

ENVIRONMENTAL ASSESSMENT

US 287

FROM: Business US 287 in Ennis
TO: SH 34

CITY OF ENNIS, ELLIS COUNTY, TEXAS

CSJ: 0172-08-050

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

AND

TEXAS DEPARTMENT OF TRANSPORTATION

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ENVIRONMENTAL ASSESSMENT

I. DESCRIPTION OF PROPOSED ACTION

A. Description of Proposal

The proposed project covered within this Environmental Assessment (EA) consists of the widening of U.S. Highway (US) 287 from Business US 287 in Ennis to State Highway (SH 34), in Ellis County, Texas. The proposed project is a segment of independent utility with its own logical termini and is the first phase of a two-phase, stage-constructed project along US 287 from Business US 287 to Interstate Highway (IH) 45. The second phase would extend from SH 34 to IH 45 and is not covered by this EA. The study limits and construction limits in this EA extend from Business US 287 to south of SH 34 to include the entire SH 34 interchange. The proposed project is within the City of Ennis (**Appendix A, Figures 1-3**).

Design plans can be inspected at the Texas Department of Transportation (TxDOT) Dallas District Office or the Ellis County Area Office located at:

TxDOT Dallas District Office
4777 East Highway 80
Mesquite, TX 75150

TxDOT Ellis County Area Office
124 FM 876
Waxahachie, Texas 75167

The proposed project would convert the existing two-lane, undivided, rural, asphalt-paved roadway with grass-lined ditches into a four-lane, divided, rural, grade-separated, asphalt-paved roadway. Intersections at Ennis Parkway, Lampasas Street, and SH 34 (W. Lake Bardwell Drive) would be grade-separated. The length of the proposed project is approximately 2.8 miles from Business US 287 to south of SH 34. The details of the proposed project are discussed in **Table 1**.

Table 1: Proposed Improvements

▪ Convert the existing two-lane, undivided roadway to a four-lane, divided roadway with two 12-foot wide travel lanes in each direction separated by a 48-foot to 76-foot variable width grassy median, four-foot wide inside shoulders, and 10-foot wide outside shoulders.
▪ Construct the northbound main lanes from the BUS 287 at US 287 split to approximately 0.75 mile southeast of the US 287 at SH 34 intersection.
▪ Convert an approximate one-mile long section of the existing two-way northbound and southbound US 287 to a one-way southbound roadway beginning at the BUS 287 at US 287 split.
▪ Convert an approximate 0.95-mile long section of the existing two-way northbound and southbound US 287 to a one-way southbound roadway beginning approximately 0.20 mile north of the US 287 at SH 34 intersection.
▪ Construct an approximate 0.83-mile long section of the southbound main lanes beginning approximately 0.53 mile south of US 287 and Ennis Parkway intersection.
▪ Construct an approximate 0.44-mile long depressed northbound and southbound main lane section with retaining walls under Lampasas Street.

Table 1: Proposed Improvements

▪ Construct a new southbound exit ramp to Ennis Parkway from US 287, and re-construct the existing northbound exit ramp to Ennis Parkway from US 287.
▪ Construct a new southbound exit ramp and a northbound entrance ramp to/from Lampasas Street.
▪ Construct a new southbound frontage road between Lampasas Street and SH 34.
▪ Construct a new northbound frontage road between Lampasas Street and the future access road (to be designed and constructed by others) to Ennis High School.
▪ Reconstruct the northbound exit and entrance ramps to/from SH 34 and the southbound exit ramp to SH 34.
▪ Construct a new bridge for the northbound lanes of US 287 at Little Mustang Creek. The bridge would be 361 feet long and 46 feet wide.
▪ Construct a new bridge for the southbound exit ramp to Ennis Parkway at Little Mustang Creek. The bridge would be 660 feet long and 26 feet wide.
▪ Construct a new bridge for the northbound lanes of US 287 at Mustang Creek Tributary. The bridge would be 200 feet long and 40 feet wide.
▪ Construct a new bridge for the northbound lanes of US 287 over SH 34. The bridge would be 237 feet long and 46 feet wide.
▪ Construct a new bridge for Lampasas Street over US 287. The bridge would be 240 feet long and 64 feet wide.
▪ Extend six existing culverts: one 4-foot by 3-foot culvert, two 5-foot by 2-foot culverts, two 6-foot by 3-foot culverts, one 5-foot by 2-foot culvert, three 4-foot by 3-foot culverts, and two 5-foot by 2-foot culverts.

The proposed design speed would be 70 miles per hour (mph) on the main lanes, 50 mph on the frontage roads and ramps, and 40 mph on cross streets. The existing and proposed typical sections can be found in **Appendix A, Figures 4 and 5**.

B. Need and Purpose

The proposed project is needed because of the inadequate capacity and safety hazards of the existing facility. Currently, drivers entering US 287 from cross-streets must enter directly onto the only lane of traffic. Because there is not an additional lane for maneuverability, unsafe conditions can exist and accidents occur. There have been 39 reported accidents over the past 2.5 years within the proposed US 287 project limits. Average daily traffic (ADT) on US 287 is projected to increase from 13,900 vehicles per day (vpd) in the year 2011 to 21,300 vpd by the year 2031, an increase of 53.2 percent (TxDOT Transportation Planning & Programming Division [TP&P]). As traffic increases on US 287, the existing facility would not be able to meet the high capacity demands and safety issues would increase.

According to the U.S. Census Bureau, the City of Ennis had a population of 16,045 persons in 2000. The North Central Texas Council of Government's (NCTCOG) 2006 population estimate for the City of Ennis is 18,300 persons. NCTCOG population projections reflect a high growth rate for the future with a population projection of 37,922 persons in 2030. The purpose of the proposed project is to

improve mobility and the connectivity between existing roadways in the City of Ennis and the Ellis County region, including major arterials such as SH 34 and Business US 287 in this rapidly developing area. The proposed improvements to US 287 are included in the 2008-2011 State Transportation Improvement Program (STIP).

C. Right-of-Way Requirements and Utility Adjustments

The existing right-of-way (ROW) width along the project is 250 feet and the proposed typical ROW width varies from 250 feet to 580 feet (at the SH 34 interchange). As a result, the proposed project would require approximately 24.2 acres of additional ROW. The City of Ennis would contribute to the acquisition of approximately four acres of ROW required for the northbound frontage road that would access the Ennis Regional Medical Center (under construction). No easements would be required for the proposed project.

Utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, cable television, fiber optics and other subterranean and aerial utilities would require adjustment. The adjustment and relocation of any utilities would be performed so that there would be no substantial interruptions. TxDOT would be responsible for the adjustment and relocation of all TxDOT utilities. Other utilities within TxDOT ROW would be relocated at the owner's expense, while utilities requiring relocation that are outside of TxDOT ROW would be eligible for reimbursement.

D. Project Cost Estimate

The proposed project is included in Appendix D of the 2008-2011 STIP and is being funded by Category 10 (Surface Transportation Projects). The total project cost for the proposed project is \$36,865,325 as of June 12, 2008. Project funding is 80 percent federal funds and 20 percent state funds. The estimated project completion year is end of 2012.

II. DISCUSSION OF THE EXISTING FACILITY

A. Existing Facility

US 287 is a northwest-southeast regional arterial located in eastern Ellis County. The existing asphalt road is comprised of two undivided lanes, each approximately 12-feet wide with 10-foot wide outside shoulders (**Appendix A, Figure 4**). The pavement surface is generally in good condition and there are open drainage ditches that parallel the roadway. The existing roadway has a typical ROW width of 250 feet. There are three existing bridges along the facility, crossing over Little Mustang Creek, Mustang Creek Tributary, and SH 34. The bridge at Little Mustang Creek is 400 feet long and 46 feet wide, while the bridge at Mustang Creek Tributary is 212 feet long and 46 feet wide, and the bridge at SH 34 is 271 feet long and 46 feet wide. All three bridges consist of two undivided 12-foot wide lanes with 10-foot wide outside shoulders. **Appendix A, Figure 6** depicts the layout of the existing and proposed roadway.

