



Cumulative Impacts Technical Report

U.S. Highway 79 (US 79) from Interstate Highway 35 (I-35) to East of Farm-to-Market Road 1460 (FM 1460)

Williamson County, Texas

TxDOT Austin District

CSJ: 0204-01-063

March 2020

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 9, 2019, and executed by FHWA and TxDOT.

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1.0 INTRODUCTION

1.1 PURPOSE OF THE TECHNICAL REPORT

This technical report presents the analysis conducted to assess the potential for cumulative impacts associated with the proposed U.S. Highway 79 (US 79) project in Williamson County, Texas. It provides definitions of direct, indirect, and cumulative impacts, and also summarizes the Texas Department of Transportation (TxDOT) guidance utilized to determine the magnitude of potential cumulative impacts.

1.2 PROJECT OVERVIEW

The TxDOT Austin District proposes improvements to US 79 between Interstate Highway 35 (I-35) and east of Farm-to-Market Road 1460 (FM 1460). The proposed project includes widening the existing US 79 roadway to add a third travel lane in each direction and installing a raised median for safety. Improvements to intersections would include potential overpasses at US 79/Mays Street and US 79/FM 1460, and altering the US 79/I-35 intersection.

The intersection at US 79 and Mays Street would be completely reconfigured with an addition of a half cloverleaf interchange to replace the existing four-way traffic light in order to improve safety and enhance the flow of traffic from one corridor to the other. Two traffic lights would facilitate the left- and right-hand turns on and off Mays Street. The addition of an overpass would direct Mays Street traffic over US 79, thus avoiding the potential danger and congestion associated with the intersection.

Additionally, the proposed overpass at FM 1460 would allow vehicles traveling in the left lanes along US 79 to go over FM 1460 without stopping, thus bypassing the intersection. The right lanes (both eastbound and westbound on US 79) would direct traffic to the 4-way traffic light at the intersection of US 79 and FM 1460, below the overpass bridge. This intersection would include turnaround lanes, protected left turn lanes, and pedestrian crosswalks, and would facilitate the transfer of vehicles onto and off of US 79 and FM 1460.

Proposed changes along US 79 at I-35 include the reroute of traffic lanes to promote smoother, safer travel on and off US 79 and I-35. US 79 would still traverse below the I-35 overpass.

A raised median is proposed along the center of US 79 throughout the majority of the project area. The addition of this median would limit access points on and off US 79 to five cross-street intersections, the interchange at Mays Street, and three designated turn lanes at

breaks in the median. The five cross-street intersections are: (1) FM 1460, (2) Sunrise Road, (3) Georgetown Street, (4) Egger Avenue, and (5) Heritage Center.

Driveways and access points would also be modified to improve safety and traffic flow. The proposed improvements also include installing shared-use paths on both sides of US 79 to improve pedestrian and bicycle accommodations. The proposed project would require approximately 8.97 acres of new right-of-way.

Overall, the project would add capacity to the existing roadway, improve traffic flow, and increase safety for the traveling public. Right-of-way acquisition required for the reconstruction of the US 79/I-35 and US 79/Mays Street intersections would result in 19 potential displacements. **Appendix A: Figure 1** shows the project location and limits.

The environmental impacts of the proposed improvements to US 79 are being analyzed in technical reports. The project will be processed as an Environmental Assessment (EA).

2.0 DEFINITIONS AND GUIDANCE

2.1 DEFINITIONS OF DIRECT, INDIRECT, AND CUMULATIVE IMPACTS

The Council on Environmental Quality (CEQ) defines direct effects as those effects that are “caused by the action and occur at the same time and place” (40 Code of Federal Regulations [CFR] § 1508.8). Direct effects are predictable and are a direct result of the project.

In addition to direct effects, major transportation projects may also have indirect effects on land use and the environment. As defined by the CEQ, indirect effects are “caused by an action and occur later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR § 1508.8).

Cumulative effects are defined as effects “on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR § 1508.7).

2.2 GUIDANCE

The approach for conducting cumulative impacts analysis is ultimately guided by the following TxDOT publications, which are available online in the TxDOT Indirect and Cumulative Impacts Toolkit: *Risk Assessment for Cumulative Impacts* (TxDOT ENV 2014) and *Cumulative Impacts Analysis Guidelines* (TxDOT ENV 2019).

3.0 CUMULATIVE IMPACTS

As previously stated, cumulative impacts can result from “individually minor but collectively significant actions taking place over a period of time” (40 CFR § 1508.7). As this regulation suggests, the purpose of a cumulative impacts analysis is to view the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. Environmental and social resources are evaluated from the standpoint of relative abundance among similar resources within a larger geographic area. Broadening the view of resource impacts in this way provides the decision maker an insight into the magnitude of project-related impacts in light of the overall health and abundance of selected resources.

In essence, a cumulative impacts evaluation first paints a conceptual picture of the existing or “baseline” condition of each resource, which is based on historical information and an assessment of the current condition of the resource. Second, the analysis then inventories future projects in the vicinity that are planned and financed, but unrelated to the proposed project, and assesses the likely collective impacts of those projects for each resource. Third, the analysis then describes the expected future status of the resource (i.e., in terms of quantity and condition) after the combined (i.e., cumulative) effects of the proposed project and other foreseeable projects are fully realized. Finally, the cumulative impacts analysis assesses the level of concern that should be associated with the expected cumulative impacts to a resource based on the scarcity or current condition of that resource. All relevant, reasonable mitigation measures must be identified, even if they are outside the jurisdiction of TxDOT. Mitigation measures identified to address the proposed project’s direct and indirect effects can also minimize, rectify, or compensate for negative cumulative effects. These measures are typically considered and disclosed in other technical reports or environmental assessments.

The evaluation of cumulative impacts discussed in this document follows TxDOT’s *Cumulative Impacts Analysis Guidelines* (TxDOT ENV 2019). According to TxDOT’s 2019 Guidance, the five steps of a cumulative effects analysis for a TxDOT project are as follows:

- (1) Resource study area, conditions, and trends
- (2) Direct and indirect effects on each resource from the proposed project
- (3) Other actions—past, present, and reasonably foreseeable—and their effect on each resource
- (4) The overall effects of the proposed project combined with other actions
- (5) Mitigation of cumulative effects

3.1 STEP 1 – RESOURCE STUDY AREA, CONDITIONS, AND TRENDS

3.1.1 Identification of Resources

According to TxDOT’s *Cumulative Impacts Analysis Guidelines* (TxDOT ENV 2019), if a project does not cause direct or indirect impacts on a resource, it would not contribute to a cumulative impact on that resource. **Table 1** describes direct and indirect impacts for each resource category that will be addressed in the EA and whether the resource is in poor or declining health or at risk. This analysis focuses on those resources substantially impacted by the project or those that are currently in poor or declining health or at risk, even if project impacts (either direct or indirect) are relatively small; only those resources meeting these criteria are brought forward for further analysis of cumulative effects.

| Table 1: Resources/Issues Considered for Cumulative Impacts Analysis | | | | |
|--|---|--|---|--|
| Subject Considered for Direct and Indirect Impacts | TxDOT/CEQ Criteria ¹ | | | Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis |
| | Would Proposed Project or Induced Growth Result in Substantial Impacts? | Is Subject a Scarce Resource or in Poor or Declining Health? | Included for Cumulative Impacts Analysis? | |
| NATURAL RESOURCES | | | | |
| Waters of the U.S., including Wetlands | No | Yes | No | Excluded. The proposed project is anticipated to be permitted by Nationwide Permit 14 without formal coordination with the US Army Corps of Engineers (USACE). Future development would not likely affect full compliance with water quality protection regulations. Potential induced growth is not anticipated to adversely impact waters of the U.S., including wetlands, due to protection provided by Section 404 of the Clean Water Act. |

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| Floodplains | No | No | No | Excluded. Although a portion of the proposed project would lie within the 100-year floodplain, the hydraulic design of the project would permit conveyance of the 100-year flood, and potential inundation of the highway would not cause substantial damage to it, the streams, or other property. Potential induced growth is not anticipated to adversely impact floodplains. |
| Water Quality | No | Yes | Yes | Included. Required permits to control erosion during construction are expected to result in minimal temporary degradation of water quality; however, water quality is a major component for survival of federally listed aquifer species. |
| Federally Listed Threatened/Endangered Species | No | Yes | Yes | <p>Included. The project area contains a U.S. Fish and Wildlife Service (USFWS) designated critical habitat unit and known, occupied habitat for the Jollyville Plateau salamander (<i>Eurycea tonkawae</i>), a federally listed threatened species. Potential impacts to this species would be possible because the potential for encountering these species during construction is high due to the location of the habitat. However, any impacts to species would be limited to individuals within the construction area and would not be expected to affect the species as a whole. Formal consultation with the USFWS would occur for the federally listed salamander.</p> <p>The project area crosses Karst Zones 1 and 3, which may provide potentially suitable geologic substrates for the Bone Cave harvestman (<i>Texella reyesi</i>), a federally listed karst invertebrate. Potential impacts to this species may be possible, but the potential for encountering these species during construction is low due to the best management practices (BMPs) and the voluntary conservation measures proposed for this project. Any impacts to this species would be limited to individuals within the construction area and would not be expected to affect the species as a whole. Informal consultation with the USFWS would occur for the Bone Cave harvestman prior to construction of the proposed project.</p> |

