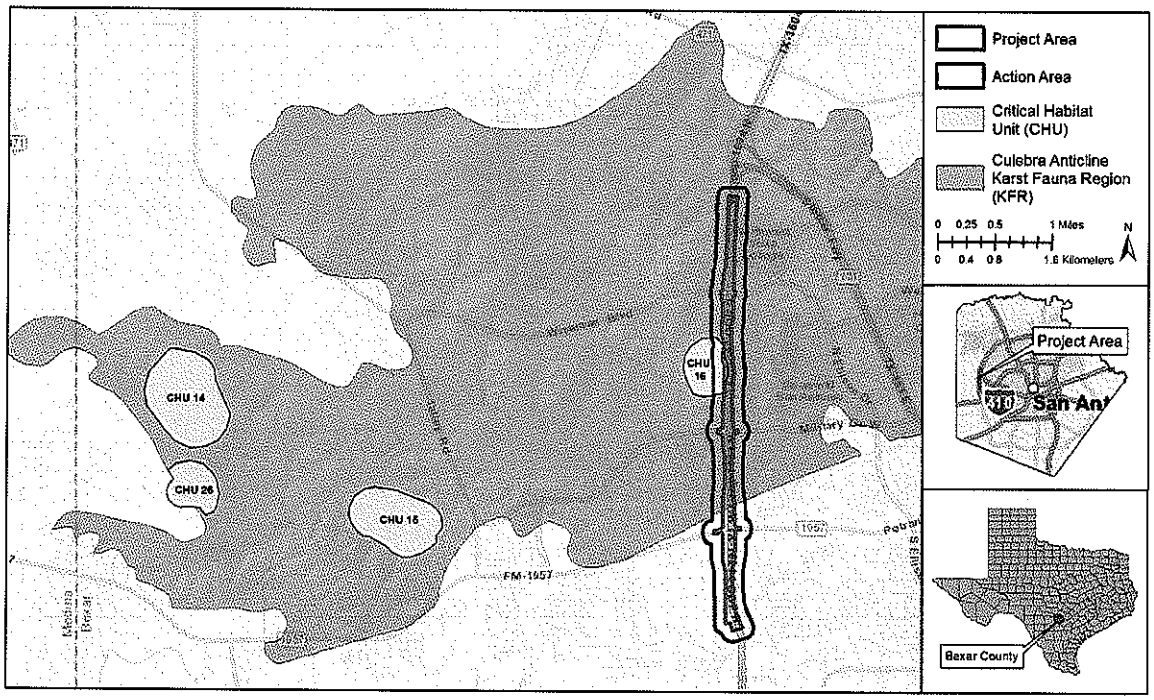
| Area | Acres | % of KFR |
|---|---|---|
| Culebra Anticline KFR | 16,716 | 100 |
| Existing development in KFR | 9,425 | 56 |
| Existing undeveloped area in KFR | 7,291 | 44 |
| Proposed future development in KFR | 5,567 | 33 |
| Total development potential (existing and proposed) | 14,992 | 90 |
| Undeveloped area (after future development) | 1,996 | 10 |
| Existing CHUs | 712 | 4 |
| Existing development within CHUs | 200 | 1 |
| Potential future development within CHUs | 234 | 1 |
| Project action area | 371 | 2 |

As of December 2014, 623 caves were known in Bexar County (TSS 2014) and at least 97 of those had been sealed or destroyed, including some that had not been biologically studied (Veni 2003). Based on observations of fauna, several of the blocked or destroyed caves were likely

occupied by listed species (Veni 2003). At least 93 caves have been confirmed to contain listed karst invertebrates (USFWS 2011); however, because of the lack of complete sampling, it should be noted that this is not likely to represent the complete range for these species. Also, many of the caves are lacking the recommended protection of a minimum of 40 acres of contiguous, unfragmented, undisturbed land to maintain both the native plant and animal communities around the feature that would help protect the integrity of the cave community and support species recovery (USFWS 2011). Recent survey efforts added four new confirmed locations for the two listed *Rhadine* beetles and seven new caves containing eyeless *Cicurina* spiders. The Texas Memorial Museum records (June19, 2013) show 35 additional caves in Bexar County known to contain unidentified, immature *Cicurina* spiders. If any of these specimens could be confirmed as being one of the listed *Cicurina* spp., it could represent new localities for the species, potentially contributing to the species recovery.

There are four CHUs within the Culebra Anticline KFR (**Figure 4**). Details for each unit and the species that occur within them are described below.

**Figure 4.** Location map of the Critical Habitat Units in the Culebra Anticline KFR.




CHU 14 consists of 292 acres of private land, west of the end of Louis Agusta Drive. The unit includes several large tracts of undeveloped woodland. There is a major roadway, Stevens Ranch Parkway, in this unit, and it is in the process of being extended from the southwestern to

western part of the unit. Some of the vegetation has been cleared in the past for ranching. Recent surveys indicate that there are 12 caves within the CHU 14, 11 of which are known to contain *R. infernalis* and the remaining feature is believed to be occupied by *R. infernalis*, but the species identification has not been confirmed. A large-scale residential development has been proposed for the land surrounding CHU 14. The developer has proposed to conserve CHU 14 as a Karst Faunal Area for the long term conservation for *R. infernalis.*

CHU 15 consists of 217 acres of private land, west of Talley Road and north of FM 1957. The majority of the lands within CHU 15 are within a subdivision, and all are privately owned. Tracts in the subdivision are relatively large and still contain wooded vegetation, but roads and houses have fragmented the cave cricket foraging areas around all of the occupied caves. This CHU contains 11 known caves. Bracken Bat Cave is the only one that contains *C. venii* and four caves (Braken Bat Cave, Isopit, Obvious Little Cave, and Wurzbach Bat Cave) are known to contain *R. infernalis*.

CHU 16 consists of 103 acres of private land. The unit contains several large, primarily undeveloped tracts of woodland, with Loop 1604, a major highway, to its east. With the exception of the cleared Loop 1604 ROW (about 4.75 acres), most of the unit is vegetated. However, some vegetation in the northern and northwestern part of the unit appears to have been cleared for livestock grazing and vegetation along the eastern edge of the unit has been impacted by a private access road. The area to the south of the unit is operated as a quarry. Caracol Creek Coon Cave is located in this unit and it is occupied by *R. infernalis*. One additional cave, Feature 1604-Z01, was found during surveys for a previous version of the Loop 1604 widening project. An unidentified *Cicurina* was found in Feature 1604-Z01.

CHU 26 consists of 100 acres of private land, southwest of the extension of Stevens Ranch Parkway and south of CHU 14. This unit is currently undeveloped; however TxDOT has proposed to construct a new location roadway, SH 211, in this area. The proposed road and ROW would cut through the CHU, reducing its size by about half. The remaining half of CHU 26, along with the area surrounding CHU 14, would be conserved as a Karst Faunal Area for the long term conservation for *R. infernalis*. Woody vegetation in the eastern portion of the CHU has been thinned for ranching, while the western portion has been more heavily cleared. There is one cave in this CHU with two entrances, Max and Roberts Cave (also known as Stevens Ranch East and West), and it is known to contain *R. infernalis*.

**Environmental Baseline**

Under section 7(a)(2) of the Act, when considering the effects of the proposed action on federally listed species, the Service is required to take into consideration the environmental baseline. The environmental baseline includes past and present impacts of all Federal activities in the action area (50 CFR 402.02) that have already undergone section 7 consultation, and any other State or private actions which are contemporaneous with the consultation in progress.

Status of the species within the action area

In 2010, TxDOT biologists performed a data review, including a Texas Speleological Survey (TSS) data search, for known karst features in the acre action area (ARMA et al. 2011). TxDOT's biological consultants performed karst feature surveys in 2009, 2010, and 2013 throughout the entire project ROW and in all properties granting access within 500 feet of the ROW to locate features identified during the data review and to search for additional features (TxDOT 2015, Zara 2014). A total of 17 features were recorded during field surveys. Thirteen features were determined to be karstic in nature and warranted further investigation. Landowners did not grant permission to access the remaining four features; therefore, these features could not be assessed. The karst evaluations determined 11 caves did not contain potential habitat for karst invertebrate species. Caracol Creek Coon Cave had been previously documented as containing *R. infernalis* and new surveys were not conducted. Presence/absence surveys in the remaining feature, 1604-Z01, contained immature *Cicurina* spiders which could not be identified to species. Due to the close proximity to the two known cave locations containing *C. venii*, TxDOT could not discount that *Cicurina* spiders found in feature 1604-Z01 may be *C. venii*.

CHU 16 occurs mostly within private property adjacent to the Loop 1604 ROW, including a portion of the project action area. About 4.75 acres of CHU 16 occurs within the existing ROW. Direct impacts to the constituent elements of CHU 16 would be avoided. A more detailed description of CHU 16 is located above in the *Analysis of the species/critical habitat likely to be affected* section.

Factors affecting the species within the action area

The action area for this project includes the Loop 1604 ROW and a 500 foot buffer beyond the outer edge of the ROW. The Service believes this action area represents the limits of where direct and indirect adverse effects to listed karst species are likely to occur due to the project; however, if a contaminant spill were to occur the effects could extend beyond the action area. The action area encompasses about 710 acres. **Table 3** breaks the action area down into areas that would be directly impacted by the project (206 acres), which includes all areas within the existing and proposed ROWs, and areas extending 500 feet beyond the ROW (504 acres) where indirect effects might occur. Within the action area, a total of 215 acres were previously impacted by existing roads and cleared ROW and 235 acres were previously impacted by residential or commercial development. An additional 212 acres is expected to be developed in

**Table 3**. Existing conditions and impacts in the project action area.

| Area | Acres | % of Action Area | % of KFR |
|---|---|---|---|
| Culebra Anticline KFR | 16,716 | - | 100 |
| Total action area | 710 | 100 | 4.2 |
| Existing and proposed 1604 footprint and ROW | 206 | 29 | 1.2 |
| 500 foot buffer beyond ROW with only indirect effects | 504 | 71 | 3.0 |
| Other existing road or ROW impacts | 9 | 1.3 | 0.1 |
| Existing residential/commercial development | 235 | 33 | 1.4 |
| Reasonably certain future development | 212 | 30 | 1.3 |
| Undevelopable area | 48 | 7 | 0.2 |

the future, leaving only 48 acres within the action area undeveloped, most of which is located within CHU 16.

A portion of the action area, about 202 acres, was previously disturbed when the existing Loop 1604 road and cleared ROW were constructed. Loop 1604 crosses the action area as a four-lane divided highway within a cleared ROW that varies from 340 to 500 feet wide. Loop 1604 through the project area is intersected by three cross streets; Wiseman Boulevard, Military Drive, and Potranco Road. The new roadway would create grade separations (overpasses) at these locations to facilitate traffic flow. Most of the proposed ground disturbance, except for 3.7 acres of new ROW, would occur in previously disturbed areas. However, the proposed project would result in the removal of about 81 acres of vegetation and 46.2 acres of impervious cover would be added to the existing impervious cover within the action area.

Several prior section 7 consultation(s) have occurred adjacent to, but not within, the action area was this project. An informal section 7 consultation was completed for modifications to the interchange at SH 151/Loop 1604 in October 2011. A *C. venii* specimen was discovered in a karst feature (151-019) uncovered during construction of the project. The interchange construction was halted, the project was redesigned to avoid additional impacts to feature 151-019 and a formal section 7 consultation was completed. The project resumed construction in 2015 and is ongoing. An informal section 7 consultation was also completed for a road widening project (from 2-lanes to 4-lanes) on Potranco Road, from Loop 1604 west to SH 211.

SAWS approached the Service in 2013 regarding the development of a Habitat Conservation Plan (HCP) for the installation of new water lines in the Loop 1604 project area. SAWS would need a section 10 Incidental Take Permit (ITP) for this proposed action in order to avoid a possible violation of the section 9 take prohibitions. The Service must conduct a formal section 7 consultation before issuing an ITP to ensure our actions do not jeopardize listed species; therefore, this action is not included in the Cumulative Effects section below.