B. Surrounding Terrain and Land Use

The topography along the project is gently sloping with the elevation varying from approximately 440 feet at the creek crossings to a high of approximately 490 feet. The land use along the roadway is predominantly agricultural and vacant, interspersed with rural residential, municipal, institutional, and commercial uses. The roadway crosses Little Mustang Creek and Mustang Creek Tributary. Ennis High School, a large traffic generator, is located on the southeast corner of SH 34 and US 287. Other large traffic generators include the Sixth Grade Center and Ennis Regional Medical Center at the northeast and southeast corners of US 287 and Lampasas Street, respectively. Ennis Municipal Airport is located at the northern terminus of the proposed project.

According to the *Ellis County Soil Survey*, various soil types cross or parallel the project. Wilson clay loam (1 to 3 percent slopes), Heiden-Ferris complex (5 to 8 percent slopes), and Burleson clay (0 to 1 percent slopes) make up 47.1 percent, 16.3 percent, and 11.5 percent of the soils in the area, respectively. Other soils in the study area include Heiden clay (3 to 5 percent slopes), Trinity clay (frequently flooded), and Mabank fine sandy loam (1 to 3 percent slopes).

Increased development along US 287 within the project limits began several years ago in anticipation of improvements to the facility. It is anticipated that the proposed project would facilitate additional future development along the project corridor. The roadway expansion is consistent with local planning efforts. Photographs of the existing facility and surrounding area can be found in **Appendix A, Figure 7**.

C. Traffic Projections

According to the TxDOT TP&P Division, the 2011 ADT volume on US 287 from Business US 287 to south of SH 34 for year is 13,900 vpd. The predicted ADT for the year 2031 is 21,300 vpd. This represents a 53.2 percent increase over 2011 traffic volumes.

III. ALTERNATIVES

A. No Build

The “No Build” alternative was considered and would leave the roadway in its existing state. With this alternative, inadequate capacity and safety conditions would still exist and would only worsen with time due to the current trend of development along the project corridor. The No Build Alternative would not fulfill the need and purpose of the project. The No Build Alternative will be carried forward as a baseline for comparison against the preferred alternative throughout the remainder of the EA document.

B. Build Alternative

Only one “Build” alternative was considered for this project. Parallel routes were not considered because the existing thoroughfare plans, development, and zoning have been established based on the present alignment of US 287. Therefore, relocating

the existing route was not a feasible alternative. The Build alternative consists of the improvements indicated in **Table 1**.

The Build alternative is the preferred alternative because it is the only alternative that adequately addresses the need and purpose.

IV. POTENTIAL SOCIAL, ECONOMIC AND ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

A. Regional and Community Growth

Land along the roadway used to be predominantly agricultural and vacant. Population estimates from the U.S. Census show that the population of Ellis County grew from 85,167 people in 1990 to 111,360 people in 2000. This represents a growth rate of 30.8% in 10 years. From 1990 to 2000, the population for the city of Ennis has grown from 13,883 people to 16,045 people, representing a growth rate of 15.6% in 10 years. It is projected that the population for the City of Ennis will grow to 28,100 people by 2020 and 37,922 by 2030, while the population of Ellis County will grow to 329,476 people in 2020 and 448,588 people in 2030 (NCTCOG).

Currently, development activities are occurring without the proposed widening of US 287; however, City of Ennis officials revealed that the Build Alternative would have an even greater influence on the City's regional and community growth. The improved access resulting from the proposed project would attract new development and lead to economic growth for the area as new residents commute within the region.

No Build Alternative

Under the No Build Alternative, new development along US 287 would still occur, but at a lesser extent and a slower pace. There would be no new frontage roads along the north and south sides US 287 to attract new commercial development. Access to some of the proposed residential subdivisions, institutional, and medical facilities in the area would be limited. Mobility in this portion of Ennis would be constrained.

B. Socio-Economic Discussion

As stated in **Section II.B.**, increased development along US 287 within the project limits began several years ago in anticipation of improvements to US 287. During the construction there could potentially be a short-term economic gain to the area due to new job opportunities and a temporary boost to the local economy. Long-term benefits would accrue to roadway users, including occupants of abutting property due to ease of access and increased capacity. They would benefit economically from various design improvements, which would reduce vehicle-operating costs and improve operations.

The City of Ennis *Comprehensive Plan* identifies several factors that are influencing Ennis' population and economic growth:

- Ennis is easily accessible to the Dallas/Fort Worth metropolitan area where development activity continues to increase. The growth and development of surrounding cities will contribute to Ennis' growth potential.

- Ennis holds tremendous potential for development due to the high cost of land in the Dallas/Fort Worth metropolitan area. As a result, the high prices for both housing and industrial sites are leading consumers and manufacturers to seek new, less expensive sites in surrounding communities.
- Ennis maintains an industrial climate due to the influence of the Southern Pacific Railroad which traverses the city. Industrial land served by rail is scarce in the Dallas/Fort Worth metropolitan area, thus increasing the potential for development in Ennis.

City of Ennis officials revealed that the Build Alternative would have an even greater influence on the City's overall growth in sales of goods and services, employment, land values, and tax revenues. The City's anticipated total revenue in the project study area from overall growth is \$3.05 billion, and the City expects more than 3,400 jobs resulting from new development. According to interviews conducted with City officials, the City's planning efforts are largely made with the US 287 Build Alternative in mind. Furthermore, the Build Alternative is vital to the economic growth of the City and the quality of life the City plans to offer their citizens.

No Build Alternative

Under the No Build Alternative, the overall growth in sales of goods and services, employment, land values, and tax revenues in the project study area would be less than that under the Build Alternative. There would be no new frontage roads along the north and south sides US 287 to attract new commercial development and the resulting employment opportunities. Access to some of the proposed residential subdivisions, institutional, and medical facilities in the area would be limited. More time and effort would be required by motorists to get to their destinations. Mobility in this portion of Ennis would be constrained due to ever increasing congestion on the existing roadway.

C. Relocations

No displacements or relocations of residents or businesses would occur as a result of this project. All property to be acquired would be conducted in accordance with the Uniform Relocation Act.

D. Public Facilities and Services

The Ennis Municipal Airport (northern terminus), Ennis Regional Medical Center (under construction at the intersection with Lampasas Street), 6th Grade Center (at Lampasas Street), and Ennis High School (at SH 34) are all located along US 287.

The proposed improvements would provide an increase in accessibility for this portion of Ellis County to the various religious, educational, medical and recreational facilities in the area. Due to additional lanes and improved roadway geometry, emergency public services would have a safer, more efficient facility to use in the performance of their various duties. Accessible routes would be maintained at all times for emergency vehicles such as fire and ambulance. As discussed in **Section I.C.**, utilities would undergo relocation and all efforts would be made to minimize the disruption of services.

No Build Alternative

As traffic on US 287 increases, the No Build Alternative would result in decreased mobility and access to the public facilities that have been constructed and are planned along the facility.

E. Community Cohesion

Community cohesion is a term that refers to an aggregate quality of a residential area. Cohesion is a social attribute that indicates a sense of community, common responsibility, and social interaction within a limited geographic area. It is the degree to which residents have a sense of belonging to their neighborhood or community or a strong attachment to neighbors, groups, and institutions as continual association over time. The Build Alternative would not separate or isolate any distinct neighborhoods, ethnic groups, or other specific groups because US 287 is an existing facility with a developing corridor consisting of commercial, institutional, and industrial uses. No neighborhoods, ethnic groups, or other specific groups are adjacent to US 287 and no development, with the exception of Bluebonnet Park, currently exists along the south side of the roadway. The Build Alternative would not create any division and would enhance the existing facility. As a result, the Build Alternative would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups. No displacements or relocations would occur due to this project.