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| | Would Proposed Project or Induced Growth Result in Substantial Impacts? | Is Subject a Scarce Resource or in Poor or Declining Health? | Included for Cumulative Impacts Analysis? | |
| Vegetation and Wildlife Habitat (including Habitat for State-Listed Species) | No | Yes | No | <p>Excluded. The proposed project footprint encompasses approximately 1.3 acres of Edwards Plateau Savanna, Woodland, and Shrubland, approximately 1.1 acres of Disturbed Prairie, approximately 0.34 acres of Tallgrass Prairie Grassland, approximately 0.63 acres of Riparian vegetation, and approximately 34.7 acres of Urban vegetation. These habitat types are not considered rare or important remnant vegetation as mapped by the Texas Conservation Action Plan. The project area contains fragmented patches of potentially suitable habitat for 2 state-threatened species and 14 species of greatest conservation need (SGCNs). However, due to the fragmentation, any impact to these species would be localized to individuals of the population. These impacts would not be expected to be significant to these species throughout their range.</p> <p>Impacts associated with the proposed project and subsequent induced growth are not anticipated to result in any effects to state-listed species. Anticipated induced growth (private development) would be regulated by the City of Round Rock’s land development ordinances. Additionally, state regulations prohibit harm to individuals of state-listed species. All development, whether publicly or privately funded, is subject to state regulations.</p> |
| COMMUNITY IMPACTS | | | | |
| Community Impacts | No | No | No | <p>Excluded. The proposed project would not significantly adversely affect, separate, or isolate any distinct neighborhoods, ethnic groups, or vulnerable populations within the project area. The potential changes in access and travel patterns could result in slightly longer travel times for residents, employers, or commercial customers along the proposed project corridor. Mobility and safety would be enhanced for all users of the facility due to the added capacity, proposed divided roadway, intersection improvements, and pedestrian and bicycle infrastructure. Impacts to the community from the anticipated commercial and community facilities displacements would be limited. No existing neighborhoods would be divided.</p> |

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| | Would Proposed Project or Induced Growth Result in Substantial Impacts? | Is Subject a Scarce Resource or in Poor or Declining Health? | | | |
| Section 4(f) and 6(f) Properties | No | No | No | | Excluded. No impacts are anticipated to local parks or recreation areas. No adverse effects are anticipated to occur to any resources eligible for the National Register of Historic Places (NRHP). |
| Limited English Proficiency | No | No | No | | Excluded. Adequate steps are planned to assist the limited English proficiency population within the project area throughout the public involvement process for the proposed project. |
| Environmental Justice | No | Yes | No | | Excluded. No disproportionately high or adverse impacts to minority or low-income populations are anticipated as a result of the proposed project. The additional right-of-way required for the proposed improvements would result in potential commercial and other displacements throughout a section of the project area that contains environmental justice populations. However, the proposed improvements provide the safest and most efficient type of facility. Additionally, avoidance of Section 4(f) impacts factored into the alignment. No existing neighborhoods would be divided, and permanent disruptions to normal daily activities are not expected for the neighboring communities. Surrounding communities would benefit from increased safety and mobility along US 79. |
| Public Facilities/ Services/ Utilities | No | No | No | | Excluded. The proposed project would provide overall benefits to the socioeconomic resources in the project area. There are commercial activity centers, residential neighborhoods, and community facilities, such as medical facilities and places of worship, surrounding the corridor. The proposed project would displace two community facilities but would generally improve mobility and safety such that the remaining places of worship and other community resources become more easily accessible. Potential induced growth is not anticipated to adversely impact any public facilities/services/utilities. |
| <i>Cultural Resources</i> | | | | | |
| Historic-Age Properties | No | No | No | | Excluded. The historic resources survey report has recommended a finding of no adverse effect to NRHP-eligible properties. Potential induced growth is not anticipated to adversely impact historic-age properties. |

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| | Would Proposed Project or Induced Growth Result in Substantial Impacts? | Is Subject a Scarce Resource or in Poor or Declining Health? | | |
| Archeological Resources | Unknown | No | No | Excluded. Archeological survey has been completed and no further archeological investigations are warranted. Given the generally undisturbed nature of the area of induced growth, there is potential for impacts to unknown archeological deposits in either surficial or sub-surface contexts. However, surveys have not been conducted throughout the full extent of the area of induced growth to date. |

¹ In accordance with TxDOT and CEQ selection criteria for limiting the scope of cumulative impacts analyses.

Based on the results of TxDOT’s cumulative impacts risk assessment and supported by the information summarized in **Table 1** reflecting the technical reports prepared for the proposed project, a Cumulative Impacts Analysis is required.

As shown in **Table 1**, the proposed project may potentially have cumulative impacts on federally listed species (specifically the Jollyville Plateau salamander and Bone Cave harvestman). Additionally, because water quality is a major component for survival of federally listed aquifer species, additional discussion of water quality is included with the discussion of federally listed species below.

3.1.2 Resource Study Area

The geographic resource study area (RSA) for cumulative impacts is a combination of physical boundaries on the landscape, such as Chandler Branch to the north, Lake Creek to the south, the confluence of Chandler Branch and Lake Creek to the east, and Onion Branch to the west, which serve as natural barriers to shallow groundwater flow to/from the project area due to their lower elevations. The RSA also incorporates resource-specific boundaries, such as the cricket foraging area buffer at I-35, where Karst Zone 1 occurs (see the *Biological Assessment* under separate cover for more information on karst zones). **Figure 1** in **Appendix A** illustrates the RSA boundary. The RSA encompasses approximately 4,167 acres. This area is in Williamson County and includes areas of the Edwards Aquifer Recharge and Transition Zones, Critical Habitat Unit 2 (occupied by the Jollyville Plateau salamander), as well as areas of Karst Zones 1, 3 and 4, as seen in **Figure 1**.

The temporal RSA for cumulative impacts to these species is considered to be 1988 through 2040. 1988 is the year the Bone Cave harvestman, was listed as an endangered species. This year also captures the beginning of the growth trend for Central Texas. 2040 is the horizon year of the Capital Area Metropolitan Planning Organization's (CAMPO) current long-range transportation plan.

3.1.3 Resource Conditions and Trends

Cumulative impacts to the Jollyville Plateau salamander and Bone Cave harvestman will be considered within the context of the geographic RSA.

3.1.3.1 *Jollyville Plateau Salamander*

Current Conditions

The Jollyville Plateau salamander is endemic to waters of the Edwards Aquifer and is range-restricted within the urban areas surrounding Austin, Cedar Park, and Round Rock, Texas. As entirely aquatic species, these salamanders are particularly vulnerable to water quality degradation and require relatively shallow, cool, moving water; an abundant macro-invertebrate community; aquatic vegetation; and substrates containing cover objects (including large rocks, cobble, and leaf litter) to provide sufficient refuge from predators (Bowles et al. 2006; Pierce, Christiansen, et al. 2010; Pierce McEntire, et al. 2014). Currently, 106 surface sites are known for the presence of the Jollyville Plateau salamander (USFWS 2013a). Estimates of population size for this species vary widely among sites. Brushy Creek Spring (H-E-B culvert that occurs within the project area and RSA) represents the easternmost occurrence of this species. Other than the Brushy Creek Spring, one additional occurrence of the Jollyville Plateau salamander is noted east of I-35 (Georgetown Spring); the remaining locations are located west of I-35, and the majority occur south and west of US 183 (Hillis et al. 2015). Surface and subsurface movement of the species is not well understood, but movement between and among the two environments is likely inhibited by geologic, hydrologic, physical, and biological barriers (Bendik 2011).

Urbanization and declines in water quality and quantity in the aquifer are cited by the USFWS as the primary threats to this species; any activity that degrades the quality or quantity of water upstream of salamander habitat may result in take through habitat modification (Bowles et al. 2006; USFWS 2012, 2013a, 2013b). Several studies have found correlations between an increase in impervious cover (i.e., urbanization) and lower densities or declining populations trends (Bowles et al. 2006; Bendik 2011). Water quality is influenced by an assortment of parameters, such as amount of impervious cover, total suspended solids (TSS), total organic carbon, dissolved pollutants (such as heavy metals and petroleum hydrocarbons), nutrients, dissolved oxygen, and chemicals such as pesticides and herbicides. All of these have been identified by the USFWS as factors that influence the

survival of aquifer-dependent salamanders. It is widely accepted that an increase in impervious cover can increase the volume and velocity of stormwater runoff, which can have a detrimental effect on water resources. Untreated stormwater runoff can negatively affect water quality when it contains urban pollutants such as those associated with highway runoff (e.g., TSS, zinc, and other heavy metals) (Sung et al. 2013; Barrett 2016).

There has been substantial urbanization and development over the Northern Segment of the Edwards Aquifer, and specifically within the RSA, in recent years. The USFWS and the City of Austin estimated that the Brushy Creek Spring watershed had a medium level (i.e., 14 to 15 percent) of impervious cover at the time of the salamander's federal listing in 2013 (approximately 6,900 to 7,700 acres of impervious cover within the 49,700-acre watershed) (USFWS 2013c). Within the RSA, approximately 741 acres, or 18 percent, are mapped as impervious cover (City of Round Rock 2020a).

Within the RSA, the only known occurrences (historical and current) for the salamander are restricted to Brushy Creek Spring. Jollyville Plateau salamanders were first collected from Brushy Creek Spring in 1948, and surveys continued at this location periodically until the early 1990s (Cambrian Environmental 2019). In the early 2000s, the original spring location was altered, which subsequently led the USFWS to determine that salamanders were extirpated from Brushy Creek Spring during the listing review. Since 2014, 19 individual salamanders have been observed 21 times at the H-E-B culvert (Brushy Creek Spring and Spring Run) (Cambrian Environmental 2019).

Regulatory History

The Jollyville Plateau salamander was listed as a federally threatened species on August 20, 2012. Presently, there is no recovery plan available for this species. In 2013, the USFWS designated 32 critical habitat units (CHUs) for the Jollyville Plateau salamander, containing a total of 4,331 acres (USFWS 2013b). This species is covered in four active Habitat Conservation Plans (HCPs) (Yaupon Great Hills Reserve L.P., TPG Four Points Land, L.P., Spicewood at Bull Creek, and Grandville Hills), none of which overlap with the project area or RSA.

In addition to the protections listed above for the salamander, there are several federal, state, and municipal-level protections in place for surface and groundwater quality and quantity that may provide indirect protection to this species by protecting water quality. One of the most stringent regulations includes water quality protections for the Edwards Aquifer (30 TAC Chapter 213).

Trends

The Edwards Aquifer is one of the most permeable and productive limestone aquifers in the United States (Edwards Aquifer Authority 2016). The aquifer is especially susceptible to contamination due to its karst topography, which facilitates rapid transmittal of potential contaminants over long distances once in the limestone aquifer (Small et al. 1996).