**Effects of the Action**

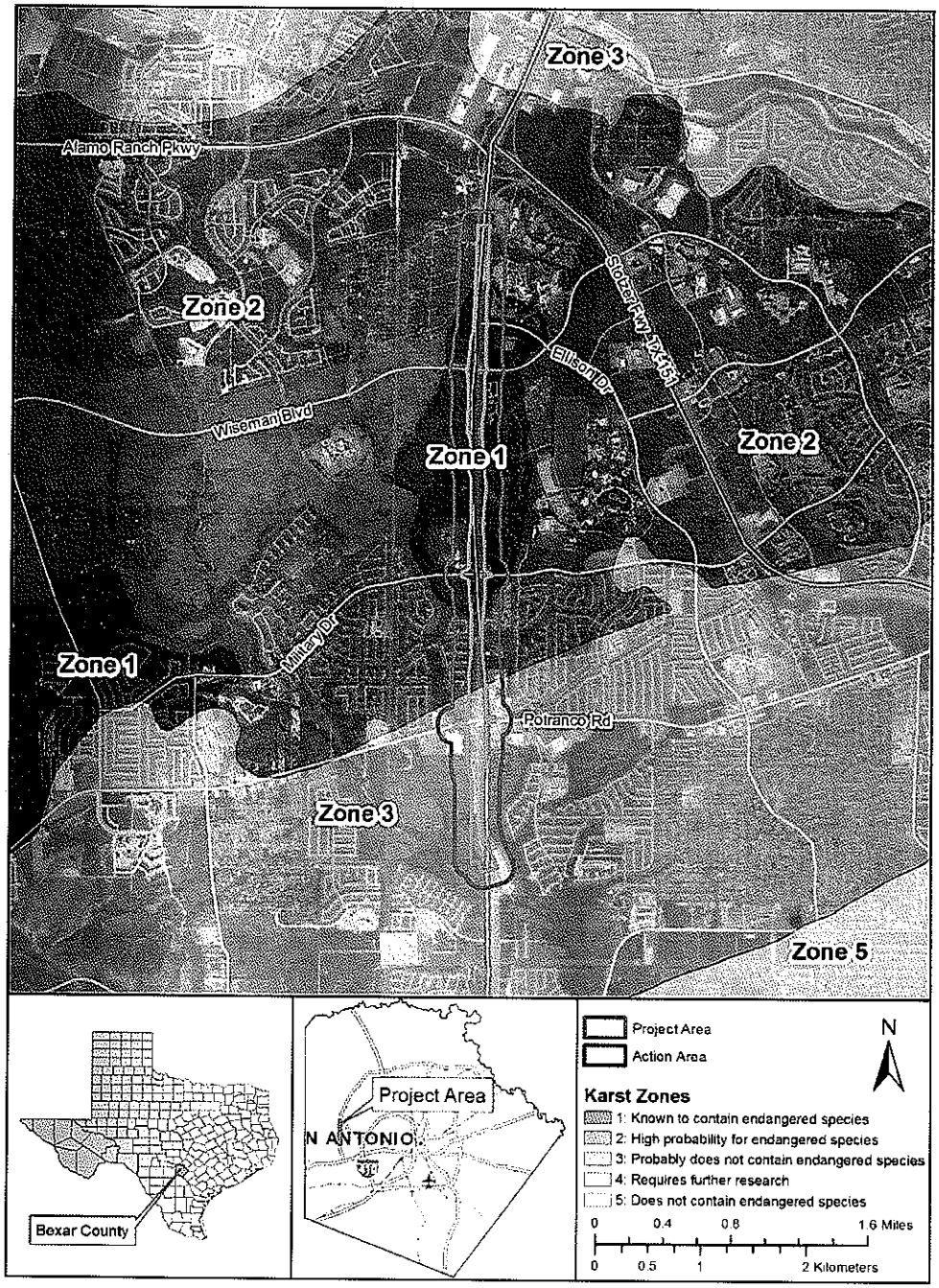
Factors to be considered

*Proximity of the action*

The proposed Loop 1604 construction would occur within the Culebra Anticline KFR, in an area that includes Karst Zones 1, 2, and 3 (**Figure 5**). The action area accounts for about 4.2 percent of the Culebra Anticline KFR, of which about 1.2 percent would be affected by the proposed project and all but 4.7 acres of that amount have been previously disturbed. The construction footprint and cleared ROW would affect about 206 acres of surface habitat in the action area, along with an unknown amount of karst habitat below the soil surface within the project boundary.

The closest known location for *C. venii* is within the action area at Feature 151-019, which was uncovered in 2012 during initial road grading activities for the SH 151/Loop 1604 interchange project. This feature has been closed with a concrete cap and will be buried under soil within the

**Figure 5.** Delineation of Karst Zones within the project action area.



SH 151 road shoulder. The only other known *C. venii* location is Bracken Bat Cave which is about two miles to the west. *R. infernalis* is known from Caracol Creek Coon Cave, in CHU 16, which is located several hundred feet to the west of the Loop 1604 ROW.

*Distribution*

The direct effects would be localized to within the existing ROW area surrounding Loop 1604, with indirect effects potentially extending out for an additional 500 feet. A majority of the construction area contains existing road pavement or vegetated ROW. The proposed project would result in the removal of approximately 81 acres of vegetation (48, 16, and 17 acres in Karst Zones 1, 2, and 3, respectively) and 46.2 acres of impervious cover would be added for the proposed project. About 3.7 acres of new ROW would be required in order to route the road outside of CHU 16 to avoid directly impacting CH constituent elements.

*Timing*

The project has a proposed letting (bid) date of May 2016. Construction would begin several months after the letting date and would take several years to complete; therefore, it would span all climatological seasons. Karst invertebrates require stable temperature/moisture regimes associated with subterranean karst habitat. Karst voids that are exposed during construction would be closed as quickly as possible to maintain environmental conditions within the voids.

*Nature of the effect*

The effects associated with highway construction activities would directly alter the karst habitat within the action area, if karst voids are encountered during construction. However, the project would not affect the overall population size, variability, or distribution outside of the action area. The project has been designed to minimize impacts to the karst invertebrates and effects would only occur within the 710 acre project action area. A majority of the area that would be disturbed by the construction is already disturbed. If any karst features are uncovered, work in the area of the feature would stop and a professional geoscientist would investigate the feature to determine if karst invertebrate habitat exists in the feature. If the feature contains potential karst invertebrate habitat, it would be surveyed by a Service permitted biologist to determine if it is occupied by one of the listed karst invertebrates. TxDOT would evaluate further project impacts for any new feature found to contain listed karst invertebrates. If possible, additional impacts to the feature would be avoided and the feature would be permanently closed. Discovery of a previously unknown karst void occupied by a listed species may result in changes to the stable climatic conditions in the feature, negatively affecting the species.

*Duration*

Work is proposed to begin on the project in the summer of 2016 and would take about 29 months to complete. The direct effects to the karst invertebrates would occur during land clearing activities or during construction of the roadway. Indirect effects, such as alterations of the species ability to carry out their normal lifecycle, including emigration/immigration across the project work zone, or changes to the climatic conditions in the cave may be temporary or

permanent. Temporary indirect effects may occur in association with temporary exposure of a newly discovered cave to the outside environment during species sampling efforts. Those effects would only last until the feature can be permanently closed. However, if a feature cannot be permanently closed, the temporary effects would become permanent and persist throughout project completion. Temporary effects may also occur where vegetation must be disturbed during construction and would persist until vegetation is reestablished in the work areas within the ROW.

*Disturbance frequency, intensity, severity*

Project construction would begin immediately after final construction schematics are completed. Any vegetation within the new ROW would be removed completely at the onset of construction and the disturbance would continue throughout construction on the project. Any previously undiscovered karst invertebrate habitat located in the ROW prior to the start of construction would likely be impacted, however, the direct effects to the karst invertebrates would be limited to activities that require excavation of subsurface habitat, and those would only occur if the karst feature is directly disturbed by surface excavation activities. The existing roadway would be removed during construction, but this would occur in areas that were previously disturbed and would likely not result in direct effects to karst invertebrate habitat.

Indirect effects are possible within the action area during and after construction and may last for as long as the road is in use. This includes changes in surface and subsurface drainage basins if voids occur below the surface within the action area, or alteration/contamination of water and nutrient inputs from road runoff or chemical spills.

Analysis for effects of the action

*Beneficial effects*

All of the Conservation Measures proposed by TxDOT for this project would benefit these species to some degree. Two of the Conservation Measures proposed by TxDOT are ongoing research projects, the biota study and the genetic analysis, meant to increase the scientific knowledge of these species. Both of these Conservation Measures are associated with recovery actions for downlisting/delisting these species in the Bexar County Karst Invertebrate Recovery Plan (USFWS 2011).

The biota study that TxDOT is undertaking would directly benefit *C. venii* and *R. infernalis,* and possibly some of the seven other endangered karst invertebrate species in Bexar County, by supplying information on the current status of listed karst invertebrate species in caves with little or no existing monitoring. Additional benefits include supplying inventories of other cave invertebrates, such as cave crickets, that serve as a proxy for the health of cave invertebrate habitat as well as general observations of the health of the cave and its surroundings. The results of this study would further the knowledge of terrestrial karst fauna distribution in Bexar County and provide an updated status of the general health of undermanaged caves with known endangered species. In addition, this study promotes specific recovery actions itemized in the Bexar County Karst Invertebrates Recovery Plan (USFWS 2011). These include identifying, and

potentially protecting, KFAs needed to meet recovery criteria, monitoring populations, gathering distribution information, and conducting genetics research to determine genetic diversity across the range.

*C. venii* and other *Cicurina* species in Bexar County would benefit from the genetic analysis being sponsored by TxDOT. If the genetic analysis is successful at identifying male and immature *Cicurina* to species, it would aid in the future identification *Cicurina* individuals which currently cannot be identified to the species level (Cokendolpher 2004). The information gathered would also help further the understanding of *Cicurina* species boundaries, genetic diversity, and descriptions of genetic characteristics of specimens, enhancing the effectiveness and efficiency of future studies.

*Direct Effects*

It is anticipated that incidental take of *C. venii* and *R. infernalis* may occur as a result of the proposed project. Individuals of these species are difficult to detect unless observed undisturbed in their environment, and occupied karst features in this area are often undetectable until they are exposed by surface or bedrock disturbing activities. Direct effects occurring from the proposed project would be related to vegetation clearing and removal of subsurface habitat associated with the installation of geotechnical boreholes, pier drilling, land clearing activities, and surface milling, grading, and excavation associated with construction of the roadway and overpasses. Any activity that alters the soil surface and underlying karst geology could result in harm, via direct death or injury, to individual *C. venii* and/or *R. infernalis*. Harm could also result from significant modification or degradation of the karst habitat, such as alteration of surface and subsurface drainage patterns, fragmentation of trogloxene foraging areas, changes to temperature and humidity regime, changes to mesocaverns connectivity, changes to water flow and nutrient input, reduction in the carrying capacity of the karst habitat, and introduction of invasive species. The project may also result in harassment of *C. venii* and/or *R. infernalis* if project components disrupt essential behavioral patterns, including breeding, feeding, or sheltering.

The total area of disturbance within the action area is estimated to be about 206 acres. The proposed project will increase the amount of ROW by 3.7 acres and will remove a total of approximately 81 acres of vegetation (48 acres in karst zone 1, 16 acres in karst zone 2, and 17 acres in karst zone 3). Construction activities for the proposed project may directly affect listed karst species due to the removal of vegetation. With the exception of the 3.7 acres of proposed new ROW, the vast majority of vegetation removal will occur within areas with existing maintained ROW vegetation. Construction would also result in the addition of 46.7 acres of new impervious surface.

Direct effects to *R. infernalis* or *C. venii* may also occur due to changes in surface and subsurface drainage patterns and changes to subsurface temperature and moisture regimes due to the placement of additional impervious cover. Because there is no precise mechanism available to calculate the area of surface and subsurface drainage basins of unknown voids that might be affected, it is not possible to quantify the resulting amount or extent of take associated with it.

*Rhadine infernalis* is known to occur in Caracol Creek Coon Cave in CHU 16 adjacent to the project area; however, the species was not documented in any of the other features surveyed and no direct effects are expected to this cave. The destruction of minor void spaces in the project area could occur within 500 feet from the footprint of Caracol Creek Coon Cave, possibly changing mesocavernous connectivity with the cave. Since this species is known to occur adjacent to the project it could potentially occupy a feature that has yet to be discovered in the project area. If such a feature was discovered and it was occupied, then take could occur in the form of harm or harassment.

The installation of 46 planned geotechnical boreholes would remove about 197 cubic feet of subsurface limestone or potential karst habitat. Geotechnical boreholes are typically small diameter (2-12 inch) holes that vary between 10 and 70 feet deep to determine if the subsurface geology would support the weight of the road. Borehole drilling would not result in the complete destruction of a karst feature, but may result in the alteration of the internal cave climate or introduce the potential for contaminated surface runoff into the cave.

Drilled shafts and support piers and footings for the overpasses and ramps typically involve drilling 3 to 15 foot diameter shafts between 12 and 40 feet deep. The project would require about 168 drilled shafts that would result in the removal of approximately 293,230 cubic feet of subsurface limestone and potential karst habitat. Drilled shafts have the potential to completely destroy, or remove a significant portion of, a karst void resulting in significant changes to the karst ecosystem.

Roadway excavation activities involve surface milling to lower the grade of bedrock to the desired road base depth, grading of the ground surface to level it after the milling is complete, and excavation with trackhoes or backhoes. Roadway excavation would range between 3.5 to 5.7 feet below the current grade and would affect approximately 2,224,918 cubic feet of fill and natural surface material, including subsurface limestone. Roadway excavation activities can result in varying sized effects to underground karst features, depending on the depth of the excavation and the extent of the karst feature. Even a small opening in the roof of a karst feature can expand greatly in a short period of time through erosional forces. Karst features discovered during excavation activities may be able to be partially preserved by permanently capping the feature, however the surface drainage basin would likely be significantly altered.