Limited English Proficiency (LEP)

Executive Order (EO) 13166 *Improving Access to Services for Persons with Limited English Proficiency* (LEP) calls for all agencies to ensure that their federally conducted programs and activities are meaningfully accessible to LEP individuals. This EO requires the federal agencies to work to ensure that recipients of federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate the prohibition under Title VI of the Civil Rights Restoration Act of 1987 and Title VI regulations against national origin discrimination.

Table 2 lists the census data for “Ability to Speak English” for the population five years of age and over for Census Tract (CT) 613, Block Group (BG) 1; CT 614 BG 1 and CT 615 BG 2, within which the Build Alternative is located. Results of a field reconnaissance (windshield survey) indicates that English was the language used for building signage and other forms of posted information and advertisements at the Build Alternative location. Additional public involvement, other than the Public Hearing, is not anticipated at this time. The Public Hearing notices would be advertised in Spanish (predominant second language per Table 2) and translators would be available. As a result of the aforementioned, the requirements of EO 13166 are satisfied.

Table 2: Limited English Proficiency (LEP) Populations

Census Unit	LEP	Speaks Spanish: Speaks English Less Than Very Well	Speaks Indo-European Languages: Speaks English Less Than Very Well	Speaks Asian Pacific Islander Languages: Speaks English Less Than Very Well	Speaks Other Languages: Speaks English Less Than Very Well
Census Tract 613	3.8%	3.3%	0.5%	0%	0%
Census Tract 614	7.6%	6.7%	0.9%	0%	0%
Census Tract 615	31.9%	31.8%	0%	0%	0.1%
Block Group 1, Census Tract 613	3.9%	3.0%	0.5%	0%	0.4%
Block Group 1, Census Tract 614	7.7%	4.2%	1.8%	0%	1.7%
Block Group 2, Census Tract 615	28.8%	22.7%	0%	0%	6.1%

Source: U.S Census Bureau, 2000 Census

F. Environmental Justice

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs on minority and low-income populations. A minority population is defined as a group of people and/or community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Bureau of the Census as African-American; Asian or Pacific Islander; Native Hawaiian, American Indian, Alaska native; other non-white persons, or persons of Hispanic origin. A low-income population is defined as one with a median annual income for a family of four equal to or below the 2008 national poverty level of \$21,200. **Table 3** lists the low income characteristics in the project area.

Table 3: Low Income Characteristics

Census Unit	Total	Income in 1999 Below Poverty Level	Median Household Income in 1999
Census Tract 613	1,596	10.0%	43,125
Census Tract 614	6,802	7.5%	45,109
Census Tract 615	4,405	13.4%	34,355
Block Group 1, Census Tract 613	1,610	9.9%	43,125
Block Group 1, Census Tract 614	2,319	5.3%	49,135
Block Group 2, Census Tract 615	2,013	14.4%	38,828

Source: U.S Census Bureau, 2000 Census

As shown in **Table 3**, low income populations exist in the project area. Adverse effects means the totality of substantial individual or cumulative human health or

environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or substantial delay in the receipt of, benefits of Department of Transportation programs, policies, or activities. Disproportionately high and adverse effect on minority and low-income populations means an adverse effect that: (1) is predominately borne by a minority population and/or a low-income population, or (2) would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population. Census information is provided in **Table 4.**

Table 4: Racial and Ethnic Distribution

Census Unit	Total	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Population of Two or More Races	Hispanic or Latino
Block 1066, BG 1, CT 613	6	100%	0%	0%	0%	0%	0%	0%	0%
Block 1072, BG 1, CT 613,	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 1074, BG 1, CT 613	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 1075, BG 1, CT 613	19	68.4%	0%	0%	0%	0%	0%	15.8%	15.8%
Block 1079, BG 1, CT 613	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 1080, BG 1, CT 613	12	91.7%	0%	0%	0%	0%	0%	0%	8.3%

Table 4: Racial and Ethnic Distribution

Census Unit	Total	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Population of Two or More Races	Hispanic or Latino
Block 1081, BG 1, CT 613	42	42.9%	2.4%	0%	0%	0%	0%	0%	54.7%
Block 1016, BG 1, CT 614	13	100%	0%	0%	0%	0%	0%	0%	0%
Block 1019, BG 1, CT 614	352	82.7%	4.0%	0%	1.1%	0%	0%	1.7%	10.5%
Block 1060, BG 1, CT 614	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 2013, BG 2, CT 615	10	50.0%	0%	0%	0%	0%	0%	0%	50.0%
Block 2014, BG 2, CT 615	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 2015, BG 2, CT 615	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 2016, BG 2, CT 615	0	0%	0%	0%	0%	0%	0%	0%	0%
Block 2017, BG 2, CT 615	10	100.0%	0%	0%	0%	0%	0%	0%	0%
Block 2018, BG 2, CT 615	29	75.9%	0%	0%	0%	0%	0%	3.4%	20.7%
BG 1, CT 613	1,610	78.0%	1.7%	0.7%	0.1%	0%	0%	1.7%	17.8%

Table 4: Racial and Ethnic Distribution

Census Unit	Total	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Population of Two or More Races	Hispanic or Latino
BG 1, CT 614	2,319	81.8%	3.3%	0.1%	0.6%	0%	0%	0.6%	13.6%
BG 2, CT 615	2,013	39.5%	17.2%	0%	0.1%	0%	0.2%	0.9%	42.1%

Source: U.S Census Bureau, 2000 Census

As shown in Table 4, minority populations exist in the project area. There are no distinct neighborhoods, ethnic groups, or other specific groups directly adjacent to US 287. As a result, the Build Alternative would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups. No displacements or relocations would occur due to this project.

The Build Alternative would benefit all populations in the surrounding community, increase safety, improve functionality, and provide better access to emergency vehicles. The Build Alternative would be beneficial to all populations within the study area because it would provide smoother traffic flow for area motorists. Therefore, no environmental justice population would be disproportionately impacted, and the requirements of EO 12898, on Environmental Justice, are satisfied.

No Build Alternative

The No Build Alternative would not affect current trends in the community, population or demographics of the project area.

G. Impact on 4(f) Properties

Bluebonnet Park (**Appendix A, Figure 7 - Photo 10**) is located within the project study area; however, no ROW would be required from the park. The Build Alternative would not require the use of or substantially impair the purposes of any publicly owned land from a park, recreational area, wildlife and waterfowl lands, or a publicly or privately owned historic site.

No Build Alternative

There would be no impacts to existing land use related to the implementation of the No Build Alternative. No Section 4(f) properties would be affected by this alternative.

H. Lakes, Rivers, and Streams

The Build Alternative crosses Little Mustang Creek and two tributaries of Mustang Creek (Lake Bardwell). Little Mustang Creek and the two tributaries of Mustang Creek are not navigable waterways. Navigational clearance under the General

Bridge Act of 1946, Section 9 of the Rivers and Harbors Act of 1899 (administered by the U.S. Coast Guard [USCG]) and Section 10 of the Rivers and Harbors Act of 1899 (administered by the U.S. Army Corps of Engineers [USACE]) is not applicable. Coordination with the USCG (for Section 9 and the Bridge Act) and the USACE (for Section 10) would not be required.

No Build Alternative

There would be no impacts to lakes, rivers, or streams associated with the No Build Alternative.