Studies have shown that impervious cover within a watershed should generally not exceed 15 percent to prevent damage to the watershed and aquatic ecosystems therein (Center for Research in Water Resources 1995). For sensitive watersheds, there should be an impervious cover percentage of no greater than 10 percent to prevent damage to sensitive stream ecosystems (USFWS 2005). As discussed above, the impervious cover percentages for both the Brushy Creek Spring watershed and the RSA exceed these recommended limits. However, the 2013 USFWS impervious cover study only examined surface watersheds for each spring site. As Shade et al., (2008, p. 3-4) point out “. . . little is known of how water recharges and flows through the subsurface in the Northern Segment of the Edwards Aquifer. Groundwater flow in karst is often not controlled by surface topography and crosses beneath surface water drainage boundaries, so the sources and movements of groundwater to springs and caves inhabited by the Jollyville Plateau salamander are poorly understood.” This is particularly relevant to the US 79 project because the actual recharge area for Brushy Creek Spring and CHU 2 are unknown. Therefore, as the USFWS (2013c, p.18) summarized, “a recharge area for a spring may occur within the surface watershed, or it could occur many miles away in a completely different watershed. A site completely surrounded by development may still contain high water quality because that spring’s base flow is coming from a distant recharge area that is free from impervious cover stressors.” Limited dye tracer work has been completed in the Northern Segment of the aquifer, and no clearly delineated recharge areas have been identified for Brushy Creek Spring (Shade et al. 2008); therefore, a data gap exists in our understanding of how development in recharge areas of the Northern Segment may impact salamander habitat. However, it is reasonable to assume that continued development of impervious cover within watersheds that provide recharge to the portions of the aquifer that sustain salamander habitat within the Northern Segment of the Edwards Aquifer could have a negative impact on the Jollyville Plateau salamander.

Although a long-term study of water quality parameters within the RSA or US 79 project area is not available, a recent effort to document the status of CHU 2 has been carried out since 2014 by Williamson County and Cambrian Environmental. The limited water quality data collected since 2014 suggest that the water quality collected inside the H-E-B culvert (current Brushy Creek Spring outlet) is consistent with Edwards Aquifer groundwater parameters and falls within the ranges typically occupied by Jollyville Plateau salamanders (Cambrian Environmental 2019).

3.1.3.2 *Bone Cave Harvestman*

Current Conditions

The Bone Cave harvestman is an obligate cave-dwelling harvestman restricted to Travis and Williamson Counties (Ubick and Briggs 1992, 2004). As of 2018, the USFWS recognized 203 known localities for this species with an approximate range of 190 square miles (USFWS 2018a), and more than 50 percent of these localities are located within currently protected areas. The Bone Cave harvestman is by far the most widespread of the listed karst invertebrates in Travis and Williamson Counties. Habitat for this species occurs in limestone caves and mesocaverns (i.e., humanly impassable voids within the bedrock). Within this environment, these animals are dependent on high humidity, stable temperatures, and external energy sources.

The known locations closest to the project area for this species are approximately 1.5 miles to the northwest and southwest of the project area (personal communication with Jenny Wilson, USFWS on October 9, 2018). The primary threat to this species is habitat loss due to increased human expansion and urbanization throughout the karst terrain in Central Texas. Threats associated with increased urbanization include filling in and collapsing of caves, alteration of drainage patterns, alteration of surface plant and animal communities, contamination, and vandalism (USFWS 2011, 2012).

Regulatory History

The Bone Cave harvestman was listed as endangered by the USFWS in 1988. An initial recovery plan for the endangered karst invertebrates occurring in Travis and Williamson Counties was published initially in 1994 and amended in 2019. On June 2, 2014, a petition to delist the Bone Cave harvestman was presented to the USFWS, and in October 2019 the USFWS determined that the petition presented substantial scientific or commercial information indicating that delisting the species may be warranted (USFWS 2019). Therefore, the USFWS has initiated a status review to determine whether delisting the species is warranted. No critical habitat was designated for this species. This species is covered in four active HCPs, three of which occur in Williamson County (Williamson County Regional HCP, Sultan & Kahn Partnership., Ltd., and Russell Park Estates).

Trends

In 1992, the USFWS commissioned a study that delineated four geographic zones according to their potential to provide suitable habitat for karst invertebrates (Veni 1992), and an update was made in 2007 (Veni 2007). The zones were based on lithology, distributions of known caves and cave fauna, and geologic controls on cave development. The zones were delineated as follows:

- Zone 1 – Areas known to contain endangered cave fauna.
- Zone 2 – Areas having a high probability of containing endangered cave fauna.
- Zone 3 – Areas that probably do not contain endangered cave fauna.
- Zone 4 – Areas that do not contain endangered cave fauna.

The RSA includes areas mapped as Zones 1, 3, and 4 (**Figure 1**). The Veni study also discussed the overall karst geography of the Austin region, as well as potential geologic and geographic barriers to karst invertebrate dispersal and limits to their distribution (Veni 2007). Eight karst fauna regions (KFRs) were delineated within Travis and Williamson Counties; the westernmost portion of the RSA is contained within the McNeil/Round Rock and Georgetown KFRs.

The Bone Cave harvestman is known from 138 caves in Williamson County and occurs in 6 of the KFRs. Since the listing of this species in 1988, the number of occupied caves has grown from 6 to more than 67 cave site clusters and individual caves (USFWS 2018b).

Factors affecting the Bone Cave harvestman in the RSA are similar to those affecting the species range-wide. The RSA is a mosaic of suburban residential development, commercial development, and transportation infrastructure. Land use surrounding the proposed project area is mostly urban, with limited space for additional development. Surrounding pressures include earthmoving activities such as construction of residential and commercial developments and road/utility improvements. These actions may result in destruction of habitat or permanent alteration of available habitat in the vicinity of the project through collapse or filling of unknown caves in Karst Zones 1 and 3, alteration of drainage patterns and surface plant and animal communities, and the potential invasion of invasive species.

3.2 STEP 2 – DIRECT AND INDIRECT EFFECTS ON EACH RESOURCE FROM THE PROPOSED PROJECT

3.2.1 Federally Listed Threatened and Endangered Species

3.2.1.1 *Jollyville Plateau Salamander*

The proposed project may affect and is likely to adversely affect the Jollyville Plateau salamander. Brushy Creek Spring, an occupied CHU, occurs within the US 79 project area. While TxDOT has taken all reasonable steps to identify and avoid potential habitat prior to construction, it is not uncommon for voids that have no surface expressions to be encountered once construction begins. Based on the general rarity of caves with *Eurycea* habitat in Williamson County, site-specific geological conditions, and the nature of the proposed project, it appears that the potential for this to occur is low. However, there is a possibility for effects to salamanders if previously undiscovered subsurface voids with

groundwater or subsurface groundwater conduits are identified in the project area. Therefore, direct impacts to this species from the proposed project are possible.

As discussed in the *Indirect Impacts Technical Report* (TxDOT 2018), indirect impacts resulting from a change in water quality may occur based on the project-related increase in impervious cover, the project's location over the Recharge Zone of the Edwards Aquifer, and the unknown aquifer flow paths that may occur beneath the surface of the project area.

Although one of the proposed BMPs would be to divert stormwater flow around the CHU, this project may impact water quality through increased stormwater contribution along the length of the project. Therefore, this project may contribute to the downstream degradation of water quality parameters that are essential to the Jollyville Plateau salamander.

Within the project area, BMPs would be used during the construction and operation of the US 79 project to minimize and avoid direct and indirect impacts to water quality, and thus avoid impacts to the salamanders that rely on the quantity and quality of groundwater in the aquifer. Engineered water quality protection features would be designed in accordance with the Edwards Aquifer Rules to offset the increase in impervious cover and any potential increase of roadway contaminants.

Once stormwater leaves the project area and infiltrates into the subsurface environment (e.g., groundwater), the flow path and amount of mixing with other subsurface waters is unknown. In the event of a BMP failure within the project area, any change in runoff water quality would be temporary and immeasurable due to the effects of dilution within the aquifer. Therefore, effects to the Jollyville Plateau salamander as a result of indirect water quality impacts are immeasurable. Formal consultation with the USFWS is underway to determine, prior to construction, the appropriate BMPs required to mitigate for any potential effects to this species.

Based on the analysis discussed in the *Indirect Impacts Technical Report*, there are approximately 600 total acres of potential development and redevelopment areas within the 3,152-acre Area of Influence (AOI) of the project, and these approximately 600 acres are assumed to be subject to induced growth potential within the AOI. Developments on these lands would adhere to the Edwards Aquifer Rules and Texas Commission on Environmental Quality (TCEQ) requirements as discussed in **Section 3.5.2**. Furthermore, any developments with the potential to impact the groundwater habitat of the protected salamander species could be subject to regulation under the Endangered Species Act (ESA). Assuming appropriate implementation of applicable land use planning regulations and local development ordinances, and compliance with local, state, and federal laws and regulations, any substantial impacts to the quality and quantity of Edwards Aquifer recharge from development within the AOI would be avoided or minimized. Reasonably foreseeable

projects undertaken within the RSA would be subject to regulation under the ESA if it is anticipated that they would impact the Jollyville Plateau salamanders or their habitat.

3.2.1.2 *Bone Cave Harvestman*

The proposed project may affect but is not likely to adversely affect the Bone Cave harvestman. While the project is located partially within the Georgetown KFR which has known occurrences for the Bone Cave harvestman, according to the USFWS, no listed karst invertebrates have been recorded within the project area. The nearest occupied caves occur approximately 1.5 miles northwest and southwest of the project area. Therefore, direct impacts to these species from the proposed project are not anticipated and would be extremely unlikely due to the limited excavation proposed within Karst Zone 1.

As discussed in the *Indirect Impacts Technical Report*, the areas of potential development and redevelopment include approximately 1.4 acres of Karst Zone 1 and 13.6 acres of Karst Zone 3. Due to the minimal excavation within Karst Zones 1 and 3 and the distance to known, occupied caves for this species, direct and indirect effects to the Bone Cave harvestman are likely to be insignificant or discountable. TxDOT would complete consultation with the USFWS prior to construction to determine the additional conservation measures for this species.