The installation of stormwater BMPs can be installed via open trench methods, using a trackhoe, backhoe, or trencher, when there are no conflicts with existing facilities on the surface. The trench is typically only a few feet wide and deep. Jack and bore excavation is used for horizontal excavation to install utility lines under existing facilities or habitat features without disturbing them. The installation of stormwater BMPs and drainage excavation would result in the removal of about 601,677 cubic feet of subsurface limestone and the relocation of utility lines would remove approximately 275,670 cubic yards of subsurface material.
**Table 4** lists the project related ground disturbing construction activities, along with the area and volume affected, that could result in direct effects to the listed karst invertebrates within the action area.

**Table 4**. Ground disturbing activities associated with proposed Loop 1604 construction activity interchange (based on preliminary schematics).

| Excavation Source | Karst Zone 1 ($ft^3$) | Karst Zone 2 ($ft^3$) | Karst Zone 3 ($ft^3$) | Total Excavation Volume ($ft^3$) |
|---|---|---|---|---|
| Geotechnical Boreholes | 114 | 13 | 70 | 197 |
| Bridge Piers and Foundations | 100,950 | 0 | 192,280 | 293,230 |
| Roadway Excavation | 498,952 | 1,091,595 | 654,371 | 2,244,918 |
| Stormwater BMPs and Drainage | 235,893 | 55,406 | 310,378 | 601,677 |
| Utility Relocations | 177,120 | 50,355 | 48,195 | 275,670 |
| **Total (cubic feet)** | **1,013,029** | **1,197,369** | **1,205,294** | **3,415,692** |
| **Total (cubic yards)** | **37,520** | **44,347** | **44,641** | **126,507** |

*Indirect Effects*

Indirect effects are caused by, or result from, the proposed action but occur later in time or outside of the area directly affected by the project. Indirect effects could occur within the entire 710 acre action area. The proposed project may result in indirect impacts to karst invertebrate habitat from surface disturbances such as vegetation removal, which may result in alterations in nutrient input and outflow and the introduction of invasive species (e.g. red-imported fire ant). Other indirect effects to karst invertebrate habitat may occur within and adjacent to the project area due to the placement of impervious cover (bridge decks, roadway surfaces, etc.) which could increase chemical runoff or erosion and alterations in surface and subsurface drainage that may result in short- and long-term changes to temperature and moisture regimes in karst habitat.

Changes in the physical environment beneath a newly constructed road can create edge effects that extend beyond the construction timeframe. One of the edge effects is the reduction in water vapor transport into and out of the natural environment caused by the addition of the impervious surfaces of roadways. Natural surfaces, especially those with vegetation, use heat energy for evapotranspiration of water, effectively cooling themselves, while roadways store heat energy, raising the surface temperature of the roadway, and raising the temperature and lowering the humidity of the area immediately adjacent to the roadway (Barnes et al. 2012). Roadway materials, such as dark asphalt pavement, are thermally conductive, meaning they have the ability to absorb more heat and rapidly move it into the ground beneath the road surface. Heat stored by roadways is released at night, after the sun has gone down, creating a heat island when compared with surrounding soil or vegetation (Trombulak and Frissell 2000). Roadway heat islands exacerbate subsurface impacts to temperature and moisture by perpetuating drying conditions. While the installation of an additional 46.2 acres of impervious cover is considered a direct effect to subsurface karst invertebrate habitat, the long-term heat island effect of the additional impervious cover is not possible to quantify.

Indirect impacts due to future degradation of groundwater quality entering subsurface features resulting from roadway runoff contaminated with increased sediment and hazardous materials from accidental spills and vehicle collisions may also impact subsurface karst invertebrate habitat. Temporary and permanent BMPs, such as silt fence, rock berms, and detention ponds

implemented in accordance with the project's SW3P and MS4 compliance documents are intended to mitigate for these impacts both during construction and for the duration of the facility's operation.

Species' response to the proposed action

It is extremely difficult, if not impossible, to determine the response of *C. venii* and *R. infernalis* to the proposed action. TxDOT has conducted surface surveys for karst habitat and investigated all potential karst features found in the pre-project survey. The only feature containing a listed species was Caracol Creek Coon Cave, although features 1604-Z01 and 1604-019 were found to contain immature *Cicurina* that cannot be identified to species. Aside from these features, there are no known karst features within the action area contain listed species. TxDOT has designed the project to avoid or minimize direct and indirect effects to the known karst features that do or may contain listed species. They have also avoided alteration of CHU 16 and will be implementing a conservation measure to ensure accidental impacts do not occur.

If any karst features are encountered during excavation or roadway construction, all work would be halted with a 50 foot diameter surrounding the void entrance and the onsite Professional Geoscientist (PG) or karst scientist would investigate the void to determine if it karstic in nature. If it is, a scientist holding a Service issued 10(a)(1)(A) scientific collecting permit would inspect the void to determine if the feature contains habitat for karst invertebrate species. If so, the feature would be surveyed for the presence of listed karst invertebrates. Should *C. venii*, *R. infernalis,* or any other listed karst invertebrate, be encountered in a karst feature, TxDOT would attempt to avoid additional impacts and permanently close the feature to prevent further degradation. If the feature cannot be conserved and must be destroyed, incidental take associated with that activity is covered in this BO. If any other listed species are encountered that have not been provided take coverage in this opinion, such as *R. exilis*, TxDOT must halt construction and immediately reconsult.

**Cumulative Effects**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

There are no non-Federal actions proposed within the project action area.

**Conclusion**

*C. venii* and *R. infernalis* are known to occur in areas of suitable karst habitat located in the Culebra Anticline KFR of Bexar County. All existing known karst features within the action area have been surveyed for the presence of listed karst invertebrates. It is unknown if there are any additional karst features which have yet to be discovered within the action area beneath the existing soil surface, although the presence of additional karst features is likely. If karst features

are present, it is also unknown if they are occupied by *C. venii*, *R. infernalis*, or other listed karst invertebrates.

Although TxDOT cannot eliminate the possibility of affecting karst invertebrates, they have minimized the effects to the maximum extent possible for this project. Therefore, after reviewing the current status of *C. venii* and *R. infernalis*, the environmental baseline for the action area, the effects of the proposed Loop 1604 project, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of *C. venii* and/or *R. infernalis*. The reasoning for this determination includes:

- Any karst features discovered during construction are currently unknown and are not part of the baseline populations of *C. venii* and *R. infernalis*. Therefore, impacts to karst features within the action area that contain these species would not decrease the baseline of the populations or reduce the potential for species recovery.
- The closest known location for *R. infernalis* is in Caracol Creek Coon Cave, which is part of CHU 16 designated for the conservation of this species. TxDOT has aligned the new construction on the opposite side of the existing road from the CHU, minimizing the potential for adverse effects. TxDOT has proposed to install construction fencing around the exterior of CHU 16 to prevent accidental impacts to *R. infernalis* or the constituent elements that make up CHU 16.
- The estimated amount of take is based on the amount of surface habitat to be directly impacted and a 500 foot buffer area, which could be indirectly affected; however, if no karst voids containing *C. venii* and/or *R. infernalis* are present beneath the action area, no incidental take would occur.
- *C. venii* is not known to occur in the action area; however, Feature 1604-Z01 contains a *Cicurina* that cannot be identified to species. The type locale for *C. venii*, Bracken Bat Cave, is located within CHU 15, about 2 miles west of the project action area. Feature 151-019 is located a short distance from the northern terminus of this project, at the intersection of Loop 1604 and SH 151. The discovery of Feature 151-019 containing *C. venii* doubled the number of known locations for this species. TxDOT has requested formal consultation for *C. venii* due to the proximity of the two known locations for the species. TxDOT is avoiding direct impacts and has minimized indirect effects to the maximum extent practicable around Feature 1604-Z01 in case the unidentified *Cicurina* spiders are actually be *C. venii*.
- The water quality BMPs to be put into place before construction begins would help to treat existing roadway runoff, as well as runoff from the newly constructed lanes, that may contaminate the surface or subsurface drainage basins of karst features within the action area.
- The maximum amount of surface habitat that would be altered for this project is about 206 acres, of which about 202 acres are already cleared ROW or impervious cover. The proposed project would convert an additional 46.2 acres to impervious cover and add 81 acres of cleared vegetation. The amount of surface habitat that would be directly affected is less than one third of the action area (29%) and only a small fraction of the potential habitat in the Culebra Anticline KFR (see Table 3 above).

Destruction or adverse modification of designated critical habitat refers to the direct or indirect alteration of the PCEs of the critical habitat that result in appreciably diminishing the

conservation value, or recovery potential, of critical habitat for the species. The Service has determined that the project would not result in the destruction or adverse modification of designated CH for *R. infernalis* within CHU 16.

- Only a small area, 4.7 acres, of CHU 16 is located within the project ROW and a total of 33.8 acres of CHU 16 occur within the action area. Less than one acre (0.44) of the subsurface drainage basin for Caracol Creek Coon Cave occurs within the project area. The CHU would not be directly affected by vegetation removal or downcutting associated with the project. Although a portion of CHU 16 is within the action area of the project, the area is already disturbed by the existing road and cleared and maintained ROW. There will be no, or minimal, impacts to the surface or sub-surface drainage basins, the cave cricket foraging area, alterations in the nutrient input or outflow, or long-term changes in surface drainage patterns for the cave. Therefore, the project would not significantly diminish the conservation value of the PCEs contributing to the survival and recovery of *R. infernalis*.

The conclusions of this BO are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

## INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include death or injury to a listed species, or significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by TxDOT, as appropriate, for the exemption in section 7(o)(2) to apply. TxDOT has a continuing duty to regulate the activity covered by this incidental take statement. If TxDOT (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, TxDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

The Service will not refer the take of any migratory birds for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703. 712), if such take is in compliance with the terms and conditions specified herein.

**Amount or Extent of Take Anticipated**

It is anticipated that incidental take of *R. infernalis* and *C. venii* would be difficult to detect and quantify due to their extremely small size and subterranean, often inaccessible, karst habitat. The presence of these species is rarely known unless observed in their natural karst environment. And as previously discussed, occupied karst features in the action area are often undetectable until they are exposed from surface disturbing activities. Because of this, a precise mechanism for predicting the number of individuals that may actually be taken by the proposed project is not available. Due to these factors, the extent of incidental take would be equated to the total action area, 710 acres. The incidental take of all *C. venii* and *R. infernalis* in any currently unidentified karst features underlying the 710 acre action area, in the form of harm or harassment, may occur as a result of this proposed project.

**Effect of the Take**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to jeopardize the continued existence of *C. venii* and *R. infernalis*. The Service also determined that the proposed project would not result in destruction or adverse modification of designated CH within CHU 16 for *R. infernalis*.

**Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of *C. venii* and *R. infernalis*:

1. TxDOT must fully implement the Voluntary Conservation Measures proposed in their BA for this project.

2. TxDOT must provide information and training to all employees and contractors working on the project on the measures proposed to avoid impacts to karst invertebrate habitat.

3. TxDOT must monitor take of *C. venii* and *R. infernalis* and provide periodic monitoring reports to the Service.

**Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the TxDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. TxDOT has proposed a number of Conservation Measures, listed in the BA and the "Description of the Proposed Action" section of this document. TxDOT's proposed Conservation Measures are incorporated as reasonable and prudent measures by reference and must be implemented, as proposed, in conjunction with this project.

2. TxDOT must hold a pre-construction meeting with its employees and contractors working on this project. TxDOT must provide specific instruction on the implementation of TxDOT's proposed Conservation Measures and the Service's Reasonable and Prudent Measures, included in this Incidental Take Statement. Instructions specific to the contractor(s) related to implementation of the Conservation Measures and Reasonable and Prudent Measures must be documented in writing. TxDOT is ultimately responsible for informing anyone working on this project of these requirements.

3. TxDOT must monitor and report to the Service the amount of incidental take that occurs in association with this project. This must be done through sufficient on-site inspections to determine if construction related impacts have or would occur outside of the action area, as described in this BO. The monitoring reports must include a summary of construction actions implemented during the previous six month period, any unanticipated actions or delays in project completion, and any known incidental take that has occurred (disturbance of karst invertebrate habitat) and the reasons for that take. Monitoring reports must be submitted in accordance with the timelines proposed in TxDOT's project monitoring and reporting Conservation Measure. Monitoring reports must be submitted in January and June of each year during construction, once at the completion of construction, and a final report one year after construction was completed.

The Service believes that it would be impossible to detect and quantify the number of individuals that may be incidentally taken as a result of the proposed project due to their extremely small size and the inaccessibility of their karst habitat. Therefore, incidental take is authorized for all *C. venii* and *R. infernalis* occupying karst habitat within the boundaries of the 710 acre action area. The incidental take would be in the form of harm or harassment. The Reasonable and Prudent Measures, with their implementing Terms and Conditions, are designed to minimize the impact of the incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded (i.e., direct effects resulting from ground disturbance activities occur outside of the 206 acre project area or indirect effects occur outside of the 710 acre action area), such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. TxDOT must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

**Conservation Recommendations**

Section 7(a)(1) of the Act directs TxDOT, as well as other federal agencies, to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service has no conservation recommendations for TxDOT concerning the conservation of listed karst invertebrate species at this time. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations by TxDOT.