I. Floodplains

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) #48139C0215 D (Revised January 20, 1999) and #48139C0220 D (Revised January 20, 1999), the project crosses a floodplain associated with Little Mustang Creek and one tributary of Mustang Creek. This floodplain is classified as "Zone A" (Special Flood Hazard Areas Inundated by 100-Year Flood with no base flood elevations determined). The remaining portions of the project do not cross any floodplains. The City of Ennis and Ellis County are participants in the National Flood Insurance Program (NFIP). There would be no effect on the status of the NFIP and no additional need for floodway or floodplain ordinance amendments.

The hydraulic design practices for this project would be in accordance with current design policies and standards. The facility would permit the conveyance of the design-year flood, inundation of the roadway being acceptable, without causing substantial damage to the highway, stream or other property. The Build Alternative would not increase base flood elevations to a level which would violate applicable floodplain regulations or ordinances.

No Build Alternative

There would be no impacts to floodplains associated with the No Build Alternative.

J. Waters of the U.S.

The Build Alternative crosses Little Mustang Creek and two tributaries of Mustang Creek. These waters of the U.S. are regulated by the USACE under the authority of Section 404 of the Clean Water Act.

A wetland delineation was conducted in accordance with the USACE 1987 Corps of Engineers *Wetlands Delineation Manual*. The general locations of the wetland data points are shown on **Appendix A, Figure 3** and the wetland data forms are included in **Appendix B**. Results of the wetland delineation found one wetland associated with Little Mustang Creek. The wetland is an intermittently inundated, emergent palustrine wetland located within the 100-year floodplain of Little Mustang Creek (**Appendix A, Figure 7 - Photo 8**). There are no wetlands present at the remaining water crossings or anywhere else along the project.

The Build Alternative would include the addition of bridges over Little Mustang Creek and its adjacent wetland, and one tributary to Mustang Creek. These bridges would span the two creeks and wetland, resulting in no permanent impacts.

Because up to 0.16 acre of the wetland adjacent to Little Mustang Creek would be temporarily impacted as a result of construction of the bridge for the proposed northbound US 287 main lanes, the project would be authorized under Nationwide Permit (NWP) 14, *Linear Transportation Projects*. NWP 14 requires a pre-construction notification (PCN) for any discharges into special aquatic sites, including wetlands.

The Build Alternative would also involve the extension of six culverts. One of these culvert extensions would impact 0.0014 acre of a tributary of Mustang Creek. The remaining five culverts are associated with upland drainage and have no nexus to a water of the U.S.

The proposed culvert extension at the tributary of Mustang Creek would be authorized under NWP 14. No PCN would be required because the impacts are less than 0.1 acre and there are no associated special aquatic sites or wetlands that would be affected.

No Build Alternative

There would be no impacts to waters of the U.S. related to the implementation of the No Build Alternative.

K. Water Quality

According to the 2008 State of Texas CWA Section 303(d) list, Little Mustang Creek and the two tributaries of Mustang Creek are not designated as threatened or impaired water segments. Little Mustang Creek and the two tributaries of Mustang Creek flow into Lake Bardwell (Segment 0815) and then into Chambers Creek (Segment 0814). There are no threatened or impaired water segments within five miles upstream of the project.

As authorized by Section 402 of the CWA, the TCEQ Texas Pollutant Discharge Elimination System (TPDES) permit program controls water pollution by regulating activities that discharge pollutants into waters of the U.S., such as construction or industrial activities. Because this project would disturb more than five acres, TxDOT would be required to comply with the TCEQ TPDES for Large Construction Activity. This would be accomplished by filing a Notice of Intent (NOI) to comply with the TCEQ stating that TxDOT would have a Storm Water Pollution Prevention Plan SW3P in place during construction of US 287. The SW3P would specify temporary and permanent erosion control measures, as well as drainage and discharge control for the project site. The SW3P would include best management practices (BMPs) approved by the TCEQ for sediment and erosion control. These BMPs would include application of temporary re-seeding using TxDOT approved seeding specifications to disturbed areas, and installing silt fences combined with rock berms.

The project engineer would ensure that appropriate steps are taken to control water pollution during construction. The amount of disturbed earth would be limited so that potential for excessive erosion is minimized and sedimentation outside of the ROW is avoided. Existing vegetation would be preserved wherever possible.

The contractor would take appropriate measures to prevent, minimize and control

spillage of hazardous materials in the construction staging area. All materials being removed or disposed of by the contractor would be done in accordance with applicable state and federal laws and as not to degrade ambient water quality. All of these measures would be enforced under appropriate specifications in the plan, specification and estimate stage of project development.

These erosion control measures would be coordinated with the permanent soil erosion control features. The features are to be a part of the completed project to assure economical, effective, and continuous erosion control throughout the construction and post-construction periods. Moreover, efforts would be made to prevent permanent water pollution by reducing fertilizer and pesticide use during the installation and maintenance of landscaping.

General Condition 21 of the NWP Program require applicants using NWP 14 to comply with Section 401 of the CWA. Compliance with Section 401 requires the use of BMPs to manage water quality on construction sites. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for Nationwide Permits as published by the TCEQ. These BMPs would address each of the following categories:

- Category I Erosion Control would be addressed by applying temporary reseeding (TxDOT approved seeding specification) and mulch to disturbed areas.
- Category II Sedimentation Control would be addressed by installing silt fences combined with rock berms.
- Category III Post-Construction Total Suspended Solids (TSS) control would be addressed by installing grassy swales.

Other approved methods would be substituted if necessary using one of the BMPs from the identical category.

No Build Alternative

There would be no impacts to surface water quality related to the implementation of the No Build Alternative.

L. Threatened/Endangered Species

This project is located in the USGS 7.5 Minute Quadrangle of Ennis West, Ennis East, and Forrester, Texas (**Appendix A, Figure 2**). The federal and state listed threatened and endangered species of Ellis County are shown below in **Table 5**. A review of the Texas Parks and Wildlife Department (TPWD) Natural Diversity Database, along with recorded observations and other TPWD lists and information, indicated that 11 federal and state-listed endangered species have the potential to occur in Ellis County.

Table 5: Federal and State-Listed Threatened and Endangered Species With the Potential to Occur in Ellis County

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect
Birds					
American Peregrine Falcon <i>Falco peregrinus anatum</i>	—	E	Nests in tall cliff eyries, year-round resident and local breeder in west Texas; migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	No
Arctic Peregrine Falcon <i>Falco peregrinus tundrius</i>	—	T	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	No
Bald Eagle <i>Haliaeetus leucocephalus</i>	DM	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	No	No
Golden-cheeked Warbler <i>Dendroica chrysoparia</i>	—	E	Juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.	No	No
Interior Least Tern <i>Sterna anitllarum athalassos</i>	—	E	Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony.	No	No
Peregrine Falcon <i>Falco peregrinus</i>	—	ET	Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, thus the species level shows this dual listing status; because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	No	No
White-faced Ibis <i>Plegadis chihi</i>	—	T	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	No	No
Whooping Crane <i>Grus americana</i>	E	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	No	No

Table 5: Federal and State-Listed Threatened and Endangered Species With the Potential to Occur in Ellis County

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect
Wood Stork <i>Mycteria americana</i>	—	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	No	No
Mammals					
Red Wolf <i>Canis rufus</i>	—	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	No	No
Reptiles					
Alligator Snapping Turtle <i>Macrochelys temminckii</i>	—	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	No	No
Texas Horned Lizard <i>Phrynosoma cornutum</i>	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September	Yes	Yes
Timber/Canebrake Rattlesnake <i>Crotalus horridus</i>	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e. grapevines or palmetto.	Yes	Yes
E – Endangered T – Threatened DM – Delisted Taxon, Recovered, Being Monitored First Five Years					

Source: US Fish & Wildlife Service, March 5, 2008 and Texas Parks and Wildlife Department, November 27, 2007.

Based on site reconnaissance of the existing and proposed ROW, the Build Alternative would have no effect on any of the threatened or endangered species listed in **Table 5** or their habitats except for the Texas horned lizard and Timber/Canebrake rattlesnake, both of which have the potential to be in the project area.