3.2.2 **Water Quality – Groundwater**

Potential consequences of the proposed project may include the potential for runoff from the project site to affect the Northern Segment of the Edwards Aquifer through surface water drainage and groundwater recharge. Potential effects to groundwater resources include short-term potential for pollutants in stormwater runoff from the construction site to reach the aquifer through surface drainage and groundwater recharge; long-term potential for pollutants in stormwater runoff from the completed roadway, including from spills, to reach the Edwards Aquifer through surface drainage and groundwater recharge; and potential for reductions in recharge to the Edwards Aquifer resulting from increases in impervious cover.

Erosion and sedimentation during construction of the roadway could have short-term, adverse effects on receiving waters in the RSA. Due to the potential for recharge to the Edwards Aquifer from the project area and areas downstream, BMPs would be utilized to prevent or reduce the pollution of runoff from the project area, including minimizing impacts to water quality as a result of erosion and sedimentation.

The proposed project would add impervious cover to the watersheds in the study area. Implementation of the proposed US 79 improvements would add approximately 10 acres of impervious cover, of which approximately 4 acres (40 percent) would be added within the Recharge Zone. The addition of impervious cover would potentially increase runoff and

slightly reduce recharge to the Northern Segment of the Edwards Aquifer. Highway stormwater runoff may contain a wide variety of possible pollutants potentially impacting surface and groundwater resources, including metals, solids, nutrients, bacteria, herbicides, and hydrocarbons such as fuel oils and gasoline (Barrett et al. 1995). BMP options continue to evolve and improve and would reduce adverse water quality impacts from stormwater runoff.

Induced growth could have some effect on water resources because induced development would result in increased impervious cover, which could in turn have an effect on water quality. However, the proposed project would not have a substantial adverse effect on water quality in the AOI because of the high percentage of already developed land and the implementation of regulations and BMPs.

Development projects that do occur within the AOI would have to comply with the relevant land development code for projects within city limits and extra-territorial jurisdiction (ETJ) boundaries of the City of Round Rock. Substantial indirect impacts are not anticipated to occur to groundwater quality due to the limited potential for induced development and the existing regulatory processes in place to avoid potential adverse impacts to groundwater quality.

3.3 STEP 3 — OTHER ACTIONS—PAST, PRESENT, AND REASONABLY FORESEEABLE—AND THEIR EFFECT ON EACH RESOURCE

According to TxDOT's 2019 guidance, the cumulative effects analysis should include "the full range of other actions, not just transportation projects" with a focus on activities "that are likely or probable, rather than merely possible" (TxDOT 2019; Federal Highway Administration 2003). An RSA that encompasses each of the resources discussed in this report was used to obtain information about past, present, and reasonably foreseeable future projects. Other actions, possible cumulative effects, and mitigating factors are also discussed in this section. Various published documents and plans were reviewed, and interviews and discussions with City of Round Rock staff members provided further information about other actions.

One overarching trend that provides a backdrop for resource-specific analysis is population growth in the jurisdictions within the RSA. According to the decennial census, the population of the City of Round Rock increased approximately 63.4 percent between 2000 and 2010. Similarly, the population of Williamson County increased approximately 69.1 percent between 2000 and 2010 (U.S. Census Bureau 2000, 2010). CAMPO develops future population and employment projections for a six-county area (Bastrop, Burnet, Caldwell, Hays, Travis, and Williamson Counties). According to CAMPO (2015), projections for

population and employment, Williamson County is expected to continue to see a high level of growth between 2010 and 2040 (**Table 2**).

| Table 2: 2010–2040 Projected Population and Employment Growth for Williamson County | | | | | |
|--|-------------|-------------|-------------|-------------|-----------------------------------|
| Williamson County | 2010 | 2020 | 2030 | 2040 | Percent Growth (2010–2040) |
| Population | 422,605 | 640,699 | 956,459 | 1,406,994 | 233% |
| Employment | 126,808 | 241,351 | 433,563 | 745,707 | 488% |

Source: CAMPO 2015.

Given this information, Williamson County is expected to see a high rate of growth for both people and jobs coming to the area. Based on discussions with the City of Round Rock staff, continued residential and commercial development is anticipated within the city, as well as just outside the city limits in the ETJ. The City of Round Rock Planning and Development Services and Geographic Information Systems (GIS) Departments track site development permits and large developments in the City and the ETJ. **Figure 2** in **Appendix A** depicts the current and future planned developments in the RSA. In all, 42 site development permits have been submitted within the RSA, with 13 still under review, 9 issued, and 20 under construction. Additionally, 2 future transportation Capital Improvement Program (CIP) projects, 6 other CIP projects, and 19 large developments exist within the RSA. These CIP transportation projects, CIP other projects, and large developments are listed in **Table 3**.

| Table 3: Planned Development Projects in the RSA | |
|---|---|
| Project Name | Description |
| <i>CIP Transportation Projects</i> | |
| McNeil Extension | Extend the existing McNeil Road for approximately 0.52 miles to Georgetown Street. |
| US 79 Kalahari | Improvements to US 79 from A.W. Grimes Boulevard to State Highway (SH) 130. |
| <i>Other CIP Projects</i> | |
| Business Center Repairs | Repairs scheduled for 2020 located at 221 E. Main Street. |
| Dell Diamond | Improvements, repairs, and parking lot resurfacing scheduled for 2020 located at 3400 E. Palm Valley Boulevard. |
| Downtown Trash Modifications | Scheduled for 2020 |
| Enterprise Building/Central Fire Station Remodel | Enterprise Building/Central Fire Station Remodel |
| Library | Scheduled for 2020–2022 |
| Prete Plaza Restrooms | Scheduled for 2020 located at 221 E. Main Street. |

| Table 3: Planned Development Projects in the RSA | |
|--|---|
| Project Name | Description |
| Large Developments | |
| Chisholm Trail Tech Center Sec. 2 | 30.91 acres located north of Chisholm Parkway, between Chisholm Trail Road and I-35. The property is zoned for commercial uses. |
| Chisholm Trail Tech Center Sec.3 | 26.28 acres located south of Chisholm Parkway, between Chisholm Trail Road and I-35. The property is zoned C-1 (General Commercial) for commercial uses. |
| Chisholm Trail Tech Center Preliminary Plats (2 plats) | The preliminary plats contain 73.58 acres and include 15 development lots. The six largest are 8.13, 6.36, 6.29, 5.76, 5.33, and 4.44 acres; the remaining nine average 2.54 acres. The property is zoned as LI (Light Industrial). |
| The Depot Townhomes (3 sections) | High density urban residential development of approximately 82 units. |
| HR 79 Investments Planned Unit Development (PUD) | The proposed PUD zoning will allow single-family lots on the northern portion of the site, Phase One, and commercial lots on the southern portion, along Palm Valley Boulevard, Phase Two. A maximum of 64 single-family lots can be built on Phase One. Four commercial lots are proposed on Phase Two – three along Palm Valley Boulevard and one behind them, along the border with Phase One. |
| Church of Christ of Round Rock | Rezoning to C-1a (General Commercial – limited) |
| Diamond Oaks PUD No. 102 (2 sections) | Proposed PUD zoning for common lot single-family, condominium, and commercial development for 24.8 acres. |
| 2800 E. Palm Valley Blvd. Retail | Zoning proposal for commercial development, to include retail and restaurant. |
| Kalahari PUD (7 sections) | The current zoning proposal will rezone the property to permit Kalahari Resorts to construct a new resort hotel and convention center with indoor and outdoor water parks, an indoor and outdoor family entertainment center, employee housing, and other commercial uses which could potentially serve as local and regional attractors. City Council and Kalahari Resorts entered into a series of agreements in 2016 to bring the resort to Round Rock. The City owns the land and will own the convention center, but Kalahari will act as the master developer of the entire site. |

Source: City of Round Rock 2020b.

Given the pattern of continued population growth that has occurred in and around the project area, numerous transportation facilities, housing developments, commercial facilities, and other businesses are planned within the areas encompassed by the RSA. The City of Round Rock tracks and approves emerging development projects in its development jurisdiction. Additionally, as described in the *Indirect Impacts Technical Report* under separate cover, City staff explained that in addition to the Kalahari planned development, the other nearby undeveloped parcels might be stimulated by the Kalahari development, and the proposed improvements to US 79 might also hasten this development. City staff also explained that redevelopment of the Henna tract, a single-family, large-lot, older residential development located at the southeast corner of Mays Street and US 79, has the potential to transition to higher-density development. Other areas mentioned for their

potential for redevelopment were the commercial tract between I-35 and Mays Street, the Egger Acres single-family neighborhood on the north side of US 79 between Egger Avenue and the Texas Baptist Children's Home, and the southern tract of offices near Heritage Center Circle. These areas of potential development and redevelopment are also illustrated on **Figure 2** in **Appendix A**.

In addition to the information gathered through discussions and interviews for the RSA described above, online research was conducted to identify some of the transportation, land use, and conservation plans that have some overlap with the RSA. **Appendix B** includes maps of planned transportation projects and future land use plans from the City of Round Rock. These plans indicate that the City is anticipating and planning for additional growth in the RSA in terms of infrastructure, capital improvements, zoning, and future land-use plans. These plans reflect the community's goals and visions for the future and provide a visual reference for where the City of Round Rock would apply their land development codes and subdivision development requirements, including environmental controls. In addition, maps are included that represent conservation actions undertaken by Williamson County in their Regional Habitat Conservation Plan (RHCP) for federally listed endangered and other rare species with habitat in Williamson County. Maps in **Appendix B** include:

- *City of Round Rock Transportation Master Plan*
- *City of Round Rock Future Land Use Map*
- *City of Round Rock Zoning Map*
- *Williamson County RHCP Permit Area*

3.4 STEP 4 – THE OVERALL EFFECTS OF THE PROPOSED PROJECT COMBINED WITH OTHER ACTIONS

3.4.1 Methodology

A combination of planner interviews, cartographic analysis, technical expert research, and data collection was used to assess the overall effects of the proposed project combined with other actions.