**Reinitiation Notice**

This concludes the Service's formal consultation on the action outlined in TxDOT's formal consultation request. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) the project is not completed within five years of the date of this BO; (3) new information reveals the agency action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this opinion; (4) the agency action is subsequently modified in a manner that causes an effect to the listed species or CH not considered in this opinion; or (5) a new species is listed or CH is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease immediately pending reinitiation.

Sincerely,

Adam Zerrenner
Field Supervisor
Austin Ecological Services Field Office

CC: Barrlynn West, TxDOT San Antonio District, San Antonio, TX (electronic)
Stirling Robertson, TxDOT ENV, Austin, TX (electronic)

## LITERATURE CITED

Alamo Regional Mobility Authority, Texas Department of Transportation, and Federal Highway Administration. 2011. Categorical Exclusion: Loop 1604 at SH 151, San Antonio, Bexar County, Texas. CSJ: 2452-01-043.

Barnes, K.B., J.M. Morgan III, and M.C. Roberge. 2012. Impervious surfaces and the quality of natural and built environments. Geospatial Research and Education Laboratory. Department of Geography and Environmental Planning, Towsen University, Baltimore, MD.

Barr, T. C. Jr. 1968. Cave ecology and the evolution of troglobites. Evolutionary Biology 2: 35-102.

Bennett, R. G. 1985. The natural history and taxonomy of *Cicurina bryantae exaline* (Araneae, Agelendidae). Journal of Arachnology 13: 87-96.

Biological Advisory Team. 1990. Comprehensive Report of the Biological Advisory Team of the Balcones Canyonlands Conservation Plan (BCCP). Austin, Texas.

Chandler, D. S. 1992. The *Pselaphidae* (Coleoptera) of Texas caves. Texas Memorial Museum, Speleological Monographs 3: 241-253.

Christensen, J. H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, and co-authors. 2007. Regional climate projections. Pages 847-940 in S. Solomon et al., eds. Climate change 2007: The physical science basis. Cambridge University Press. Cambridge, England.

Christman, M. C., D. C. Culver, M. K. Madden, and D. White. 2005. Patterns of endemism of the eastern North American cave fauna. Journal of Biogeography 32: 1441-1452.

Cokendolpher, J. C. 2004. *Cicurina* spiders from caves in Bexar County, Texas (Araneae: Dictynidae). Texas Memorial Museum, Speleological Monographs 6: 13-58.

Cowan, B., J. Banner, N. Hauwert, and M. Musgrove. 2007. Geochemical and physical tracing of rapid response in the vadose zone of the Edwards Aquifer. Geological Society of America Annual Meeting Paper No. 69-3.

Culver, D. C. 1982. Cave Life: Evolution & Ecology. Harvard University Press. Cambridge, Massachusetts.

Culver, D. C. 1986. Cave Fauna. Pages 427-443 *in* M. E. Soule', ed. Conservation Biology: the science of scarcity and diversity. Sinauer Associates. Sunderland, Massachusetts.

Culver, D., L. L. Master, M. C. Christman, and H. H. Hobbs III. 2000. Obligate cave fauna of the 48 contiguous United States. Conservation Biology 14(2): 386-401.

Dunlap, K. 1995. Inexpensive (and easy) temperature monitoring in caves. Pages 76-87 *in* G. T. Rea, ed. 1995 National Cave Management Symposium Proceedings. Indiana Karst Conservancy, Incorporated. Indianapolis, Indiana.

Elliott, W. R. 1992. Fire ants invade caves. American Caves: Winter 13.

Elliott, W. R. 1994. Community ecology of three caves in Williamson County, Texas: a three year summary. 1993 Annual Report for Simonton Development Co., Inc., U.S. Fish and Wildlife Service, and Texas Parks and Wildlife.

Elliott, W. R. 2000. Conservation of the North American cave and karst biota. Pages 671-695 in H. Wilkens, D. C. Culver, and W. Humphreys, eds. Subterranean Ecosystems. Elsevier, Oxford, United Kingdom.

Elliott, W. R. and J. R. Reddell. 1989. The status and range of five endangered arthropods from caves in the Austin, Texas Region. A report on a study supported by the Texas Parks and Wildlife Department and the Texas Nature Conservancy for the Austin Regional Habitat Conservation Plan. Austin, TX.

Horizon Environmental Services, Inc. 1991. Karst invertebrate survey of the Lakeline Mall Site, Williamson County, Texas. Prepared for Melvin Simon and Associates, Inc.

Howarth, F. G. 1983. Ecology of Cave Arthropods. Annual Review of Entomology 28: 365-389.

Howarth, F. G. 1987. The evolution of non-relictual tropical troglobites. International Journal of Speleology 16: 1-16.

Howarth, F. G. 1988. Environmental ecology of North Queensland caves: or why are there so many troglobites in Australia? Pages 76-84 *in* L. Pearson ed. 17th Biennial Australian Speleological Federation Tropical Conference. Lake Tinaroo, Far North Queensland, Australia.

International Panel on Climate Change (IPCC). 2007. Climate change 2007: synthesis report, summary for policymakers. IPCC, Fourth Assessment Report.

Jackson, R. B., L. A. Moore, W. A. Hoffman, W. T. Pockman, and C. R. Linder. 1999. Ecosystem rooting depth determined by caves and DNA. Proceeding of the National Academy of Science 96: 11387-11392.

Krejca, J. K. and F. W. Weckerly. 2007. Detection probabilities of karst invertebrates. Report prepared for Texas Parks and Wildlife Department and U.S. Fish and Wildlife Service. Austin, Texas.

Lavoie, K. H., K. L. Helf, and T. L. Poulson. 2007. The biology and ecology of North American cave crickets. Journal of Cave and Karst Studies 69: 114-134.

Loomis Partners, Inc., Jackson Walker LLP, Zara Environmental LLC, Wendell Davis and Associates, and M.E. Allison & Associates. 2014. Draft Southern Edwards Plateau Habitat Conservation Plan, Rvised. Report prepared for Bexar County.

Lovejoy, T. E., R. O. Bierregaard, A. B. Rylands, J. R. Malcolm, C. E. Quintela, L. H. Harper, K. S. Brown, A. H. Powell, G. V. N. Powell, H. O. R. Schubert, and M. J. Hays. 1986. Edge and other effects on isolation on Amazon forest fragments. Pages 7-12 *in* M. Soule', ed. Conservation Biology: The Science and Scarcity of Diversity. Sunderland, Massachusetts.

Mitchell, R. W. 1971a. Food and feeding habits of troglobitic carabic beetle *Rhadine subterranea*. Speleology 3: 249-270.

Mitchell, R. W. 1971b. Preference responses and tolerance of troglobitic carabic beetle *Rhadine subterranea*. International Journal of Speleology 3: 289-304.

Mitchell, R. W. and J. R. Reddell. 1971. The invertebrate fauna of Texas caves. Pages 35-90 *in* E. L. Lundelius and B. H. Slaughter, eds. Natural history of Texas caves. Gulf natural History Publishing, Dallas, Texas.

Porter, M. L. 2007. Subterranean Biogeography: What Have We Learned From Molecular Techniques Journal of Cave and Karst Studies 69(1): 179-186.

Poulson, T. L., K. H. Lavoie, and K. Helf. 1995. Long-term effects of weather on the cricket (*Hadenoecus subterraneous*) guano community in Mammoth Cave National Park. American Midland Naturalist 134: 226-236.

Reddell, J. R. 1993. Response to the petition to delist seven endangered karst invertebrates. Letter to U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department, Austin, Texas.

Simon, K. S., T. Pipan, and D. C. Culver. 2007. A conceptual model of the flow and distribution of organic carbon in caves. Journal of Cave and Karst Studies 69(2): 279–284.

Taylor, S. J., K. Hackley, J. Krejca, M. J. Dreslik, S. E. Greenberg, and E. L Roboin. 2003. Examining the role of cave crickets (*Rhaphidophoridae*) in Central Texas cave Ecosystems: isotope ratios ($\delta^{13}C$, $\delta^{15}N$) and radio tracking. Illinois Natural History Survey, Center for Biodiversity Technical Report 2004 (9): 1-128.

Texas Commission on Environmental Quailty. 2010. Results of the eighth season of the Karst Management and Maintenance Plan (KMMP) for Government Canyon State Natural Area, Bexar County, Texas. Unpublished report.

Texas Department of Transportation. 2013. Karst Invertebrate Technical Report, Loop 1604 at State Highway 151, Bexar County, Texas. CSJ: 2452-01-043.

Texas Department of Transportation. 2015. FINAL - Karst Invertebrate Technical Report for Loop 1604 from Interstate Highway 35 to State Highway 90, Bexar County, Texas. Prepared by Zara Environmental LLC.

U.S. Fish and Wildlife Service. 1994. Recovery plan for endangered karst invertebrates in Travis and Williamson Counties. Austin, Texas.

U.S. Fish and Wildlife Service. 2011. Bexar County Karst Invertebrate Recovery Plan. U. S. Fish and Wildlife Service, Albuquerque, New Mexico.

U.S. Fish and Wildlife Service. 2012. Designation of Critical Habitat for Nine Bexar County, TX, Invertebrates. Final Rule. Federal Register 77: 8450-8523.

Veni, G. 1988. The caves of Bexar County second edition. Texas Memorial Museum Speleological Monographs, 2, Studies on the Cave and Endogean Fauna of North America IV. Texas Memorial Museum, Austin, Texas.

Veni & Associates. 1994. Geologic Controls on Cave Development and the Distribution of Endemic Cave Fauna in the San Antonio, Texas, Region. Report for Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service, Austin, Texas.

Veni & Associates. 2003. Delineation of hydrogeologic areas and zones for the management and recovery of endangered karst invertebrate species in Bexar County, Texas. Report for U.S. Fish and Wildlife Service, Austin, Texas.

White, W. B. 1988. Geomorphology and hydrology of karst terrains. Oxford University Press. New York.

White, K. 2006. Paleohydrology of the Edwards Aquifer karst and the evolution of rare and endangered *Cicurina* cave spiders, South-central Texas. PhD Dissertation, University of Mississippi, Oxford, Mississippi.

Zara Environmental LLC. 2014. DRAFT 2014 Karst Surveys for Loop 1604 From Potranco Road to Culebra Road, Bexar County, TX. Prepared for Hicks & Company, Inc.

## Michael Chavez

**From:** TxDot <TxDot@tceq.texas.gov>
**Sent:** Thursday, September 04, 2014 2:17 PM
**To:** Michael Chavez
**Subject:** RE: EA review, 1604 (Portranco to FM 471), Bexar Co, CSJ 2452-01-056

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

The Texas Commission on Environmental Quality (TCEQ) received the Texas Department of Transportation's (TxDOT) request for environmental review of the following project: 1604 (Portranco to FM 471), Bexar Co, CSJ 2452-01-056

In accordance with the Memorandum of Understanding between TxDOT and TCEQ regarding environmental reviews, which is codified in Chapter 43, Subchapter I of the Texas Administrative Code (TAC) and 30 TAC § 7.119, TCEQ is responding to your request for review.

TCEQ does not have any comments.

TxDOT will still need to follow all other applicable laws related to this project, including applying for applicable permits.

If you have any questions, please feel free to contact Elizabeth McKeefer, CAPM, NEPA Coordinator at (512) 239-1786 or txdot@tceq.texas.gov.

---

**From:** Michael Chavez [mailto:Mike.Chavez@txdot.gov]
**Sent:** Thursday, September 04, 2014 9:02 AM
**To:** TxDot
**Cc:** Michael Chavez
**Subject:** EA review, 1604 (Portranco to FM 471), Bexar Co, CSJ 2452-01-056

TxDOT requests the TCEQ evaluate the 1604 (Potranco to FM 471) project per 43 TAC 2.23. The proposed project would convert the existing four-lane divided roadway to a four-lane expressway. We are requesting TCEQ review since the project meets MOU triggers related to water quality impairment.

An electronic version of the Environmental Assessment will be transmitted to your office using our FTP system. Let me know if you have any questions.

**Michael R Chavez**
Project Delivery Manager
Environmental Affairs Division
Texas Department of Transportation
512-416-2514
Mike.Chavez@txdot.gov

Don't mess with Texas® means don't litter.