No Build Alternative

The No Build Alternative would have no effect on threatened or endangered species.

M. Vegetation and Wildlife Habitat

The Texas Parks and Wildlife Department's (TPWD) 1984 *Vegetation Types of Texas* map shows that the Build Alternative is located within the physiognomic region classified as "other native and/or introduced grasses". According to the TPWD *Texas Natural Regions* map, the project is within the Blackland Prairies ecological region.

Dominant plant species that exist along the proposed ROW within the project area consist of bermudagrass (*Cynodon dactylon*), common sunflower (*Helianthus annuus*), goldenrod (*Solidago sp.*), saw-tooth greenbrier (*Smilax bona-nox*), little bluestem (*Schizachyrium scoparium*), annual ragweed (*Ambrosia artemisiifolia*), sugarberry (*Celtis laevigata*), mesquite (*Prosopis glandulosa*), and Eastern red cedar (*Juniperus virginiana*).

The Build Alternative would impact 114.3 acres of existing ROW, which consists of 113.3 acres of maintained herbaceous vegetation and 1.0 acre of upland woodland. Additionally, the Build Alternative would require 24.2 acres of proposed ROW consisting of 20.8 acres of pasture and open land, 0.3 acre of fence line trees, and 3.1 acres of upland woodlands. The trees range from six feet to 30 feet in height and two inches to 10 inches diameter at breast height (dbh) (**Appendix B: TxDOT Woodlands Data Form**). The Build Alternative would also require the removal of one 30-inch dbh sugarberry tree located on the east side of US 287, north of the SH 34 intersection (**Appendix A, Figure 7 - Photo 5**).

No riparian vegetation would be impacted by the Build Alternative. Little bluestem was identified within the proposed ROW; however, the Little Bluestem-Indiangrass Series (S2) is not present. Other the dominant plant species stated above are much more numerous than little bluestem and no Indiangrass was identified. There are no native prairie remnants located within the project study area.

In accordance with Provision (4)(A)(ii) of the TxDOT – TPWD Memorandum of Understanding (MOU), some habitats may be given consideration for non-regulatory mitigation during project planning (at the District's discretion). Some of these habitats may include the following:

1. Federal candidate species – if it would assist in the prevention of the listing of the species.
2. Rare vegetation series (S1, S2, or S3) that also locally provides habitat for a state listed species.
3. Vegetation communities listed as S1 or S2 that provides habitat for state-listed species.
4. Bottomland hardwoods, native prairies and riparian sites.
5. Locally important habitat features.

Impacts to vegetation would be limited to areas necessary to construct the proposed roadway widening improvements and re-grade the side slopes adjacent to the roadway, and to widen the six cross-drainage culverts. Trees within the ROW, but not in the construction zone, would not be removed if possible. These areas would be preserved to try to minimize the impact to wildlife habitat in the area.

Mitigation for impacts to the 3.1 acres of upland woodlands would be required. The specific location of the mitigation area would be determined at a later date. The mitigation would be conducted in accordance with TxDOT woodlands mitigation standards (**Appendix B**).

The Migratory Bird Treaty Act states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. Migrational patterns would not be affected by the Build Alternative. No migratory birds, streams, water bodies, woody vegetation, or other habitat that would serve as a temporary or seasonal stop for migratory birds were observed within the project area during a site visit. In the event that migratory birds are encountered on-site during project construction, every effort will be made to avoid take of protected birds, active nests, eggs, and/or young. The contractor would remove all old migratory bird nests from September 1 through the end of February from any structure where work will be done. In addition, the contractor would be prepared to prevent migratory birds from building nests between March 1 and August 31.

No Build Alternative

There would be no impacts to vegetation, wildlife habitat, or migratory birds related to the implementation of the No Build Alternative.

N. Invasive Species and Beneficial Landscaping

Permanent soil erosion control features would be constructed as soon as feasible during the early stages of construction through proper sodding and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits and temporary sodding would be considered where large areas of disturbed ground would be left bare for a considerable length of time. In accordance with E.O. 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, seeding and replanting with TxDOT approved seeding specifications that is in compliance with E.O. 13112 would be done where possible. Moreover, abutting turf grasses within the ROW are expected to re-establish throughout the project length. Soil disturbance would be minimized to ensure that invasive species would not establish in the ROW.

No Build Alternative

The No Build Alternative would have no effect on wildlife habitat or vegetation.

O. Historic Resources

A review of the National Register of Historic Places (NRHP) and the Texas Historic Sites Atlas indicated that no historically significant properties, including State Archeological Landmarks (SALs) or Recorded Texas Historic Landmarks, have been previously documented within the Area of Potential Effect (APE), which for this project was determined to be 150 feet beyond the existing ROW. An historic building survey and archeological investigation were conducted by qualified personnel in January 2007. The survey revealed nine resources 50 years of age or older (pre-1963) within the project's APE. These resources include two residences, five

outbuildings, and two storage tanks. The survey recommended that these historic-age resources are not eligible for National Register of Historic Places (NHRP) listing. TxDOT Historians concurred with the survey and determined that the resources are common vernacular structures and are not associated with important events or persons (Criteria A and C), are not significant based on their architectural design (Criterion C), and are not likely to yield information important to prehistory or history (Criterion D). As a result, these resources are determined not eligible for listing in the NRHP. There are no Official State Historical Markers located within the APE.

In accordance with the Programmatic Agreement (PA) between TxDOT, the Texas Historic Commission (THC), FHWA, and the Advisory Council on Historic Preservation (ACHP), this project is categorically excluded from individual coordination with the State Historic Preservation Office (SHPO) as the project has no potential to impact historic properties.

No Build Alternative

There would be no impacts to historic resources related to the implementation of the No Build Alternative.

P. Archeological Resources

In January 2007, a TxDOT archeologist evaluated the potential for the proposed undertaking to affect archeological historic properties or SALs in the APE, which for this project was determined to be the proposed ROW. Section 106 review and consultation will proceed in accordance with the PA among TxDOT, THC, FHWA, and the ACHP, as well as the MOU between THC and TxDOT.

The results of the archeological survey indicated that due to the upland environment of the project area and the recent development and construction in the APE of the existing US 287, it is unlikely that the area would contain any subsurface archeological deposits with contextual integrity. The pedestrian survey of the existing and proposed ROW found that large sections of the APE have been adversely affected by previous construction, excavation, erosion, erosion control, terracing, and dumping. No cultural materials were found during the survey on the surface, in shovel tests, or in the creek banks.

No archeological historic properties were identified during the survey. As a result of these investigations, it is recommended that the proposed widening and alterations of the US 287 Build Alternative would not affect archeological historic properties and that no further work is required.

In the unlikely event that evidence of archeological deposits is encountered during construction, work in the immediate area would cease and TxDOT archeological staff would be contacted in order to initiate accidental discovery procedures under the provisions of the PA between TxDOT, THC, FHWA, and the ACHP, and the MOU between TxDOT and THC.

No Build Alternative

The No Build Alternative would have no effect on archeological resources.

Q. Aesthetic Considerations

As directed for all federally assisted projects (where cost-effective and to the extent practicable) regionally native plants would be used for landscaping. Moreover, TxDOT would design and promote construction practices that minimize adverse effects on existing vegetation.

No Build Alternative

There would be no visual impacts related to the implementation of the No Build Alternative.

R. Prime, Unique, and Special Farmland Impacts

According to the City of Ennis 2006 Zoning Map, portions of the area surrounding the Build Alternative are zoned as Agricultural District. In accordance with the Farmland Protection Policy Act (FPPA) of 1981, the additional ROW was scored using U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Form AD-1006. The resulting score was 71, which is below the minimum of 160 points requiring further coordination with NRCS. The regulation implementing the FPPA (7 CFR 658.4(c)(2)) states "Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated." No further coordination with the NRCS is required.