3.4.2 Federally Listed Species

3.4.2.1 Jollyville Plateau Salamander

The proposed project may affect, and is likely to adversely affect, the Jollyville Plateau salamander. Although Jollyville Plateau salamanders are known to occur within the Brushy Creek Spring/H-E-B culvert, direct take of individuals from this location is not anticipated due to the project's proposed BMPs and restriction on construction activities occurring near

the existing culvert infrastructure. The USFWS has indicated that any activity that degrades the quality or quantity of water passing through salamander habitat may result in take through habitat modification (USFWS 2012). Impacts to the aquifer could occur during the construction of the proposed improvements if aquifer conduits are encountered during excavation activities. Impacts could also occur during normal use of the facility following project completion due to the occurrence of accidental spills relating to vehicle collisions. Impacts to the salamanders could occur if there is a subsurface groundwater flow path from the project to the H-E-B culvert or an unknown occupied spring or conduit. Reasonably foreseeable projects undertaken within the RSA would be subject to regulation under the ESA if it is anticipated that they would impact either the Jollyville Plateau salamander or their habitat.

The geographic RSA covers approximately 4,167 acres. Within that area, approximately 741 acres (approximately 18 percent) are currently mapped as impervious cover; in comparison, approximately 3,426 acres of land are still potentially permeable to groundwater (City of Round Rock 2020a). Of the impervious cover, approximately 363 acres are located over the Edwards Aquifer Recharge Zone, and approximately 268 acres are located over the Edwards Aquifer Transition Zone. Considering the reasonably foreseeable future developments, a worst-case scenario for the RSA would include an addition of approximately 518 acres of impervious cover (or an additional 12 percent). Of which, only approximately 7 acres and 24 acres would occur on the Recharge and Transition Zones, respectively. However, the exact type, location, timing, and density of future developments within the “potential development and redevelopment” areas are unknown at the time of this report preparation. When comparing the direct impact of adding 10 acres of impervious cover and potential indirect induced growth impact as a result of the US 79 project, the incremental effects from the proposed project to this species is negligible in the context of the overall cumulative effects of the reasonably foreseeable future projects assessed in this document.

3.4.2.2 *Bone Cave Harvestman*

As discussed above, the proposed project may affect, but is not likely to adversely affect the Bone Cave harvestmen due to its low likelihood of occurrence in the surrounding project area. Effects to the Bone Cave harvestman associated with roadway and development projects could take the form of direct mortality or harm to individuals resulting from the disturbance, destruction, and removal of subsurface habitat by geotechnical borehole drilling, pier drilling, surface milling, grading, and excavation. Any of these activities may entirely or partially remove a subsurface void in bedrock that contains habitat for the Bone Cave harvestman. In cases where voids are mostly intact, exposure of subsurface habitat can cause climate alteration such as temperature swings, desiccation, or flooding. Additionally, any surface disturbance of karst habitat, such as vegetation removal, may result in fragmentation of invertebrate foraging areas, alterations in nutrient input and

outflow, reduction in the carrying capacity of karst habitat, and the introduction of invasive species. Reasonably foreseeable projects undertaken within the RSA would be subject to regulation under the ESA if it is anticipated that they would impact either the Bone Cave harvestman or their habitat.

Similar to the discussion for Jollyville Plateau salamander, the addition of impervious cover resulting from development within the RSA could alter the surface and subsurface drainage regimes in karst habitat. Additionally, the increase in impervious cover creates the potential for the introduction of surface contaminants, including stormwater runoff, into caves and other connected features. In contrast to the salamander discussion, effects to Bone Cave harvestman are focused around the karst zones that are known to contain suitable habitat versus the Edwards Aquifer Zones. Considering the reasonably foreseeable future developments, a worst-case scenario for the RSA would include an addition of approximately 518 acres of impervious cover (or an additional 12 percent). Of which, only approximately 1 acre and 5 acres would occur on Karst Zones 1 and 3, respectively. The exact type, location, timing, and density of future developments within the “potential development and redevelopment” areas are unknown at the time of this report preparation. However, when comparing the addition of impervious cover and potential impacts to karst zones as a result of the US 79 project, the incremental effects from the proposed project to this species is negligible in the context of the overall cumulative effects of the reasonably foreseeable future projects assessed in this document.

3.4.3 Water Quality – Groundwater

Stormwater runoff and streams crossing the Recharge Zone are the main sources of recharge to the Edwards Aquifer. Consequently, the quality of these waters is directly related to the quality of water entering the aquifer. As development in the RSA continues, the potential for degradation of stormwater increases with an increase in impervious surface and additional point source pollutant sources (e.g., septic systems, industrial facilities, accidental spills, and underground storage tanks). As a result, the potential for degradation of the Edwards Aquifer exists as well. As discussed earlier, groundwater sampling has confirmed the relatively high quality of water in the Edwards Aquifer. However, the detection of anthropogenic contaminants in some of the samples indicates the susceptibility of the aquifer to development and urbanization on the Recharge Zone and Contributing Zone (Mahler et al. 2006).

The proposed project would add a total of approximately 10 acres of impervious cover, of which approximately 4 acres (40 percent) would be added over the Recharge Zone of the Edwards Aquifer. Research has shown a strong correlation between the imperviousness of a watershed and the health of its receiving streams. In a review of water quality literature, Schueler (1994) concluded that the research, conducted in many geographical areas,

concentrating on many different variables, and employing widely different methods, has yielded a surprisingly similar conclusion – stream degradation occurs at relatively low levels of imperviousness (10 to 20 percent). Past activities have resulted in the development of and changing land uses in the watersheds within the RSA and have therefore resulted in an increase of impervious cover across the landscape.

As the trend for growth in the Round Rock area continues, the trend for increased impervious cover in the watersheds in the RSA is expected to continue. The various land-use plans identified in **Section 3.3** indicate that the municipalities within the RSA anticipate future development, along with the preservation of open space. As discussed previously, the correlation between increased impervious cover and decreased surface water quality is strong. However, with current regulatory measures and future planning efforts to protect water quality, future development would be less likely to adversely affect surface and groundwater quality when compared to past developments.

3.5 STEP 5 – MITIGATION OF CUMULATIVE EFFECTS

3.5.1 Federally Listed Species

Due to US 79's location over the Edwards Aquifer, partial inclusion within Karst Zone 1, and proximity to CHU 2, the proposed project may affect the Jollyville Plateau salamander and the Bone Cave harvestman. Consultation will be completed with the USFWS to develop minimization and mitigation strategies to offset any potential effects to these species.

Projects moving forward as a result of induced growth from the proposed project, and present or reasonably foreseeable projects (as discussed in **Section 3.3**), would be subject to regulation under the ESA if it is anticipated that they would impact the Jollyville Plateau salamander, the Bone Cave harvestman, or their habitats significantly enough to be qualified as a *take* of the species. The ESA defines *take* as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct” (ESA 1973). Although the Jollyville Plateau salamander is not listed for protection under the Williamson County RHCP, the plan was designed to include karst invertebrate habitat for the Bone Cave harvestman. Land set aside for the Williamson County RHCP protects groundwater quality in the Northern Segment of the Edwards Aquifer, which indirectly benefits the salamanders. These existing protections would help to mitigate for future effects to the listed salamander species. See the discussion in **Section 3.5.2** for further information on protections in place for groundwater quality.

3.5.2 Groundwater Resources

Mitigation for potential water quality impacts occurs in the form of regulations and ordinances. One agency—the TCEQ—is responsible for regulatory protection of the Northern Segment of the Edwards Aquifer.

TCEQ regulations to protect the Edwards Aquifer are contained in the Edwards Aquifer Rules (30 TAC 213). These rules require developers who are planning to construct on the Recharge Zone or portions of the Contributing Zone of the Edwards Aquifer to prepare and submit an aquifer protection plan to the TCEQ for review and approval. The rules require the use of permanent stormwater BMPs that remove 80 percent of the incremental increase of TSS in runoff from the site. The rules do not require the use of permanent BMPs for single-family residential development that has 20 percent or less impervious cover. Additionally, the TCEQ has issued two optional guidance documents, *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer* (TCEQ 2007a) and *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer and Related Karst Features that May Be Habitat for Karst Dwelling Invertebrates* (TCEQ 2007b). These documents provide optional enhanced water quality measures (OEMs) and BMPs for protecting the Edwards Aquifer that may be implemented in areas subject to the Edwards Aquifer Rules. The OEMs are consistent with the TCEQ's goal of non-degradation of groundwater quality and may be used to further protect the Edwards Aquifer, public health and welfare, terrestrial and aquatic life, and the environment (TCEQ 2007a; TCEQ 2007b).

The TCEQ's Total Maximum Daily Load (TMDL) Program works to improve water quality in impaired or threatened water bodies in Texas. A TMDL defines an environmental target by determining the extent to which a certain pollutant must be reduced. TMDLs are developed for surface waters that are quality-limited due to a pollutant or adverse condition. Based on the environmental target in the TMDL, the state develops an implementation plan to mitigate sources of pollution within the watershed and restore impaired uses. The Texas Water Quality Inventory and 303(d) List is an overview of the status of surface waters of the state, including concerns for public health, fitness for aquatic species and other wildlife, and specific pollutants and their possible sources. The TCEQ 303(d) list, a subset of the inventory, identifies waters that do not attain to one or more standards for their use.

Water quality in wells and in the Edwards Aquifer is protected by the Safe Drinking Water Act of 1974 and the 1996 Amendments to the Act (Public Law 104-182)—laws that protect drinking water and provide source water protection. The 1996 Amendments provided new and stronger approaches to prevent contamination of drinking water, including a strong emphasis on source water protection. These rules required states to delineate source water areas of public water systems and assess the susceptibility of such source waters to contamination. The source water assessment results would then be used to implement

source water protection programs. TCEQ's Source Water Protection Program was created by the 1996 Amendments to the Safe Drinking Water Act and set in motion a voluntary process by which local governments and suppliers of drinking water are encouraged to take proactive steps to protect local drinking water supplies before costly treatment enhancements are required. These supplies are defined primarily as water systems serving at least 15 connections or at least 25 persons at least 60 days per year.

Sections 404 and 401 of the Clean Water Act include provisions and responsibilities for water quality protection measures and protection of wetlands. For Section 404 permits issued by USACE, TCEQ is authorized to certify that these permits meet the state's water quality standards. TCEQ carries out this responsibility under the Section 404 permitting program and can require the installation of temporary and permanent stormwater BMPs as part of the conditions of a Section 404 permit.