Texas Department of Transportation

# MEMO

April 9, 2014

**To:** 850 File, Various Road Projects, Various CSJs, Various Districts

**From:** Scott Pletka, Ph.D.

**Subject:** Internal review under the First Amended Programmatic Agreement Among the Federal Highway Administration, the Texas Department of Transportation, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU), and internal review under the Memorandum of Understanding (MOU) Between the Texas Historical Commission and the Texas Department of Transportation

---

Listed below, are the projects reviewed internally by qualified TxDOT archeologists from 4/3/14 to 4/9/14. These projects either do not warrant survey as a result of a low probability of encountering archeological historic properties and State Archeological Landmarks, or the projects were inspected by survey or impact evaluation and do not warrant further work. As provided under the PA-TU, consultation with the Texas State Historic Preservation Officer is not necessary for these undertakings. As provided under the MOU, the proposed projects do not require individual coordination with the Texas Historical Commission.

| CSJ | DISTRICT | ROADWAY | WORK PERFORMED |
|---|---|---|---|
| 0902-38-077 | Fort Worth | CR 772 | No Survey |
| 0902-38-078 | Fort Worth | CR 773 | No Survey |
| 0314-01-077 | Fort Worth | IH 20 | No Survey |
| 0369-01-033 | San Antonio | SH 127 | Recon Survey |
| 2452-01-056 | San Antonio | Loop 1604 | No Survey |
| 0901-32-043 | Paris | CR 237-2 | No Survey |
| 0901-32-047 | Paris | CR 272-1 | No Survey |
| 0909-22-162 | Waco | CR 747 | No Survey |
| | | | |
| | | | |
| | | | |

Signature Scott Pletka Date: April 9, 2014

For FHWA and TxDOT

cc: ECOS Data Entry; PD; ENV_ARC: PA File *Table Template for Weekly List Memo.doc*

Back To List

Properties ★ Details

## Archeology Background Study Details

### Documentation of Project Setting

**1. Does the project conform to a type agreed (per Appendix 3 of PA-TU) to pose no potential to affect historic properties?** No

**2. Geologic Atlas of Texas map or PALM or soils maps examined.** Yes

**3. Texas Archeological Sites Atlas map examined for sites within one kilometer of the project area.** Yes

**4. Historical information examined. Check all that apply.**

**Resources Used During the Initial Assessment**

☑ Topographic map(s) ☑ Soil map(s) ☑ Road map(s) ☐ As-built plans ☐ Other

**If other selected, please identify:**

See Hicks & Company background by Josh Haefner in Documents Section.

**5. Aerial images or project area images (e.g., Google Maps with Street View) examined.** Yes

### Analysis of Project Setting

**6. Have archeological sites been identified within the area of potential effects (APE) or within 150 feet of the APE?** Yes

**Comments:**

No eligible properties in APE

**7. Do cemeteries occur within the APE or within 25 feet of the APE?** No

**Comments:**

**8. Do Holocene-age deposits mapped on Geologic Atlas of Texas or PALM or soils maps occur within the APE?** No

**Comments:**

**9. Does the APE cross a waterway with the potential for shipwrecks?** No

**Comments:**

**10. Is the APE within 500 feet of a historically reliable water source?** Yes

**Comments:**

**11. Does the APE include a wetland or frequently flooded area?**

**Comments:**

**12. Does the Atlas map or other information (enter comment) show that occupation typically occurs on particular landform or landforms that the APE does not contain?** No

**Comments:**

**13. Have all settings that may have been favorable for occupation been subject to previous disturbances? Check all that apply.** Yes

**Previous Disturbances Identified During the Initial Assessment**

☑ Previous road construction and maintenance ☑ Installation of utilities
☑ Modern land use practices like plowing and brush clearing ☑ Urban and/or suburban development
☑ Erosion and scouring by natural processes ☐ Other

**If other selected, please identify:**

**14. Have the majority of the settings with high potential for archeological sites within the APE been previously surveyed?** Yes

**Comments:**

Last surveyed by Blanton and Associates, 2010.

**Conclusions**

**15. Have previous investigations covered a sufficient proportion of the APE to conclude that the APE is unlikely to contain archeological sites or cemeteries?** Yes

**Comments:**

**16. Has the APE been sufficiently disturbed that any prehistoric archeological sites would lack the integrity to address important questions? Any such sites would lack integrity of (check all that apply):** Yes

**Integrity Issues Identified During the Initial Assessment**

☑ Location ☑ Design ☑ Materials ☑ Association ☐ Other

**If other selected, please identify:**

**17. Has the APE been sufficiently disturbed that any historic-era archeological deposits would lack sufficient integrity to address important questions? Any such sites would lack integrity of (check all that apply):** Yes

**Integrity Issues Identified During the Initial Assessment**

☑ Location ☑ Design ☑ Materials ☑ Association ☐ Other

**If other selected, please identify:**

**18. Does historic research show that historic-era archeological deposits, cemeteries, and shipwrecks are not likely to occur within the APE?** Yes

**Comments:**

**19. Does the project area occur in a setting that was not conducive to human occupation and activity?** No

**Comments:**

**20. Will the project adversely affect archeological sites or cemeteries?** No

**Comments:**

No-see attached Hicks & Company Background Study

**Last Updated By:** Eric Oksanen **Last Updated Date:** 04/08/2014 05:51:48

Texas Department of Transportation
125 EAST 11TH STREET | AUSTIN, TEXAS 78701-2483 | (512) 463-8588 | WWW.TXDOT.GOV

April 1, 2016

RE: CSJ: 2452-01-056; Loop 1604 from Potranco Rd to FM 471, Convert to Freeway, Section 106 Consultation; Bexar County, San Antonio District

To: Representatives of Federally-recognized Tribes with Interest in this Project Area

The above referenced transportation project is being considered for construction by the Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT). Environmental studies are in the process of being conducted for this project. 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.

The purpose of this letter is to contact you in order to consult with your Tribe pursuant to stipulations of the Programmatic Agreement among the Federal Highway Administration, the Texas Department of Transportation, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU). The project is located in an area that is of interest to your Tribe.

*Undertaking Description*

TxDOT's San Antonio District is proposing to expand Loop 1604 in Bexar County, Texas (Figure 1).The expansion will convert the existing roadway to a four-lane expressway from Potranco Road to FM 471. The proposed project would require approximately 3.7 acres of new right of way, between Kilmarnoch Road and Reed Road. In addition, the project would require 7.5 acres of drainage easements.

*Area of Potential Effects*

The project's area of potential effects (APE) comprises the following area.

- The project limits extend from Potranco Road to FM 471 along Loop 1604. The total project length is thus 16,632 feet.
- The existing right of way is 340 to 400 feet in width.
- The existing right of way comprises an area estimated at 308 acres.
- A narrow strip of proposed new right of way would be acquired along the east side of Loop 1604 between Kilmarnoch Road and Reed Road. This proposed new right way would total 3.7 acres.
- The estimated depth of impacts is typically 3 feet with a maximum depth of impacts of 20 feet.

- For the purposes of this cultural resources review, the APE also includes an additional 50-foot area around the previously-described horizontal dimensions to account for potential alterations to the proposed APE included in the final project design. Consultation would be continued if potential impacts extend beyond this additional area, based on the final design.

*Identification Efforts*

For this project, TxDOT has conducted a desktop-based study of available background information. The project is very unlikely to affect archeological historic properties. Much of the project area occurs in a setting comprised of ancient and eroded sediments (Figure 2) with a low potential to contain intact, buried deposits. Prehistoric sites in such environments typically lack integrity of location and association. The project area has twice been previously surveyed, once in 1991 and again in 2010 (Figure 3). Two archeological sites are present within the APE: Site 41BX1004 and Site 41BX1876. Recorded during the 1991 survey, Site 41BX1004 is described as a sparse prehistoric lithic scatter ineligible for listing as a State Antiquities Landmark or in the National Register of Historic Places (THC 2014). Surficial in nature, this site was displaced during the original construction of LP 1604. Site 41BX1876 was recorded during the 2010 survey. This site, a small-sized prehistoric lithic scatter, is noted as having been previously truncated by mechanical activity. With no intact surface or subsurface components, the research potential of this site is considered exhausted. Additionally, segments of the immediate project area have been disturbed by recent subdivision, business park construction, and associated infrastructure construction (Figure 4). In summary:

- The APE lies almost entirely within an area of ancient sediments with little potential to bury and preserve archeological materials.
- Much of the sediments within the APE have been previously disturbed by construction and modern land use practices. These activities would have destroyed more fragile archeological materials and would have moved more durable materials from their original location. Any sites that may occur within the APE would likely lack sufficient integrity of location, association, and materials to be able to address important questions of history and prehistory (36 CFR 60.4).
- The APE has been previously surveyed, and these surveys identified only two archeological sites, both surface lithic scatters that have been extensively disturbed by previous construction and lack any data to address important questions of history or prehistory.
- Based on the foregoing factors, there is little to no reason to expect archeological historic properties (36 CFR 800.16(l)) to be located within the APE.

*Findings and Recommendations*

Based on the above, TxDOT proposes the following findings and recommendations:

- a desktop review has found that no archeological historic properties (36 CFR 800.16(l)) would be affected by this proposed undertaking and the proposed project may proceed to construction
- that a zone of 50 feet beyond the horizontal project limits be considered as part of the cultural resources evaluation; and
- if any future changes to the project APE extend beyond the additional 50-foot zone or if archeological deposits are discovered, your Tribe would then be contacted for further consultation.

According to our procedures and agreements currently in place regarding consultation under Section 106 of the National Historic Preservation Act, we are writing to request your comments on historic

properties of cultural or religious significance to your Tribe that may be affected by the proposed project APE and the area within the above defined buffer. Any comments you may have on the TxDOT findings and recommendations should also be provided. Please provide your comments within 30 days of receipt of this letter. Any comments provided after that time will be addressed to the fullest extent possible. If you do not object that the proposed findings and recommendations are appropriate, please sign below to indicate your concurrence. In the event that further work discloses the presence of archeological deposits, we will contact your Tribe to continue consultation.

Thank you for your attention to this matter. If you have questions, please contact Scott Pletka at 512/416-2631 (email: Scott.Pletka@txdot.gov). When replying to this correspondence by US Mail, please ensure that the envelope address includes reference to the Archeological Studies Branch, Environmental Affairs Division.

Sincerely,

Scott Pletka, Supervisor
Archeological Studies Branch
Environmental Affairs Division

_____ _____

Concurrence by: Date:

Attachments
cc w/attachments: ENV-ARCH ECOS

**From:** Scott Pletka
**To:** Doug Booher; Carlos Swonke; Mike Chavez
**Subject:** RE: 1604 tribal
**Date:** Tuesday, May 03, 2016 10:39:09 AM

---

The comment period for tribal consultation ended yesterday with no objections received. The ARCH program status has been updated to “NEPA cleared”.

-Scott

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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Print this Page

New Coordination

Program Area: Historical Studies

Schedule Status: Complete

Task Type: Coordination - Coordinate with Agency

Related Item: Review | PCR Review

Agency Name: Environmental- Historical (ENV-H) STIP VI - Negative

Standard Agency Review Time: 45 (# Days)

Coordination Status: Approved

**Add Correspondence**

**Correspondence For:**

**Correspondence Type:**

**Date :**

Correspondence From:

**Correspondence To:**

Comments:

| Correspondence For | Correspondence Type | Date | Correspondence From | Correspondence To | Comments | Actions |
|---|---|---|---|---|---|---|
| Consultation Complete | Other | 03/03/2014 | Bruce Jensen | admin file | | |

Has the coordination letter been uploaded? No — Sent Date: — Upload Date:

Has the coordination response been uploaded? No — Sent Date: — Upload Date:

Has the letter of concurrence and/or authorization to proceed been uploaded? No — Sent Date: — Upload Date:

Planned Start Date: 03/03/2014

Actual Start Date: 03/03/2014

Planned End Date: 03/07/2014

Actual End Date: 03/03/2014

Comments:

Based on documentation provided, the project APE of ROW + 150' contains no historic properties. No individual coordination with SHPO is required.

Last Updated By: Bruce D Jensen Last Updated Date: 03/03/2014 03:10:31

# Project Journal

| Created By | Created Date | Program Area | Type | Categor | Subject |
|---|---|---|---|---|---|
| Renee Benn | 12/02/2014 | Historical Studies | Internal | General | HIST clearance |

**Note**

BDJ cleared as federally funded project but this is a state EA. Project remains clear for HIST however, as it is a negative survey and federal clearance efforts have a higher standard than state clearance efforts. There are no historic-age properties in the APE. MRC - Project changed funding to federal. Based on previous findings, clearance still is applicable based on negative survey at federal standards. There are no historic-age properties in the APE since 2016 is within 5 year window of clearance.

# APPENDIX D

## Public Involvement


# Loop 1604: From Potranco Road to Farm to Market Road 471

## Public Hearing

## Summary and Analysis

San Antonio, Bexar County, Texas
2452-01-056

December 2014

# TABLE OF CONTENTS



## Appendix

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## Introduction

This report presents a summary and analysis of the Public Hearing that was conducted for the Loop 1604 project from Potranco Road (Farm to Market Road [FM] 1957) to FM 471 (Culebra Road) on October 8, 2014.

## Project Overview

The San Antonio District of the Texas Department of Transportation (TxDOT) proposes an expansion of Loop 1604 from Potranco Road to FM 471. Improvements would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations at Potranco Road, West Military Drive, and Wiseman Boulevard.