No Build Alternative

There would be no farmland impacts associated with the No Build Alternative.

S. Air Quality Assessment

The proposed North Central Texas project is located in Ellis County, which is part of the U.S. Environmental Protection Agency (EPA) designated nine-county non-attainment area for the eight-hour standard for the pollutant ozone; therefore, the transportation conformity rule applies. The Build Alternative is consistent with the area's financially constrained long-range Mobility 2030 (MTP) and the 2008-2011 Transportation Improvement Program (TIP), as proposed by the NCTCOG. The US DOT (FHWA/FTA) found the MTP to conform to the State Implementation Plan (SIP) on June 12, 2007 and found the 2008-2011 TIP to conform on October 31, 2007. All projects in the NCTCOG's TIP that are proposed for federal or state funds were initiated in a manner consistent with requirements of amended 23 United States Code (U.S.C.) 134, 23 U.S.C. 135, 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) and 49 U.S.C. 5303. Energy, environment, air quality, cost and mobility considerations are addressed in the programming of the TIP. Project specific MTP and TIP pages are located in **Appendix C**.

The proposed action's traffic projection does not exceed 140,000 vehicles per day for either the existing or design year and thus is exempt from a Traffic Air Quality Analysis because previous analyses of similar projects did not result in a violation of National Ambient Air Quality Standards (NAAQS).

Congestion Management Process

The congestion management process (CMP) is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs. The project was developed from NCTCOG's operational CMP which meets all requirements of amended 23 U.S.C. 134(k)(3)) and 49 U.S.C. 5303(k)(3), amendments incorporating the transportation planning requirements of SAFETEA-LU.

The operational management and travel demand reduction strategies are commitments made by the region at two levels: program level and project level implementation. Program level commitments are inventoried in the regional CMP, which was adopted by the NCTCOG Regional Transportation Council. They would be included in the financially constrained MTP and future resources would be earmarked for their implementation.

The CMP element of the plan would carry an inventory of all project commitments (including those resulting from major investment studies) detailing type of strategy, implementing responsibilities, schedules, and expected costs. At the project implementation level, travel demand reduction strategies and commitments would be added to the regional TIP or included in the construction plans. The regional TIP would provide for programming of these projects at the appropriate time with respect to the single-occupancy vehicle (SOV) facility implementation and project specific elements. Individual CMP projects in the area are listed in **Table 6**.

Table 6: Congestion Management Process Projects

Project Code	Street / Name	City	County	Implementing Agency	Project Type	Year of Implementation	Total Project Cost
0172-08-045	US 287 at Rudd Rd.	Ennis	Ellis	TxDOT-Dallas	Intersection Improvement	2000	\$379,205
0172-08-049	US 287 at Lampasas St.	Ennis	Ellis	TxDOT-Dallas	Intersection Improvement	2003	\$466,295
0173-01-043	SH 34 from Breckenridge St. to IH 45 SB Frontage Rd.	Ennis	Ellis	TxDOT-Dallas	Construct Continuous Left-Turn Lane	2005	\$2,379,079

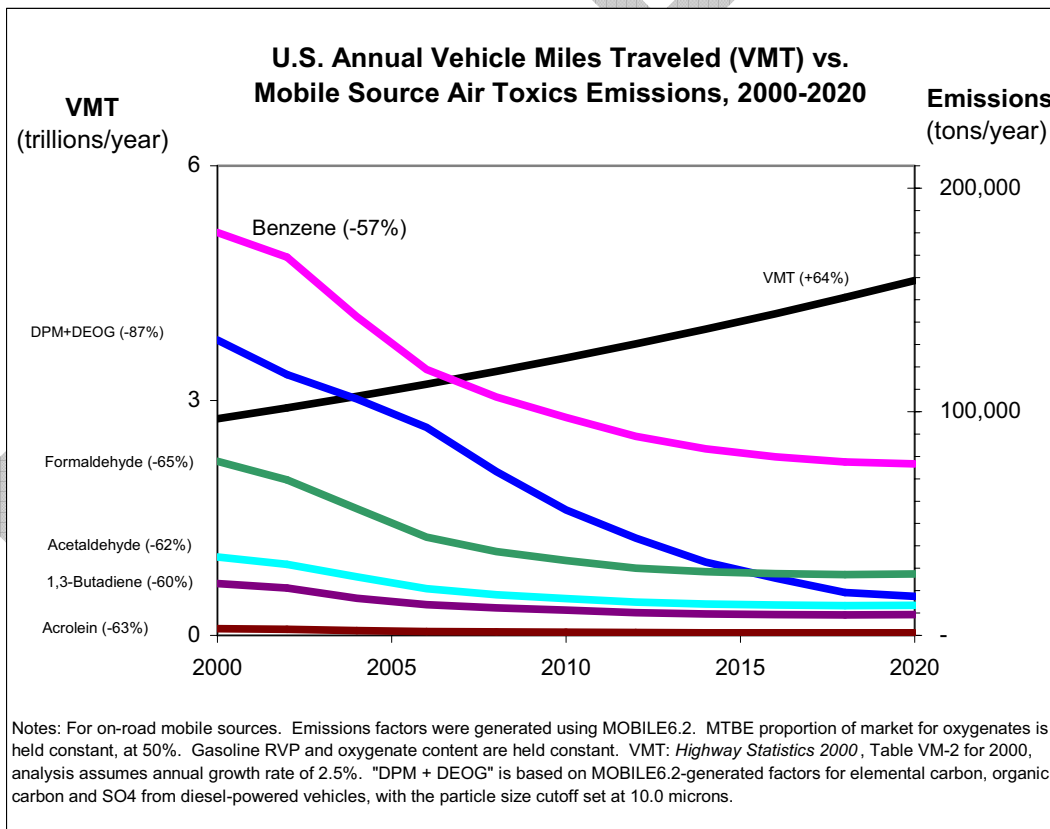
Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion

products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources. 66 FR 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, acrolein, and acetaldehyde by 57 percent to 87 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in the following graph:



In an ongoing review of MSATs, the EPA finalized additional rules under authority of CAA Section 202(l) to further reduce MSAT emissions that are not reflected in the above graph. The EPA issued Final Rules on Control of Hazardous Air Pollutants from Mobile Sources (72 FR 8427, February 26, 2007) under Title 40 Code of Federal Regulations Parts 59, 80, 85 and 86. The rule changes were effective April

27, 2007. As a result of this review, EPA adopted the following new requirements to significantly lower emissions of benzene and the other MSATs by: (1) lowering the benzene content in gasoline; (2) reducing non-methane hydrocarbon (NMHC) exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees Fahrenheit); and (3) reducing evaporative emissions that permeate through portable fuel containers.

Beginning in 2011, petroleum refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume, for both reformulated and conventional gasolines, nationwide. The national benzene content of gasoline in 2007 is about 1.0 percent by volume. EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled vehicles will become effective in phases. Standards for light-duty vehicles and trucks (equal to or less than 6000 pounds [lbs]) become effective during the period of 2010 to 2013, and standards for heavy light-duty trucks (6,000 to 8,000 lbs) and medium-duty passenger vehicles (up to 10,000 lbs) become effective during the period of 2012 to 2015. Evaporative requirements for portable gas containers become effective with containers manufactured in 2009. Evaporative emissions must be limited to 0.3 grams of hydrocarbons per gallon per day.

EPA has also adopted more stringent evaporative emission standards (equivalent to current California standards) for new passenger vehicles. The new standards become effective in 2009 for light vehicles and in 2010 for heavy vehicles. In addition to the reductions from the 2001 rule, the new rules will significantly reduce annual national MSAT emissions. For example, EPA estimates that emissions in the year 2030, when compared to emissions in the base year prior to the rule, will show a reduction of 330,000 tons of MSATs (including 61,000 tons of benzene), reductions of more than 1,000,000 tons of volatile organic compounds, and reductions of more than 19,000 tons of PM 2.5.