4.0 CONCLUSIONS

This analysis considered the Jollyville plateau salamander, the Bone Cave harvestman, and their habitats, in addition to groundwater and water quality resources; discussed the health of these resources and relevant trends; and identified specific RSA boundaries and appropriate temporal boundaries for the analysis. Direct and potential indirect impacts were summarized for each sensitive resource. Past, present, and reasonably foreseeable future actions were identified through research, interviews, and cartographic analysis. The construction of the proposed project was considered in conjunction with these other actions to consider cumulative impacts. This analysis provided detailed information about sensitive resources within the RSAs for the US 79 project and described the regulatory controls that have evolved over time to help protect these resources.

Minimization of impacts to sensitive resources would be coordinated through the USFWS and achieved through specific design measures and BMPs implemented for the proposed project, and similar requirements would be applicable to developers throughout a large portion of the RSAs, especially where construction is proposed over the Recharge and Contributing Zones of the Edwards Aquifer. Mitigation measures are required for impacts to endangered species habitat, and HCPs are in place in Williamson County that provide a framework in which developers can comply with the ESA. The larger municipalities with jurisdiction within the RSA all have land-development code requirements and plans for their future land use and transportation networks that generally reflect a common commitment to sustainable development. The conservation entities charged with protecting endangered species and sensitive resources have plans in place to continue to protect sensitive habitats.

Direct impacts that would be caused by the proposed project would be limited in part by the implementation of extensive BMPs before, during, and after construction. Given the incremental contribution the proposed project would make toward induced development in the AOI, within the context of the continuing development trends, the proposed project is not anticipated to result in substantial adverse indirect impacts to sensitive resources. The proposed project may incrementally contribute to cumulative effects on water quality and threatened and endangered species, but project impacts would not act as a tipping point to significantly affect the overall health of these resources. Neither water quality nor threatened and endangered species are expected to be significantly affected by the combination of the project with other past, present, and reasonably foreseeable future actions.

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Appendix A: Figures

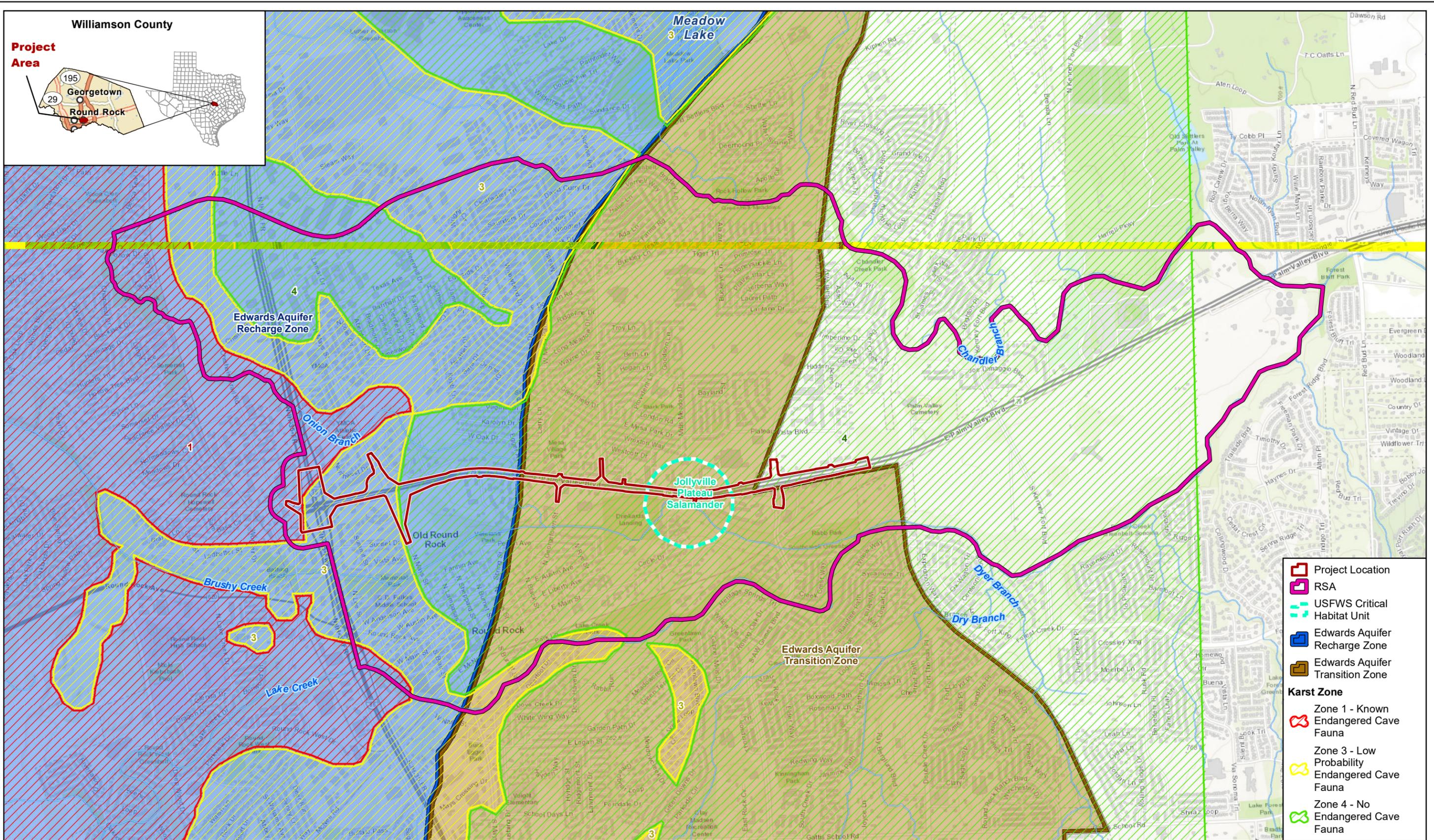


Figure 1
Project Location and the Resource Study Area (RSA) for Federally Listed Species
 US 79 from I-35 to East of FM 1460

- Project Location
- RSA
- USFWS Critical Habitat Unit
- Edwards Aquifer Recharge Zone
- Edwards Aquifer Transition Zone
- Karst Zone**
- Zone 1 - Known Endangered Cave Fauna
- Zone 3 - Low Probability Endangered Cave Fauna
- Zone 4 - No Endangered Cave Fauna

Data Sources: CMEC (2020), NHD (2019), TCEQ (2005), USFWS (2017), Veni (2007), Aerial Source: Esri (2020)

CSJ: 0204-01-063

0 2,000 Feet 1 in = 2,000 feet
 0 500 Meters Scale: 1:24,000
 Date: 1/30/2020

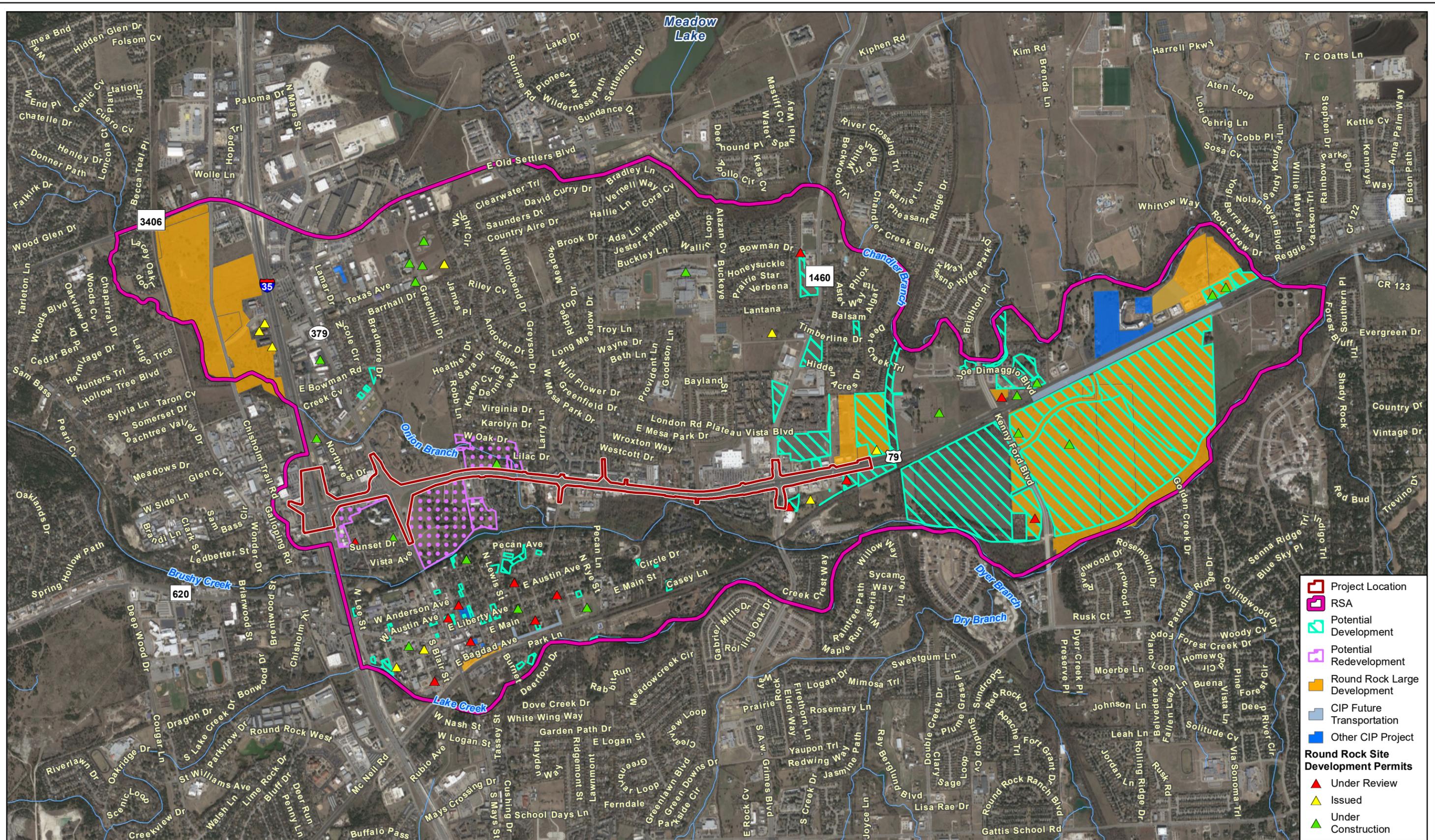


Figure 2
Cumulative Impacts within the RSA
US 79 from I-35 to East of FM 1460

G:\Projects\TXDOT\US79_135_FM1460\Cumul_Figure 2_Current and Future Dev_20200127_KC.mxd