## Need and Purpose

Transportation improvements for Loop 1604 are needed between Potranco Road and FM 471 due to high traffic counts and congestion along Loop 1604. The purpose of the proposed project is to improve mobility and maintain safety for the traveling public. By converting the roadway to an expressway and building grade separations at major intersections within the project limits, the proposed project would increase mobility and limit the interaction of high-volume traffic traveling along Loop 1604 and turning traffic from Potranco Road, W. Military Drive, and Wiseman Boulevard.

## Public Hearing Date, Time and Location

- Date: Wednesday, October 8, 2014
- Time: 5:00 to 7:30 p.m.
- Location: Dolph Briscoe Middle School
  Cafeteria
  4265 Lone Star Pkwy.
  San Antonio, Texas 78253


*TxDOT Webpage Posting*

## Public Notices and Advertisements for the Public Meeting

- Published notifications in English and Spanish languages in the *San Antonio Express News* on Monday, September 8, 2014. (See **Appendix A**)
- Web Postings:
  - Placed on the TxDOT project website on September 12, 2014
  - Placed on the Northwest Vista College webpage on September 25, 2014


*Northwest Vista College Webpage Posting*

- Mailings (see **Appendix B**)
  Official Public Hearing Notices mailed to 215 people, including:
  - Two hundred and eighteen property owners and businesses along the project limits
  - Seven Elected and Public Officials
- Emails
  - Meeting notice emailed on September 25, 2014, to 97 stakeholders
  - Meeting notice emailed on October 3, 2014, to 105 stakeholders
  - Meeting notice emailed on October 8, 2014, to 106 stakeholders
- Personal Visits
  - Members of the project team visited with 15 local businesses, organizations, apartment complexes, and churches along the project limits to share meeting and project information. A project flyer with meeting details, and the project location map was passed out to stakeholders.
- Telephone Outreach
  - Project team members also reached out to over 10 property managers, and leasing agents by telephone to share meeting and project information.
- Additional Outreach
  - TxDOT placed mobile message boards on the project limits from October 2, 2014 to October 8, 2014, with meeting details.
  - Northwest Vista College forwarded the Public Hearing Notice to over 16,900 students, faculty, and staff members on September 25, 2014 and October 7, 2014.

Notice of Public Hearing

Notice of Public Hearing

The Texas Department of Transportation (TxDOT) will conduct a public hearing on Wednesday, October 8, 2014 at the Dolph Briscoe Middle School cafeteria, 4265 Lone Star Parkway, San Antonio, TX 78253. The purpose of the hearing is to present the planned improvements for Loop 1604 between Potranco Road (FM 1957) and FM 471 (Culebra Road) in Bexar County, Texas, and to receive public comments. An open house will be held from 5:00 p.m. to 6:00 p.m., project information will be available for review and project team members will be available to answer questions. Information regarding a separate project, the State Highway (SH) 151 and Loop 1604 interchange project will be available during this time. Technical presentations for Loop 1604 will begin at 6:00 p.m. and will be followed by a public comment period.

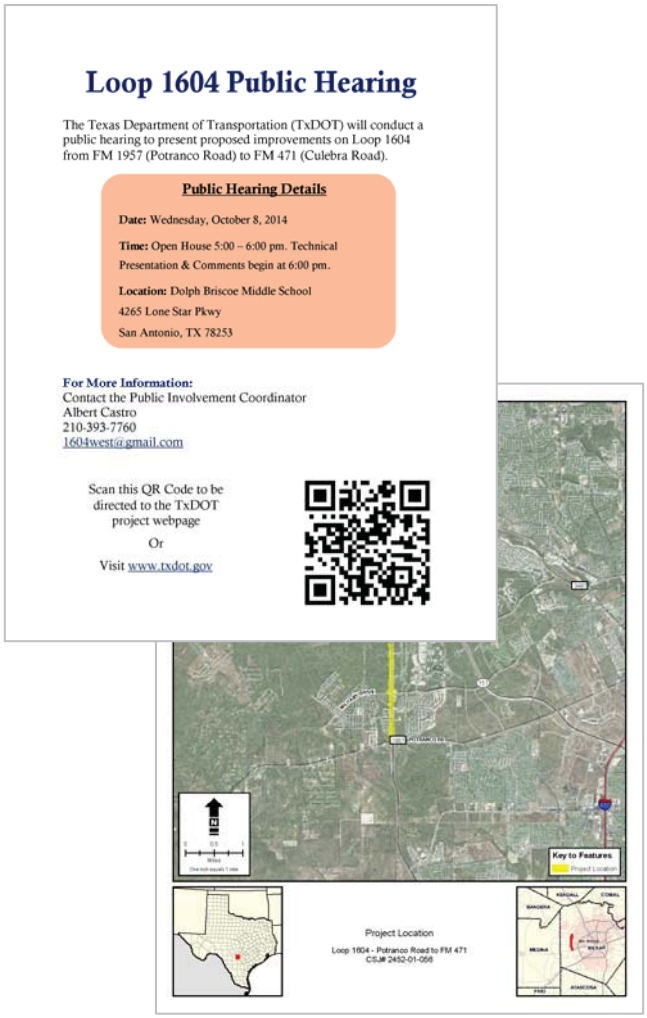
The proposed improvements would expand Loop 1604 to a 4-lane expressway (non-toll lanes) to alleviate congestion and high traffic volumes along the existing loop. Improvements would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations at Potranco Road, West Military Drive, and Wiseman Boulevard. By converting the roadway to an expressway and building grade separations at major intersections within the project limits, the proposed project would increase mobility and limit the interaction of high-volume traffic traveling along Loop 1604 and turning traffic from Potranco Road, W. Military Drive, and Wiseman Boulevard. Environmental studies, maps, and engineering drawings for the proposed project can be obtained from the district office.

Although additional right of way is required, no houses or businesses will be displaced. Information concerning services and benefits available to affected property owners and information about the tentative schedule for right of way acquisition can be obtained from the district office.

All interested citizens are invited to attend this public hearing. Verbal and written comments from the public regarding this project are requested and may be presented for a period of 10 calendar days following the hearing. Written comments may be submitted by mail to CD&P, PO Box 5459, Austin, TX 78763 or by email to 1604west@gmail.com. Comments must be received on or before October 18, 2014 in order to become part of the official hearing record.

The Public Hearing will be conducted in English and a Spanish translator will be present. Persons interested in attending the hearing who have special communication or accommodation needs, or need an interpreter, are encouraged to contact Albert Castro at (210) 393-7760 or 1604west@gmail.com at least two days prior to the public hearing. Every reasonable effort will be made to accommodate these needs. If you have general questions or concerns regarding the proposed project, you may contact:

Albert Castro
Public Involvement Coordinator
(210) 393-7760
1604west@gmail.com



Public Hearing Flyer & Project Location Map

Loop 1604 Public Hearing

The Texas Department of Transportation (TxDOT) will conduct a public hearing to present proposed improvements on Loop 1604 from FM 1957 (Potranco Road) to FM 471 (Culebra Road).

Public Hearing Details

Date: Wednesday, October 8, 2014

Time: Open House 5:00 – 6:00 pm. Technical Presentation & Comments begin at 6:00 pm.

Location: Dolph Briscoe Middle School
4265 Lone Star Pkwy
San Antonio, TX 78253

For More Information:
Contact the Public Involvement Coordinator
Albert Castro
210-393-7760
1604west@gmail.com

Scan this QR Code to be directed to the TxDOT project webpage
Or
Visit www.txdot.gov

Key to Features

Project Location
Loop 1604 - Potranco Road to FM 471
CSJ# 2452-01-066

## Attendance

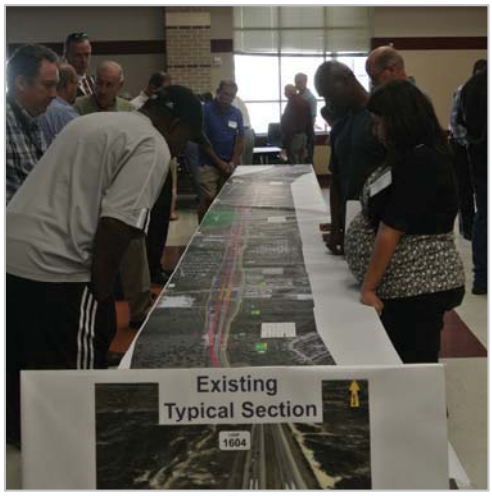
*Public Hearing 10/8/14*

- One hundred and ten people registered their attendance at the meeting via the sign in sheet.
- Eleven of the people who signed in were either employees of TxDOT or project team members.

A sign in table was set up at the main entrance to the cafeteria, which included attendance sheets and comment cards. As attendees entered, they were asked to sign in and were provided comment cards. A copy of the room layout, redacted sign in sheets, and a sample comment card are presented in **Appendix C**.

## Public Hearing Format

The meeting started in an open-house format from 5:00 p.m. to 6:00 p.m. Project information was available for review and project team members were available to answer questions. Information regarding a separate project, the State Highway (SH) 151 and Loop 1604 interchange project was also available during this time. The public hearing began at 6:00 with a technical presentation on Loop 1604 and was followed by official public hearing comments.




*Public Hearing 10/8/14*

## Meeting Materials

Two large-scale copies of the proposed project schematic and environmental constraints maps were displayed on tables. Large-scale exhibits showing existing and proposed typical sections were also shared. Copies of the Draft Environmental Assessment, the Project Technical Report and the Public Meeting Report were also on hand for review. Meeting exhibits are provided in **Appendix D**. Project team members were available at each table to answer questions.

A project schematic for the SH 151 and Loop 1604 interchange project and the project technical report were also available for review.

The Quick Response (QR) code was displayed on project materials. The code, once scanned, directs to the project webpage on the TxDOT website. The code was scanned 15 times.

A PowerPoint presentation was given to provide information about the project (see **Appendix E**). A court reporter was also present to record any verbal comments attendees wished to make.


*Loop 1604 Project QR Code*

## Summary of Public Comments and Responses

All comments postmarked or received by October 18, 2014, were accepted and included in this report. Two email reminders of the official comment period were sent to the project distribution list. The first reminder was sent on October 13, 2014, to 108 recipients, and the second was sent on October 17, 2014, to 108 recipients. No additional comments were received after October 18, 2014.

### *Verbal Comments and Responses*

The court reporter recorded the verbal comments of five attendees. The comments and responses are listed below. The transcript is presented in **Appendix F**.

**Comment** – Terry Ybarra
We do need access to Wiseman from North San Antonio Hills. And the City keeps promising that we will have an opening on Oak Cluster, but we just don't see it happening. I just would like to know when it's going to happen.
**Response** – Comment noted. Wiseman Blvd is not on the State System, and thus TxDOT is not able to provide access to it.

**Comment** – Scott Johnson
My name is Scott Johnson with ICPG Property Tax Services. I understand that some of the land out there had to be -- the right-of-way had to be moved for a beetle, which is more common than people understand. That has caused millions and millions of dollars of loss for property owners' net worth and value and ability to develop. Also, the blind spider is not that rare and can be moved to other karst formations, which are plentiful in our state parks and city parks. That should be done instead of an additional $30 million of tax money, which is going to be wasted for no good reason.
**Response –** Comment noted.

**Comment** – Lupe R.
I may be the only one here that doesn't understand that two years ago it was $15 million and from what the TV says it's now $45 million for y'all finding endangered species, spiders -- endangered. I do not understand. And for this reason, I don't understand because we are more endangered human beings than spiders. Right now we're killing babies, 104 Babcock and on Southcross. We're killing them, chopping them down, burning them, and we're worried about spiders. And I'm not against going forward, and I understand that, you know, this is the fastest growing -- at least this is what people say, but I still do not understand this.
God put it in my heart today -- my sister called me and said what was going on. And two years ago I was very perplexed. I said, "How can they stop progression supposedly because they found spiders?" In my house, I kill them. So enlighten me after I finish because, you know, this is going on. And in a few weeks we're going to vote for people that are supposedly pro-choice. I like choice. I like to either drink a soda or a coffee, but its semantics. They say choice. No, this is about murder. This is about -- and I hope you all -- I hope you all when you vote, vote for pro-life; because from what I

see some people, they don't have too long that God is going to call them, and He's going to hold us accountable. He's holding me accountable, and He put it in my heart for me to come to speak. That's why I'm saying what I'm saying. And I hope to God vote prolife; otherwise, your souls are going to be endangered besides a spider. You all souls are going to be in danger. God bless y'all. We need it. We need the blessings from God. Ebola -- don't worry about Ebola, not that it's all right. But you know what? There is 2- to 3,000 a day abortions here in America and then –
**Response –** Comment Noted

**Comment** – Clemente Echenarria
I'm Clemente Echenarria. I live in North San Antonio Hills, which is right across from Northwest Vista College. I want to thank you for the effort that you're doing, for improving our situation; however, it's not really helping us that much. We still have to have a way of coming in from 1604 north to get to our subdivision. That's the way it's always been. But it looked to me like every time there is construction we get overlooked. And, if you notice, if you're coming in from Potranco -- if you want to get to our neighborhood, you have to go all the way to Culebra, and most of you know that that's a nightmare at 5:00. And we have been suffering for the last 15 years. I live in that neighborhood. The situation is not -- it's not picking up that much, but we have a lot of senior citizens in our neighborhood, and the problem is that police response, ambulance and fire trucks is very marginal, to say the least; because if they're coming in from Galm Road where we have our volunteer fire department, they have to go all the way down Culebra, fight the traffic, come back to our neighborhood. The idea would be to either punch a hole between Wiseman to our neighborhood, and we have been trying that for a long time. We're running out of excuses to our members in our neighborhood. And I just talked to Mr. Rodriguez, and he said that the City had no money and -- but we have to do coordination with the developer.
What I'm asking TxDOT is to see -- because if you go to Shaenfield Road, there is a turnaround on Shaenfield Road, and it does not affect the full traffic. If we can do that and to allow us and also the emergency vehicles to get into our neighborhood, that would be a blessing. And I think we're good for it; because even though we only have 296 homes, most of the homes are – we pay taxes -- a lot of taxes. Since we've been annexed, we have paid over $30 million in taxes, and the only thing that we have to show for is probably some paved roads and some lights. That's about it.
So if you will consider, take a look and see if there is a way that we can have access to 1604 going north. And also when you're coming in from going north, if we can have access to get to our neighborhood because to go south is no problem at all. The problem is on the fact that we have to go all the way 1604, Culebra, turn around. There is a lot of traffic and there is a lot of commotion. Thank you very much.
**Response –** When traveling northbound on LP 1604, the distance from Misty Woods to the FM 471 turnaround, and back to Misty Woods is 3.2 Miles. This is a typical distance for travel along an expressway facility in between cross-streets.
Wiseman Blvd is not on the State System, and thus TxDOT is not able to provide access to it.