Sensitive Receptor Assessment

The additional travel lanes contemplated as part of the project alternatives would have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSATs could be higher under the Build Alternative than the No Build Alternative. Dispersion studies have shown that the "roadway" air toxics start to drop off at about 100 meters. By 500 meters, most studies have found it very difficult to distinguish the roadway related from background air toxic levels in any given area. An assessment of some potential sensitive receptors within both 100 and 500 meters was conducted. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population (hospitals, schools, licensed daycare facilities, and elder care facilities). **Table 7** lists the number of sensitive receptors identified within 100 and 500 meters of the Build Alternative ROW line.

Table 7: Sensitive Receptors by Distance

Alternatives	Length (miles)	328 feet (100 meters)	1,640 feet (500 meters)
Build Alternative	2.8	2	2

As shown in **Table 7**, two sensitive receptors are located within 328 feet (100 meters) of the Build Alternative's ROW line and two sensitive receptors are located within 1,640 feet (500 meters) of the Build Alternative's proposed ROW line. **Table 8** lists the identities of the sensitive receptors, their location, and their distance from the Build Alternative's proposed ROW line. The sensitive receptors are shown in **Appendix A, Figure 8**.

Table 8: Sensitive Receptors in the Study Area

Name	Address	City	Zip Code	Distance from ROW in feet
Bluebonnet Park	Northwest corner of Ennis Parkway and US 287	Ennis	75119	Adjacent
Ennis 6 th Grade Center	2200 W. Lampasas Street	Ennis	75119	410
Ennis Regional Medical Center	803 W. Lampasas Street	Ennis	75119	120
Ennis High School Stadium	1405 Lake Bardwell Road (SH 34)	Ennis	75119	970

The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built along highly developed commercial and residential areas and major intersections, such as the US 287 at Lampasas intersection and the US 287 at SH 34 intersection. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-build Alternative cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when a roadway is widened and, as a result, moves closer to receptors, 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, MSATs 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 substantially lower than today.

Unavailable Information for Project Specific MSAT Impact Analysis

This document includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the alternatives in this project. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete. Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Emissions: The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model--emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion. The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual

concentrations of MSATs ear roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level. The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at <http://www.epa.gov/iris>. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- **Acrolein**: The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.

- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust (DE)** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases. Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes - particularly respiratory problems¹. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information

While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from the Build Alternative and MSAT concentrations or exposures created by the Build Alternative cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

In this document, a quantitative assessment has been provided relative to the MSAT emissions and has acknowledged that the Build Alternative may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

¹ South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

Project Specific MSAT Information

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project (see “Unavailable Information for Project Specific MSAT Impact Analysis” for more information). However, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative assessment cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment 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:

www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

Level of Service (LOS) is a standard used to indicate the effectiveness of transporting vehicles along a roadway. LOS ranges from LOS A, which describes free-flow operation with minimum delays at signalized intersections, to LOS F, which describes extremely low speeds, high delays, high volumes, and extensive queuing. LOS levels were determined for the existing conditions, No Build Alternative and Build Alternative using the traffic numbers provided by TxDOT's TP&P Division. After analyzing all three scenarios, it was determined that a change would occur due to the Build Alternative. The existing US 287 facility operates at a LOS F, and the design year No Build Alternative would also operate at a LOS F. However, the design year Build Alternative would operate at a LOS E, which is better than a LOS F. Even with just a small change from the existing conditions to the Build Alternative conditions, it is likely that MSAT emissions concentrations would be lower for the Build Alternative because the average number of vehicles per hour per lane would be 703 vehicles compared to 1,406 vehicles for the No Build Alternative and 918 vehicles for the existing condition.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, vehicle miles traveled (VMT) growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the study area are likely to be lower in the future in almost all cases.

Mitigating for Construction-Related Air Emissions

Construction activity may generate a temporary increase in MSAT emissions. None of the receptors are expected to be exposed to construction activity for a long duration; therefore, any extended disruption of normal activities is not expected. Construction normally occurs during daylight hours; however, provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction emission through abatement measures such as work-hour controls (work activity outside normal hours of an adjacent school campus) and proper maintenance of muffler systems.

No Build Alternative

Under the No Build Alternative, air quality would be expected to deteriorate in association with projected increases in traffic volumes and resulting congestion.

T. Noise Assessment

This analysis conforms to Federal Highway Administration (FHWA) Regulation 23 CFR 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise," and TxDOT's 1996 Guidelines for Analysis and Abatement of Highway Traffic Noise.

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB." Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dBA."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "L_{eq}."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise.
- Determination of existing noise levels.
- Prediction of future noise levels.
- Identification of possible noise impacts.
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC), as shown in **Table 9**, for various land use activities. This criterion is used as one of two means to determine when a traffic noise impact would occur.

Table 9: FHWA Noise Abatement Criteria

Activity Category	L _{eq} (dBA)	Description of Land Use Activity Areas
A	57 (Exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in categories A or B above.
D	--	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.
Note: Primary consideration is given to <u>exterior</u> areas (Category A, B, or C) where frequent human activity occurs. However, <u>interior</u> areas (Category E) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.		

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion: the predicted noise level at a receiver approaches, equals or exceeds the NAC. "Approach" is defined as one dBA below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dBA or above.

Relative criterion: the predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal or exceed the NAC. "Substantially exceeds" is defined as more than 10 dBA. For example: a noise impact would occur at a Category B residence if the existing level is 54 dBA and the predicted level is 65 dBA (11 dBA increase).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area. The FHWA traffic noise modeling software was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 10** and **Appendix A, Figure 3**) that represent the land use activity areas adjacent to the Build Alternative that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 10: Traffic Noise Levels (dBA L_{eq})

Receiver	NAC Category	NAC Level	Existing	Predicted 2031	Change (+/-)	Noise Impact
R1-Park	B	67	57	61	+4	No
R2-School	E	52	42	34	-8	No
R3-Hospital	E	52	42	38	-4	No
R4-House	B	67	59	63	+4	No
R5-House	B	67	58	65	+7	No

As indicated in **Table 10**, the Build Alternative would not result in a traffic noise impact. However, year 2031 traffic noise impact contours were established for future development along the Build Alternative. The 66 dBA noise contour is 120 feet from the ROW line.

Noise associated with the construction of the 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 is 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.

A copy of this traffic noise analysis would be made available to local officials to ensure, to the maximum extent possible, future developments are planned, designed and programmed in a manner that will avoid traffic noise impacts. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

No Build Alternative

Under the No Build Alternative, noise levels would be expected to increase in association with projected increases in traffic volumes, but would be less than the build alternative.

U. Hazardous Waste/Substance

Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), a preliminary investigation was conducted to identify facilities within the project study area which are "at risk" of environmental contamination by hazardous wastes and substances.

Facilities considered likely to be contaminated and within the proposed ROW are categorized as "high risk". An example of "high risk" site is a landfill. Facilities are

categorized as “low risk” if available information indicated that some potential for contamination exists, but the site is not likely to pose a contamination problem to highway construction.

The scope of the preliminary investigation consisted of a review of the TxDOT specified federal and state environmental databases, and the performance of a site reconnaissance on January 9, 2007 to confirm information from the databases and note additional field observations. The database search was conducted on January 8, 2007 and is in compliance with ASTM standards; however, the search radii were modified to conform to the Dallas District’s screening criteria. No land use history, title searches, records/historic aerial photographs/historic maps review, interviews, or consultation with local/state/federal authorities were conducted. The databases and search distances are shown in **Table 11**.