- Project Location
 - RSA
 - Potential Development
 - Potential Redevelopment
 - Round Rock Large Development
 - CIP Future Transportation
 - Other CIP Project
- Round Rock Site Development Permits**
- ▲ Under Review
 - ▲ Issued
 - ▲ Under Construction

Data Sources:
 CMEC (2020), NHD (2019)
 City of Round Rock (2020)
 Aerial Source: Google (2018)

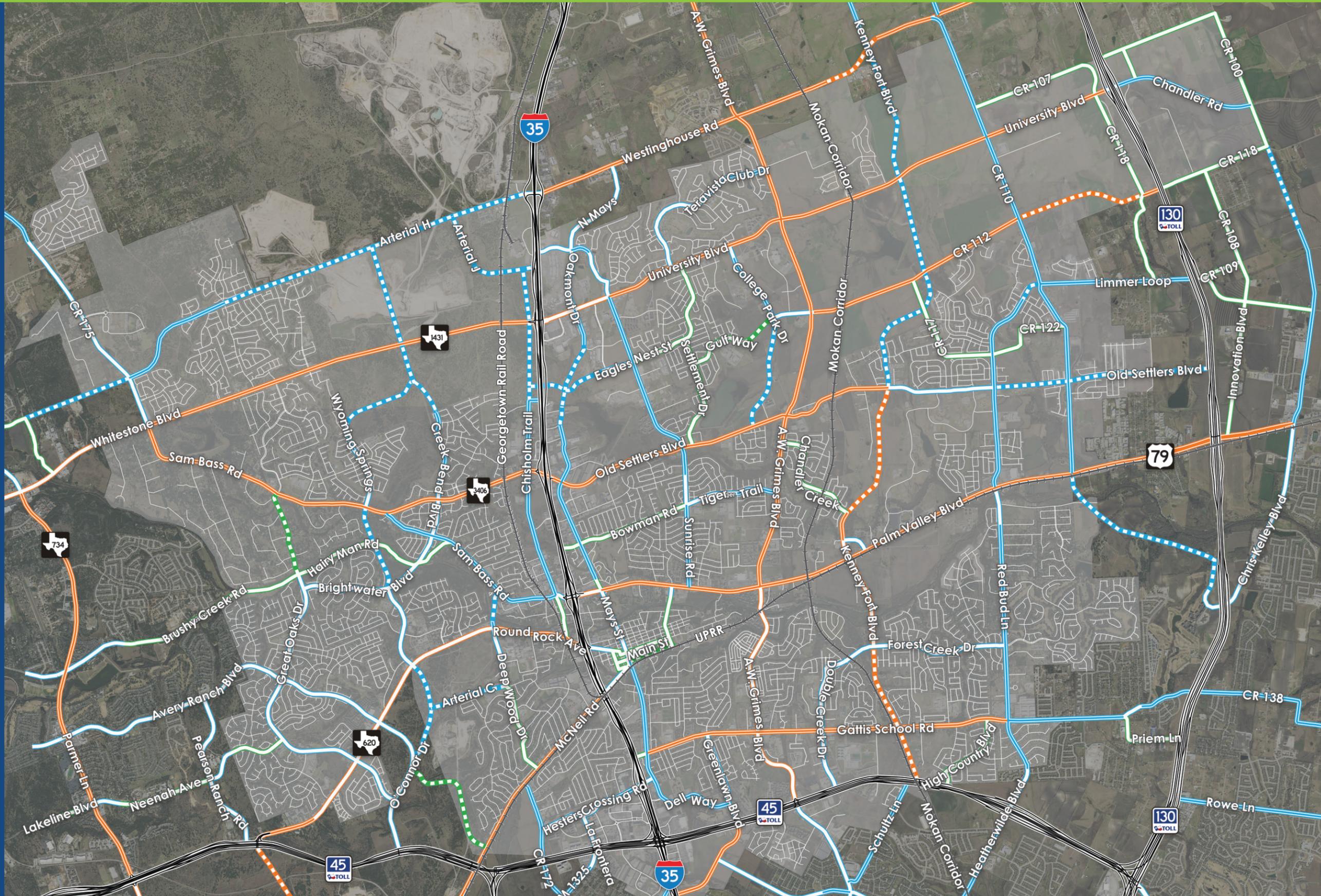
CSJ: 0204-01-063

0 2,000 Feet
0 500 Meters

1 in = 2,000 feet
 Scale: 1:24,000
 Date: 1/30/2020

Appendix B: Planning Documents

Ultimate Roadway Network



Transportation Master Plan

www.roundrocktexas.gov/planupdate

LEGEND

- Freeway Facility
- 6 Lane Facility
 - Existing
 - Enhanced
 - Proposed
- 4 Lane Facility
 - Existing
 - Enhanced
 - Proposed
- 2 Lane Facility
 - Existing
 - Proposed
- MoKan Corridor
 - To be developed by others
- City Features
 - Extraterritorial Jurisdiction (ETJ)



2017 UPDATE

This Thoroughfare Master Plan depicts existing roadways, proposed enhancements to existing roadways, and proposed roadways. Final alignments of proposed roadways will be determined in cooperation with Williamson County and its Long Range Transportation Plan, and the subdivision platting process.



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ROUND ROCK, TEXAS

FUTURE LAND USE (2020)

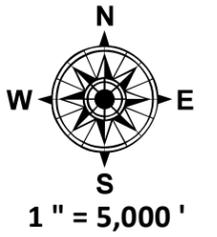


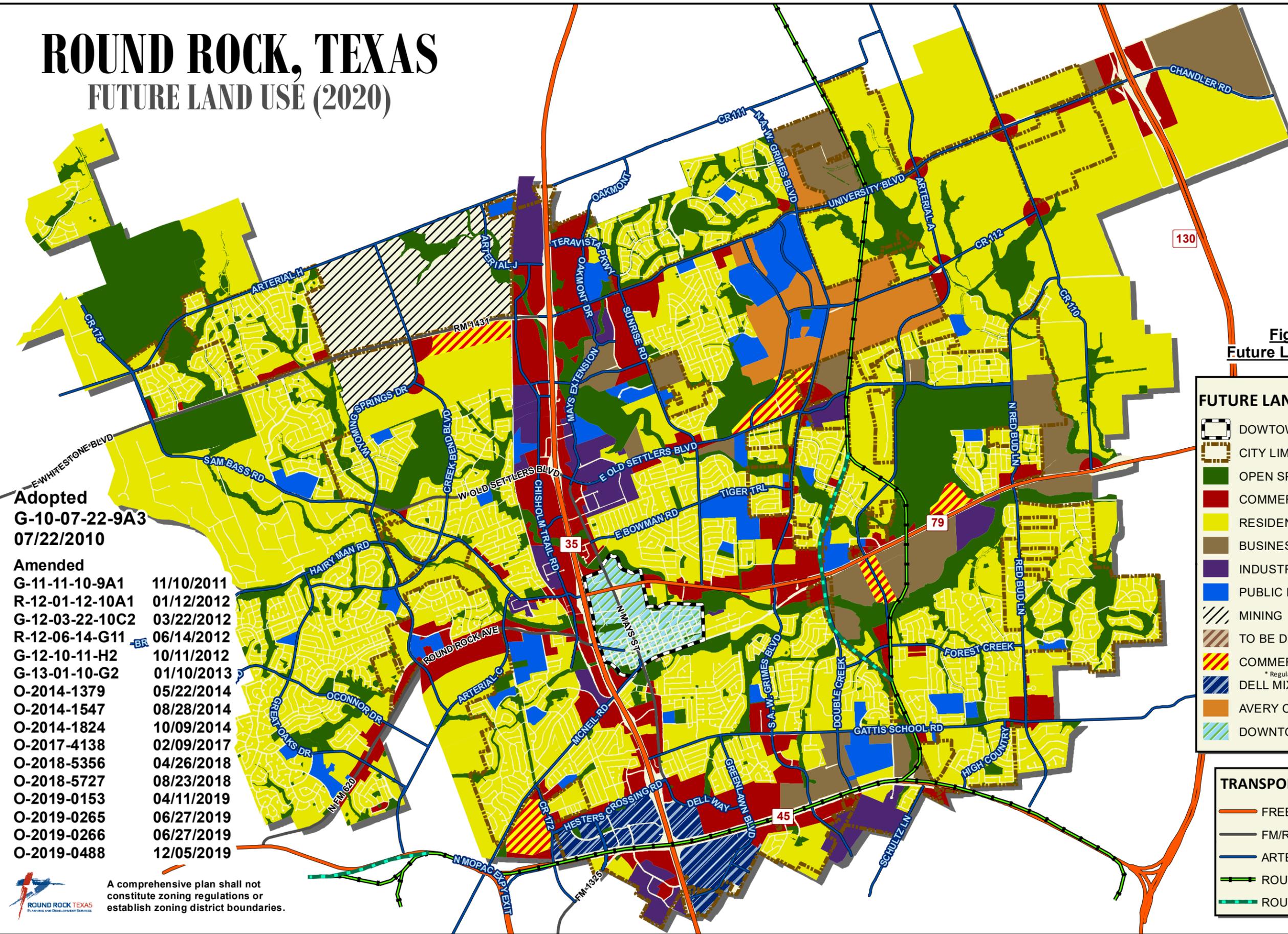
Figure 6.2
Future Land Use Map

FUTURE LAND USE (2020)

- DOWNTOWN STUDY AREA
- CITY LIMITS
- OPEN SPACE
- COMMERCIAL
- RESIDENTIAL
- BUSINESS PARK
- INDUSTRIAL
- PUBLIC FACILITIES
- MINING
- TO BE DETERMINED
- COMMERCIAL/ MULTI-FAMILY
* Regulated by the DT.M.P.
- DELL MIXED USE
- AVERY CENTRE MIXED USE
- DOWNTOWN MIXED USE