**Comment** – Richard Ramos
My name is Richard Ramos, and I happen to be the current president for North San Antonio Hills. What I really want to convey to you, to TxDOT and the county guys, is that in particular North San Antonio Hills has been trying to get a turnaround on Culebra coming back to our development since the year 2007. I have a chronology where I have actually gone to TxDOT and other state and city representatives in trying to make sure that they can hear us, for us trying to get that turnaround. And now we have a very expensive turnaround on 151; but, in my opinion and in the opinion of 296 houses that represent North San Antonio Hills, it comes short of trying to satisfy us for the most part. Okay. I'm disappointed in the fact that we didn't go the extra route. I'm disappointed in the fact that a spider stopped us. And perhaps it would be the proposals that we placed in hand time and time again were probably not even taken into consideration. I don't know. I've never gotten an explanation as to why our particular proposals were not acceptable. It's likely announced – is she still here? I guess she left.
So that's basically what I want to convey to you guys is that we've been struggling probably like some of you other guys for a while in trying to get that done, and we haven't been able to do that. So it's an ongoing battle for us. Thank You.
**Response –** After the proposed project is constructed, the access to North San Antonio Hills Subdivision from LP 1604 will remain the same as it does today. The project that is currently under construction will build the interchange at LP 1604 at SH 151. Upon completion of this interchange access from SH 151 to the San Antonio Hills Subdivision will be improved by providing a direct connection from westbound SH 151 to Southbound LP 1604. By providing this connection, and building the SH 151 mainlanes over LP 1604 so traffic can then directly access Alamo Ranch Parkway without having to utilize the turnaround at Culebra Rd (FM 471). This will remove traffic from the Culebra Rd turnaround, thus improving the use of this turnaround by North San Antonio Hills residents.

## *Written Comments and Responses*

Nine written comments were received either at the meeting, or by mail, fax, or email after the meeting. The official comment period ended on October 18, 2014. Scanned copies of the comments are presented in **Appendix G**.

**Comment** – Althea Ehlers
We need to get rid of the light at Emory Peak and 1604. It's great that you built the overpass at Marbach & 1604 But then we have to stop at the light at Emory Peak. Thank you very much for getting the ball rollon on overpasses at Bandera, Brawn & Shanfield. It is much appreciated. I would like to be kept informed of the projects from Bandera to Hwy 90. Altheaiehlers@sbcglobal.net Your personnel at this meeting were very informative. My other interest is 1957 & 211.
**Response** – Comments noted. The LP 1604 at Emory Peak intersection will be addressed in the next LP 1604 project. This project will be under development this year, and is scheduled to Let in 2016.

**Comment** – Ybarra's
What we would like is to have access to Misty woods, without having to drive 6 miles every day just to get to 151 or Culebra. When 1604 was made into a 4-lane road, our access was blacked, until now we are having to drive all the way to Culebra just to get to our home. Please find a way to have access to North San Antonio Hiss without having to drive all over.
**Response** – When traveling northbound on LP 1604, the distance from Misty Woods to the FM 471 turnaround, and back to Misty Woods is 3.2 Miles. This is a typical distance for travel along an expressway facility in between cross-streets.

**Comment** – Josie Rangel
Stations 165, 170, 180, 185 need plenty of room-adequate lanes. For deceleration to enter frontage road and adequate lanes for acceleration to enter frontage road.
**Response** – The southbound exit ramp at the stated location has a separate lane on the frontage road all the way to the intersection with Wiseman Blvd. This solution meets all design criteria and will accommodate the accelerating and decelerating traffic.

**Comment** – Lynda Chow
If 1604 were completed more as a freeway encircling all of SA, would that pull commercial traffic off I-35 and I-37 and route it around downtown?
**Response** – Comment noted. This is a valid observation.

**Comment** – Jerry & Janice Washington
Noise wall is needed.
**Response** – A noise wall workshop will be conducted for property owners that would be adjacent to the noise walls to determine if noise wall will be installed. Note - comment does not describe a specific location.

**Comment** – Bill Skeen
We are the owners of a 21 acre tract with more than 1,200 ft of frontage on Loop 1604. There is a significant amount of ROW acquisition proposed for our property in order to mitigate any impact to an environmentally sensitive area known as the "Raccoon Cave." We are concerned that an an "abundance of caution" to have no impact on the Raccoon cave, TxDOT is proposing to take more ROW from our property than required. We are very interested in reviewing the environmental report data to determine if the data supports the ROW taking of our property. We believe that in addition to this project, TxDOT's plan to use the mitigation action for the Raccoon Cave to count for mitigation on other TxDOT projects not associated with this section of the 1604 Expansion. There is a definitive impact on our plans to develop the property both direct (land) and economic.
**Response** – The Environmental Document will be available for review once clearance is issued. The feature referred to is a federally listed Critical Habitat Unit, that is being avoided on this project to prevent any type of adverse impact on the listed endangered species know to live in this Habitat Unit.

Comment – William Kane

Concerning subject, I am very concerned with the current configuration of the southbound entrance and exit ramps between Military Drive and Potranco Road. The current configuration has the exit ramp just past Military, but just before Westcreek Oaks, which is a the second major road into and out of Westcreek (besides Military). Then, the entrance ramp to southbound 1604 is just beyond Westcreek Oaks. As configured, there is about 300 feet of access road between the exit ramp and the intersection of Westcreek Oaks. I am concerned there is going to be just too much all converging on that small 300' section of access road.

First, we are going to have all southbound traffic coming from Military drive (whether from Westcreek or from Oakcreek on the other side) heading toward 1604 southbound. Since the entrance ramp is beyond Westcreek Oaks, that southbound 1604 traffic will all be on that 300' stretch of access road. Second, all traffic exiting 1604 for Potranco road will be on that small stretch of 300' of road. This is going to be a great deal of traffic, and it will be coming off that ramp at 70 mph. Third, there will be a considerable amount of traffic coming out of Westcreek from Westcreek Oaks either going southbound on 1604 or heading to the turnaround at Potranco to go northbound. I would expect the this traffic to increase as with the current configuration, this way out of Westcreek offers the quickest access to the southbound 1604 entrance ramp.

So, in this small 300' section of access road we are going to have people turning onto the access road from Westcreek Oaks, merging with all the southbound traffic from Military drive, both of which will be trying to dodge traffic exiting for Potranco road, at a very high rate of speed. To me, it is a major accident waiting to happen. Here is a scenario to illustrate. Some weekday morning a car heading for Potranco road will be exiting the ramp. He intends to turn right onto Potranco, so within that 300' stretch of access road, he will move over the far right lane. His blinker will still be on, since he just exited 1604, and forgot to turn it off. Some inexperienced driver, perhaps feeling the pressure of added traffic on Westcreek Oaks backed up behind him (perhaps a teenager heading to Brennan HS since there is no back way for him to get there through Westcreek), will see the guy move over to the right lane, with his blinker on, and will incorrectly assume that he is turning right onto Westcreek Oaks. So he pulls out and we have a very high-speed t-bone accident, and right on the driver's side door. I can almost guarantee with this configuration it is just a matter of time before this happens.

The solution is simple, switch the entrance and exit ramps. Place the entrance ramp just before Westcreek Oaks, and the exit ramp just past Westcreek Oaks. Now you don't have the situation of all this traffic converging on such a small 300' stretch of road. This also encourages southbound Westcreek traffic to exit on Military vs exiting at the Potranco exit and making the quick jump across the access road to turn left onto Westcreek Oaks. It also should encourage southbound Westcreek traffic toward Military vs Westcreek Oaks. Military, since it has a light, is better equipped to handle most Westcreek traffic, vs Westcreek Oaks. People like me, who want to turn onto Westcreek Oaks will exit on Military and go through the light, which is essentially what we are doing today, so no worse off than we are now. For me, that is a small price to pay for the safety gained by changing the current configuration.

**Response** – Efforts were made to increase the distance between these two ramps on the frontage road near Westcreek Oaks. Given the short distance between Potranco Rd and Military Dr it limited the spacing between these two ramps. The gore of the ramp is the painted white lines on the ramp and frontage road that form a long triangle. The ramps as shown on the schematic meet the minimum design criteria in regards to spacing between the ramp gores on the frontage road and spacing from the exit ramp gore to the nearest access point at Westcreek Oaks. Residents would be encouraged to make the same maneuver as they do today to access Westcreek Oaks. The only difference is they will need to take the proposed Military Drive exit ramps, and then go through the LP 1604 at Military Drive intersection then make the right turn off the new Southbound Frontage Rd onto Westcreek Oaks.
Switching the ramps as suggested will create more weaving and problems from the higher traffic generating streets such as Military Dr and Potranco Rd, since they will have a much shorter distance to weave over either from the exit ramp, or to the entrance ramp. The 'X ramp' pattern shown on the schematic is the preferred ramp pattern for most of these reasons.

**Comment** – Richard Ramos
As I mentioned on 8 Oct 14. We the residents of North San Antonio Hills (NSH) are extremely disappointed with the TXDot organization and the County leadership for not taking into account the egress accessibility from Oak Cluster to Wiseman for the residents of this community. We have brought this concerns to you'll attention from 2007 to the present and to no avail. Nearly, 90% of the residents in NSH are 80 years of age if not older. Neither the fire department nor the police can service this community timely nor can they meet the city or State metric for arrival time on the scene. This is an unacceptable situation and we put these residents at risk every day. We have no other course, but to engage with our State Representative and hope Mr. Cortez can help us.
**Response** – Comment noted. Wiseman Blvd is not on the State System, and thus TxDOT is not able to provide access to it.