TRANSPORTATION (2007)

- FREEWAY/TOLLWAY
- FM/RM/STATE
- ARTERIAL
- ROUTE ALIGNMENT
- ROUTE ALTERNATIVE

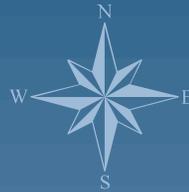


- Adopted**
G-10-07-22-9A3
07/22/2010
- Amended**
- G-11-11-10-9A1 11/10/2011
 - R-12-01-12-10A1 01/12/2012
 - G-12-03-22-10C2 03/22/2012
 - R-12-06-14-G11 06/14/2012
 - G-12-10-11-H2 10/11/2012
 - G-13-01-10-G2 01/10/2013
 - O-2014-1379 05/22/2014
 - O-2014-1547 08/28/2014
 - O-2014-1824 10/09/2014
 - O-2017-4138 02/09/2017
 - O-2018-5356 04/26/2018
 - O-2018-5727 08/23/2018
 - O-2019-0153 04/11/2019
 - O-2019-0265 06/27/2019
 - O-2019-0266 06/27/2019
 - O-2019-0488 12/05/2019

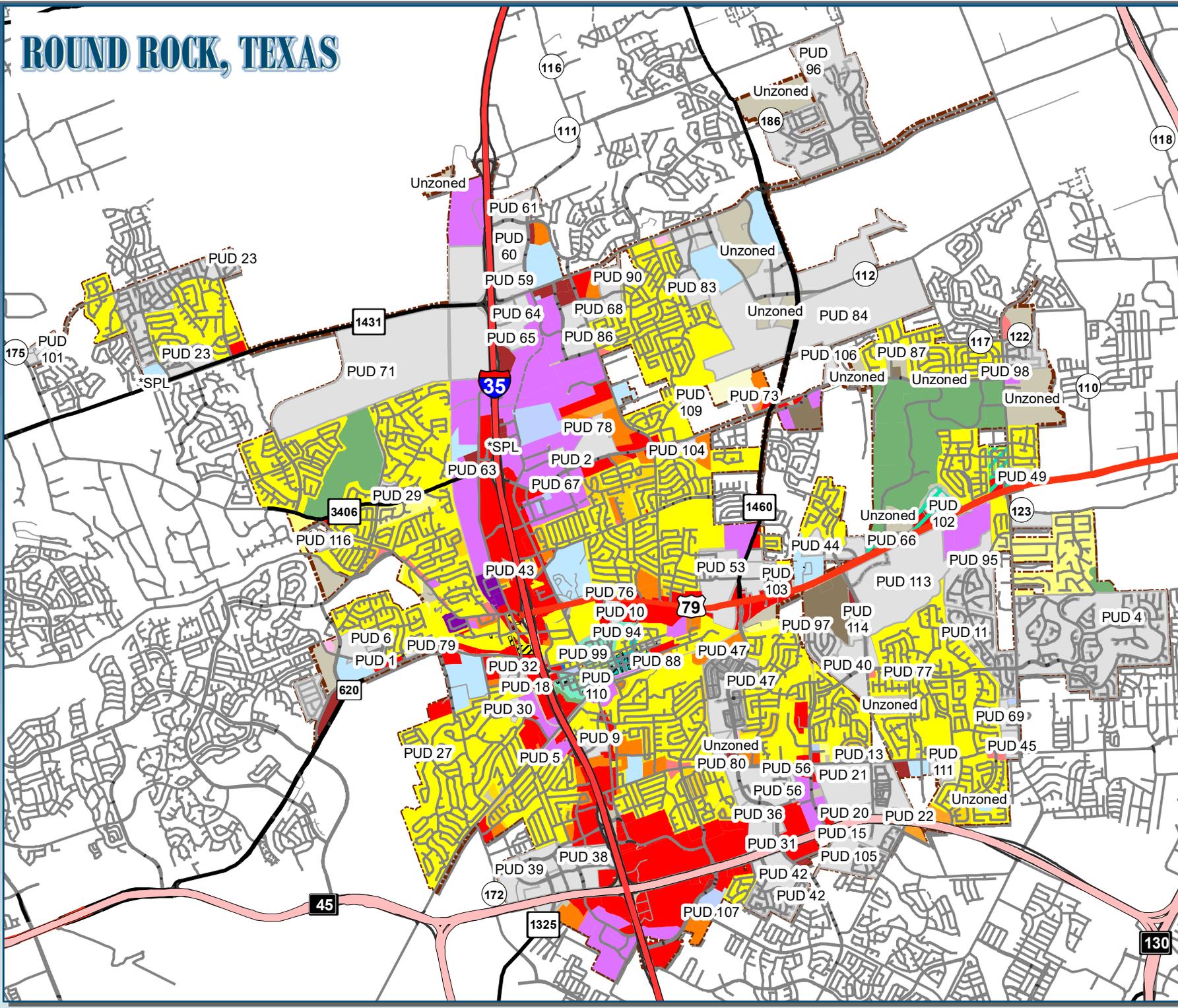
ROUND ROCK, TEXAS
Planning and Development Services

A comprehensive plan shall not constitute zoning regulations or establish zoning district boundaries.

ROUND ROCK, TEXAS



Zoning



ZONING OVERLAYS

Overlay Districts

- Chisholm Trail - CT
- Historic - H
- Palm Valley - PV
- National Register Historic - NRH

ZONING DISTRICTS

Residential Districts

- Single Family Rural - SF-R
- Single Family Large Lot - SF-1
- Single Family Standard Lot - SF-2
- Two Family - TF
- Townhouse - TH
- Multi-Family - MF2

Commercial Districts

- General Commercial - C-1
- General Commercial Limited - C-1a
- Local Commercial - C-2

Employment Districts

- Office - OF
- Business Park - BP
- Light Industrial - LI
- Industrial - I

Special Purpose Districts

- Public Facility - PF1
- Public Facility - PF2
- Public Facility - PF3
- Senior - SR
- Mining - MI
- Open Space - OS
- Agricultural
- MU-1
- MU-2
- MU-L
- Planned Unit Development - PUD
- CITY LIMITS



FEBRUARY 2019

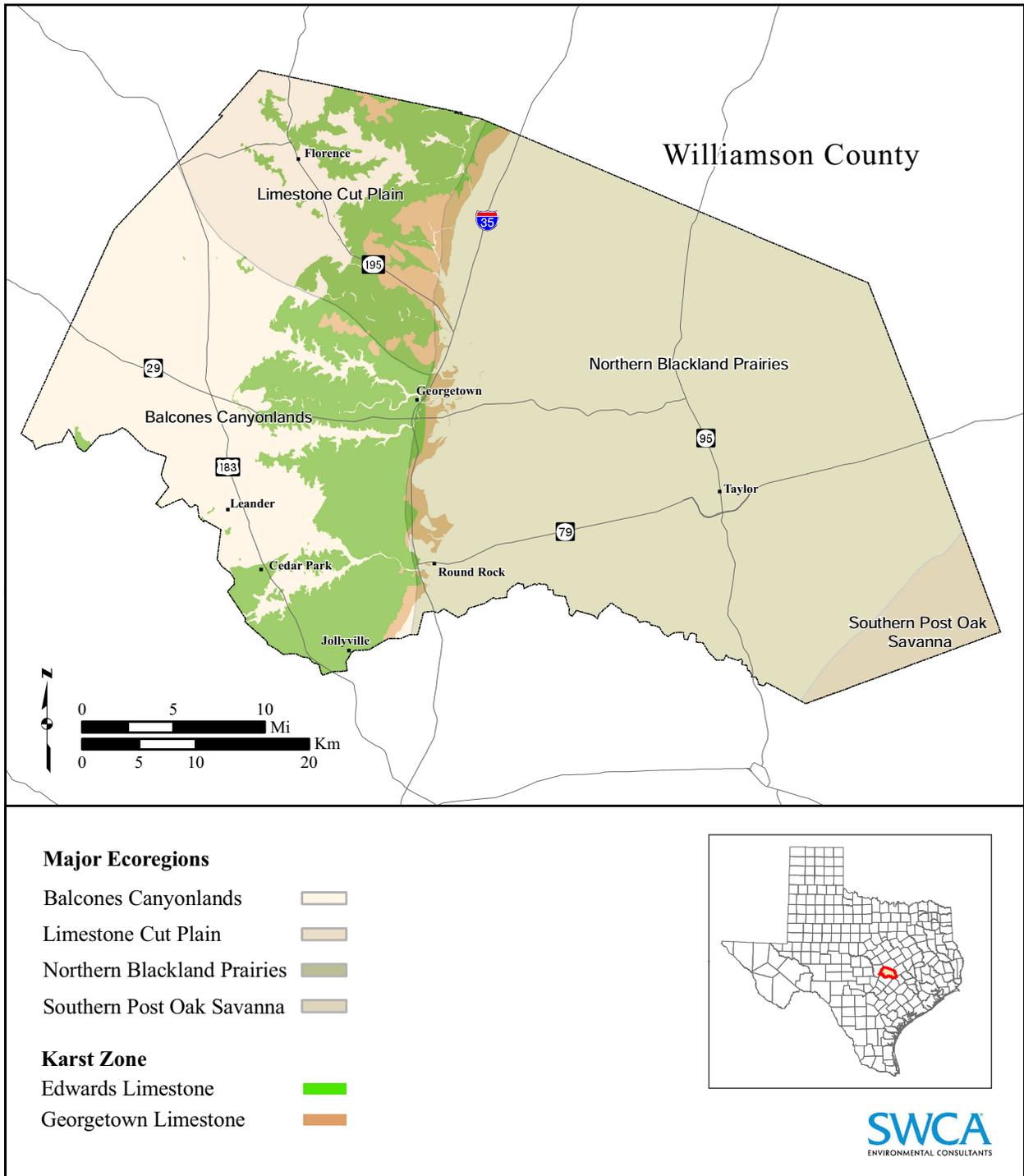


Figure 1-1. The Williamson County permit area including the major ecoregions and Karst Zone, the primary focus of the RHCP.