**Comment** – Peter Rogers
I welcome any improvements to Loop 1604, however, I fear recent improvements over the years and plans for future improvements are nearsighted and inadequate. Why is the grade separation at Marbach only one lane in each direction when a bulk of the traffic during rush hours is NB and SB? Drivers who are not familiar with the area or blocked by traffic have a difficult time getting over to that ONE thru lane and end up stopped at the light at Marbach, which is almost always red these days. All "overpasses" or "grade separations" need to be at least four lanes. Why is there such an emphasis on frontage roads in this City/County/State and not in the increase in thru lanes? Frontage roads turn into primary paths of travel when inadequate thru lanes become congested, which leads to a lot of accidents. Why make most effective use of the land currently available and punch through more freeway, highway, and interstate lanes. The design of frontage roads should be for exclusive use to access businesses and housing developments along the interstate. Why is there not more emphasis on improving feeder streets and roads such as Potranco and Military Drive West? It baffles my mind why Potranco is not a four lane road from 1604 to at least Texas

Research Parkway (211). Military Drive West WB from 1604 needs to at least have a turn lane all the way to N. Grosenbacher road as it will eventually be connected to housing and mixed use developments on tracts of land between Military Drive and Wiseman, Talley and 1604. There isn't even sidewalks other protection from traffic who cross Military Drive West to and from Galm Elementary. Growth will continue to spread outward on Potranco, along Talley Road, to 471 and further North and West. That is why it is important to do this right if it will be done at all. Close coordination also needs to be done with other municipalities to match growth on their maintained roads in the area.
Hopefully a grade separation at Marbach will reduce the growing number of people using Military Drive West as an alternate to Potranco for a thru route but I also fear a grade separation at Military Drive West and 1604 will only bring in more traffic from Potranco and Talley and nothing will be done by the county or city to augment any TxDOT improvements on 1604. We have seen a huge increase in traffic in this area but more alarming is the increase in traffic by commercial vehicles. The oilfields are not just creating problems for communities outside 173 , 97 and 123. You do not have to drive far outside of our loops to see wells being drilled and San Antonio is home to multitudes of oilfield service companies and fleets of commercial vehicles. Additionally, in the West/Northwest area on 1604, from HWY 90 to I-10, we see a ton of traffic from aggregate haulers as they transport caliche from nearby pits to the oilfields in the South or to the developments continuing around the area or other parts of San Antonio. There have been two commercial vehicle/pedestrian vehicle traffic fatalities very recently. Not long ago, a gravel truck turned over at 1604 frontage road when he turned from 1604 SB to Military Drive West WB. A commercial vehicle turned over going NB on 1604 near 1604/Military Drive West. Trucking traffic is increasing at an incredible rate since 1604 is one of the primary oversize/overweight routes to South Texas oilfield production. While truck traffic does not seem to be the major factor in increased traffic, the mix of increased commercial trucking with a massive increase in car traffic is a deadly mix. Trucks and commuters need a free-flowing, easy way to travel from I-10 to HWY 90 on 1604 loop on the N, NW, W, SW sides of town. While recent improvements over the years between Shaenfield and Bandera Road have helped, it obviously was not enough. I do not see any of the future plans being any more aggressive than plans already executed, which have proven to be better yet inadequate for current and future growth.
**Response** – Comments are noted. The new overpass on LP 1604 at Marbach Rd was funded through a statewide safety call for projects. Based on the traffic volumes and crash rates at that intersection, it was selected for these 'Safety funds' to construct only a 2-lane overpass. There is a funded project on LP 1604 from FM 1957 to US 90 that will expand LP 1604 to a 4-lane expressway, with frontage roads and grade-separations. This project will make the overpass at Marbach Road 4-lanes wide. This project is scheduled to go to construction in early 2016.
In regards to other improvements to adjacent roadways, on FM 1957, Bexar County will be going to bids on a widening project on FM 1957in 2015. This project will begin at LP 1604 and end at SH 211, which will expand FM 1957 to 4-lanes with a center turn lane.

# CERTIFICATION OF PUBLIC HEARING

CSJ: 2452-01-056
Loop 1604 From Potranco Road to FM 471 Project: The project limits extend along Loop 1604 from Potranco Road (Farm-to-Market [FM] 1957) to FM 471 (Culebra Road) in San Antonio, Bexar County, Texas .

1. A public hearing was held on Wednesday, October 8, 2014, to discuss the proposed Loop 1604 From Potranco Road to FM 471 Project;

2. The economic and social effects of the project location, design, and impact on the environment have been considered;

3. The statutory provisions of the Civil Rights Act of 1964 were considered in determining economic, social, and environmental effects; and

4. The project is consistent with the goals and objectives of urban planning, as promulgated by the community.

Jonathan Bean, P.E.
Director of TP&D,
San Antonio District

12/15/14

Date

# Notice Affording an Opportunity for Public Hearing - Loop 1604



**Purpose:**

The Texas Department of Transportation (TxDOT) is offering the opportunity to request a public hearing covering the social, economic, and environmental effects of the proposed expansion of Loop 1604 from Potranco Road (Farm to Market [FM] 1957) to FM 471 in San Antonio, Bexar County, Texas. The length of the proposed project is approximately 4.1 miles. This project was initially evaluated with a State Environmental Assessment (EA) and a public hearing was conducted; however, based on the recent inclusion of federal funding, this document has been prepared in accordance with the procedural provisions of the National Environmental Policy Act (NEPA).

Any interested citizen may request a public hearing covering the social, economic and environmental effects of the proposed location and design for this project. Requests for a public hearing must be submitted in writing on or before Oct. 27, 2015 to the Director of Advanced Planning, Texas Department of Transportation, 4615 NW Loop 410, San Antonio, Texas, 78229.

If you have general questions or concerns regarding the proposed project, you may contact TxDOT's Environmental Affairs Division at (512) 416-2514.

If such a request is received, a public hearing will be scheduled. Adequate notice will be published to announce the date and location of the hearing.

Maps showing the project location and design, environmental document, tentative construction schedules, and other information relative to the project are on file and available for inspection during regular business hours at:

TxDOT San Antonio District Office
4615 NW Loop 410
San Antonio, Texas 78229

**Description:**

The existing facility is a four-lane divided roadway with two 12-foot travel lanes in each direction and shoulders ranging in width from four feet to ten feet; the existing right-of-way width ranges from 340 to 400 feet. The proposed improvements would include the construction of the southbound Loop 1604 main lanes and frontage road, entrance and exit ramps, and three grade separations; the existing roadway would be converted to a four-lane expressway. Improvements would be constructed primarily within existing right of way, although approximately 3.7 acres of new right of way would be required.

The proposed project would not result in the displacement of any businesses or residences, and no adverse impacts to communities, including to minority and low-income populations, would occur as a result of the improvements. Information concerning services and benefits available to affected property owners and information about the tentative schedule for right-of-way acquisition may be obtained from the San Antonio District office. Additionally, the proposed improvements would not result in substantial direct, indirect, or cumulative impacts to any of the following resource categories: socioeconomic resources, hazardous materials, air quality, traffic noise, water resources, biological resources (including threatened and endangered species), or cultural resources.

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 Dec. 16, 2014, and executed by FHWA and TxDOT.

**Deadline:**

Written requests must be submitted on or before Oct. 27, 2015.

**Downloads:**

- Federal Environmental Assessment (EA)
- State EA Public Hearing Summary and Analysis Report
- Notice

**Contact:**

Texas Department of Transportation
Director of Advanced Planning
4615 NW Loop 410
San Antonio, Texas 78229
(210) 615-6076

NATION

# Deal could lead to progress on cybertheft

ASSOCIATED PRESS

WASHINGTON — China's pledge to help crack down on hackers who steal commercial secrets from the United States, even coming as it did amid a bit of arm-twisting by President Barack Obama, is a big breakthrough that could reduce U.S.-China tensions and end huge losses for American companies.

Analysts say the agreement between the world's two biggest economies is just a start but could lead to progress on the cybertheft issue — depending on how well it's implemented. Obama announced the agreement at a joint news conference Friday with Chinese President Xi Jinping.

"I think it's a big deal," said Dmitri Alperovich, who published a seminal paper in 2011 identifying Chinese cybereconomic espionage and now runs a cybersecurity company, Crowdstrike. "For the first time ever, the Chinese have made a distinction between national security espionage and economic espionage."

Also significant, Alperovich said, is that the Chinese have agreed to provide responses to U.S. government requests for investigations. "They can't just shrug and say, 'We don't do hacking; hacking is illegal,' " he said.

Mark MacCarthy, vice president for public policy at the Software and Information Industry Association, said the tech industry trade group agrees with Obama that the cybertheft of intellectual property must stop. "We are hopeful the understanding reached by the president and Chinese President Xi Jinping results in real progress on the ground," he said.

ANALYSIS

The U.S. has accused Beijing of backing Chinese hackers who steal trade secrets from American companies. Before the Xi summit, Obama called cybertheft by China "an act of aggression."

James Lewis, director of the Center for Strategic and International Studies' Strategic Technologies Program, said the thefts probably cost U.S. companies tens of billions of dollars annually.

Last year, the U.S. charged five officers in China's People Liberation Army with computer hacking and economic espionage against six U.S. companies, including Westinghouse, U.S. Steel and Alcoa.

Malcolm Lee, nonresident senior fellow at the Brookings Institution and a former White House economic official, said the Friday agreement will "begin to address one of the most destabilizing and corrosive issues in the relationship."

Senior U.S. officials said the Obama administration had been preparing a package of sanctions in recent weeks aimed at China and other nations over cyberthefts of intellectual property. When news of those plans appeared in the U.S. media, China dispatched a high-level delegation, led by Meng Jianzhu, the secretary of the Central Political and Legal Affairs Commission of the Chinese Communist Party, to work out a deal. The result was Friday's announcement.

Andrew Harnik / Associated Press

**President Barack Obama, Chinese President Xi Jinping, first lady Michelle Obama and Xi's wife, Peng Liyuan, arrive for a State Dinner at the White House on Friday. China has promised to help crack down on hackers who steal commercial secrets from the United States.**

Last year's indictments helped, too, Lewis said. "The Chinese thought about how unhappy that experience was, and they didn't want to go through it again," he said. "They knew the Americans were really worked up."

The U.S. also has been getting better at tracking the source of cyberattacks. North Korea, for instance, was quickly identified as the source of a hack last year that damaged computers at Sony and exposed internal e-mails at the filmmaker.

"That made them think, 'We're not going to be able to get away with this,' " Lewis said.

Trevor Nagel, a partner with the law firm White & Case who specializes in cybersecurity and other global technology issues, noted that China now has intellectual property of its own to protect, as it has become a world leader in manufacturing.

Jeremie Waterman, executive director for China at the U.S. Chamber of Commerce, called the agreement "a clear statement" on an issue of critical importance to the future of relations between the two countries. "Hopefully, it marks a new chapter," Waterman said, adding that, as with other areas of negotiation between the U.S. and China, the key will be implementation.

The agreement may not be easy to enforce, particularly because it's often difficult to trace the source of cyberattacks and the Chinese government has never acknowledged a role in past attacks, said Betsy Page Sigman, a cybersecurity expert at Georgetown University's McDonough School of Business.

"The Chinese government can use intermediaries" in such attacks, "and it can be very difficult for them to be found out," she said.

# The post-Boehner Congress: A sense of dread in D.C.

NEW YORK TIMES

WASHINGTON — At the White House, a stunned President Barack Obama expressed hope for bipartisan progress as turmoil among Republicans ended Rep. John Boehner's speakership.

On Capitol Hill, the conservatives who again felled one of their leaders rallied to name the terms for the next person to wield the speaker's gavel.

And on Wall Street, fear set in at the prospect of another showdown over the government's ability to pay its debt, support its export businesses and keep its doors open.

Boehner's sudden announcement Friday that he will step down from the speakership and leave the House on Oct. 30 has thrown Washington into deep uncertainty. His resignation is likely to herald an even more combative stretch in the nation's capital, emboldening conservatives to defy Obama on decisions re-

▸▸ **Next speaker:** Conservatives send a message. **A17**

garding spending, debt and taxes.

Some in Congress and the White House hold out hope that Boehner's departure and the election of a new speaker will break the fever among conservatives, who have been plotting his downfall for over a year, and grant his replacement a grace period.

Obama promised on Friday to "reach out immediately" to the next speaker to begin working on the nation's problems.

But more prevalent is a sense of dread that an already bitter and divisive political atmosphere is about to get even worse.

The GOP presidential race has been dominated by outsiders such as Donald Trump, Carly Fiorina and Ben Carson, who have castigated their party's leadership in Washington. Now, with conservatives claiming Boehner's demise as a political victory, many expect his successor to face tremendous pressure to bring that combative spirit to the halls of Congress and to instigate a showdown with the president over budget limits and the debt ceiling at the end of the year.

"To get members to bust the budget caps, they have to threaten a Christmas-vacation shutdown for members of Congress," said Rep. Thomas Massie, R-Ky., one of the rebels who pushed for Boehner's overthrow. "Heaven help the speaker who replaces John Boehner and goes along with that charade."

The showdown looms Dec. 11, when a stopgap spending bill expected to pass this week would expire and Congress and the president will have to find a way to fund the government through September 2016 and raise its borrowing limit.

The new speaker, elevated by a conservative rebellion, will face demands from those same rebels to extract concessions from a president who has little to lose by standing firm. At stake for conservatives will be the one clear victory they have scored since the tea party revolution of 2010: firm statutory limits on spending signed into law in 2011, which Obama has said he can no longer abide.

In turn, the Republican Party, already wrestling with the effect of Trump's populist insurgency on its White House chances, could find itself justifying to moderate voters another Washington crisis, prompted by an even more unruly, confrontational House majority.

Hours after Boehner's announcement, Rep. Roger Williams, R-Austin, one of the conservative hardliners, warned, "I hope all Republicans, including those in the Senate, are listening to what grassroots conservatives are saying: It is time for conservative leadership and conservative principles."

Texas Department of Transportation

# MEMO

November 13, 2015

**District:** San Antonio
**County:** Bexar
**CSJ:** 2452-02-056
**Highway:** Loop 1604
**Limits:** Potranco Road (Farm-to-Market [FM] 1957) to FM 471 (Culebra Road)

## CERTIFICATION OF OPPORTUNITY FOR A PUBLIC HEARING

This is to certify that:

1. The opportunity has been afforded to the public to request a public hearing covering the project's location and design. No requests for a public hearing were received by the deadline of October 27, 2015 at 5:00pm.
2. The economic and social effects of the project's location and design and its impact on the environment have been considered.
3. In determining the economic, social, and environmental effects, the statutory provisions of the Civil Rights Act of 1964 have been considered.
4. The project is consistent with the goals and objectives of urban planning, as dictated by the community.

Name **Jonathan Bean**
Director TP&D, San Antonio District

11/13/15
Date