Table 11: Federal and State Environmental Database Search Radius	
Database	Search Radius
National Priorities List (NPL)	1.00 mile
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)	0.50 mile
No Further Remedial Action Planned (NFRAP)	0.50 mile
Resource, Conservation and Recovery Information System (RCRIS) Treatment, Storage and Disposal (TSD)	0.50 mile
RCRIS Corrective Action (CORRACT)	1.00 mile
RCRIS Generators	Build Alternative
Emergency Response Notifications (ERNS)	Build Alternative
Texas Voluntary Cleanup Program (VCP)	0.50 mile
Texas State Superfund	1.00 mile
Municipal Solid Waste Landfill (MSWL) Facilities	0.50 mile
Closed and Abandoned Landfill Inventory (CALI)	0.50 mile
Leaking Petroleum Storage Tanks (LPST)	0.50 mile
Petroleum Storage Tanks (PST)	0.25 mile
Texas Spills List	Build Alternative
Industrial and Hazardous Waste (IHW)	0.25 mile

The database search revealed two facilities in the TxDOT specified databases listed in Table 9 and one facility in a non-TxDOT specified database (Department of Defense). **Table 12** provides a summary of the database search results and **Appendix A, Exhibit 9** shows the locations of the three facilities. Only one of the TxDOT specified databases is shown in **Table 12** because no entries or listings were discovered for the NPL, CERCLIS, NFRAP, RCRIS-TSD, RCRIS-CORRACT, RCRIS Generators, ERNS, VCP, Texas State Superfund, MSWL, CALI, LPST, Texas Spills List, and IHW databases.

Table 12: Hazardous Materials Facilities in the Project Area				
Database	Search Distance	Facilities Within Search Distance	No. of High Risk Facilities	Last Database Update
PST	0.25 mile	2	1	May 2006
Department of Defense (DOD) ¹	1.00 mile	1	0	January 2005
¹ This information originates from the National Atlas of the United States. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.				

The facilities listed in **Table 12** are discussed as follows:

- Tiger Mart 23, 2200 W. Lake Bardwell Road (SH 34), Ennis, Texas (Map ID 1 - PST): This facility is approximately 0.1 mile northeast of the project on adjacent property and up-gradient of the project (**Appendix A, Figure 7 - Photo 4**). ROW would be required near this facility and deep excavation activities associated with construction of the Build Alternative would occur within the vicinity of this facility. According to the database, two nine-year old 20,000-gallon gasoline PSTs and one nine-year old 20,000-gallon diesel PST are in use at this site. The PST tank material/containment is reported as composite (steel with fiberglass-reinforced plastic [FRP] cladding)/single-wall. Pipe material/containment is reported as “not reported/double wall.” Tank pipe release/detection is reported as “not reported/automatic line leak detector (3.0 gallons per hour for pressure piping).” Tank/pipe corrosion protection is reported as “composite tank (steel with FRP external laminate/non-metallic flexible piping.” Spill/overflow protection is reported as automatic flow restrictor valve.

Based on the proximity and gradient of this facility relative to the project, there is the potential that a subsurface release of petroleum hydrocarbons could adversely affect the subsurface conditions of the proposed ROW required by the project and associated project construction activities. Therefore, this site poses a high risk to the Build Alternative ROW acquisition and construction.

- City of Ennis Municipal Airport, 3000 W. Ennis Avenue, Ennis, Texas (Map ID 2 - PST): This facility is reported to be approximately 0.13 mile northeast of the project; however, the PST location is approximately 0.25 mile northeast and down-gradient of the project. According to the database, one 26-year old 10,000-gallon PST is in use at this site. The PST contents are reported as “unknown.” The tank material/containment is reported as “steel/single wall”. Pipe material/containment is reported as “steel/single wall”. Tank pipe release/detection is reported as “not reported/monthly piping tightness test at 2.0 gallons per hour.” Tank/pipe corrosion protection are both reported as “cathodic protection-field installation.” Spill/overflow protection is reported as automatic delivery shutoff valve.

Based on the proximity and gradient of this facility relative to the project, this facility poses a low risk to the Build Alternative ROW acquisition and construction.

- The DOD facility (Map ID 3) consists of USACE property associated with Lake Bardwell and is located 0.57 mile down gradient from the project. This facility is considered to be a low risk to the Build Alternative ROW acquisition and construction.

A visual survey of the project area was conducted on January 9, 2007 to identify the release or threatened release of petroleum products and other hazardous substances. This survey included an observation of properties located along and immediately outside of the project limits. No evidence of surface contamination or hazardous substances such as surface stains, stressed vegetation, or suspect sites such as former gasoline service stations was observed. If any hazardous substance is encountered during construction, it would be handled in compliance with applicable federal, state and local regulations.

The contractor would take appropriate measures to prevent, minimize, and control the spill of fuels, lubricants, and other hazardous materials in the construction staging areas. All spills generated by the contractor would be cleaned immediately and any contaminated soil would be removed from the project and disposed of properly. Designated areas would be identified for spoils disposal and materials storage. The areas would be protected from inflow and runoff. Materials resulting from the destruction of existing roads and structures would be stored in these designated areas. All materials being removed or disposed of by the contractor would be conducted in accordance with local, state, and federal laws, and by the approval of the TxDOT Project Engineer.

During any construction project there exists some potential to encounter contaminated soil or water. Should hazardous materials/substances be encountered, the TxDOT Dallas District Hazardous Materials Section would be notified and steps would be taken to protect personnel and the environment.

No Build Alternative

There would be no impacts to the No Build Alternative from hazardous materials.

V. Indirect Effects

FHWA generally describes the consequences of an action as falling into two broad categories: direct and indirect. Indirect effects are defined as those "...which are caused by an action and are 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). Potential indirect effects could include the following:

- Development and land use changes due to improved access;
- Increases in storm water runoff due to changes in land use and increased development on land surrounding the proposed facility;
- Increased sedimentation of wetlands and streams and decreased water quality due to future development of land adjacent to the new facility;
- Loss of wildlife habitat and decreased habitat value in areas of increased land development spurred by the Build Alternative;
- Impact to cultural resource sites from development projects on private properties that do not require cultural resource investigations because public funds or permits are not required;
- Increased use of parks and recreational areas due to more convenient access provided by the new facility; and
- Stimulation of the local economy from the circulation of construction spending; improved access to employment opportunities, markets, goods, or services such as health and education; an increased work force related to construction; and development stemming from the new facility.

Indirect effects were assessed based on guidance described in the Transportation Research Board's (TRB) *National Cooperative Highway Research Program (NCHRP) Report 25-25, Task 22: Forecasting Indirect Land Use Effects of Transportation Projects* and *NCHRP 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (TRB, 2002). The NCHRP 466 guidance suggests providing a brief summary of existing conditions (notable features) and direct impacts in the study area, identifying and analyzing indirect effects, summarizing and evaluating indirect effects, and discussing the mitigation of indirect effects.

Resource specific indirect impacts were evaluated within the Build Alternative project study area and are discussed in the following sections. Much of the indirect effects discussion is qualitative due to limited data availability; however, quantitative information is provided where possible.

Resources Affected

The Build Alternative would not have substantial adverse impacts on the following resources in the project area: community cohesion, public facilities and services, environmental justice populations, Section 4(f) and 6(f) properties, groundwater, threatened/endangered species, historical sites, archeological sites, aesthetics, and air quality. The Build Alternative would be designed to adhere to applicable regulations, policies, mitigation requirements, standards, and guidelines. This analysis focuses on resources that are impacted by the Build Alternative. The following resources were identified for indirect impacts analysis:

- Regional and Community Growth as Related to Land Use
- Economic Conditions
- Floodplains
- Waters of the U.S.
- Water Quality
- Vegetation and Wildlife Habitat
- Agricultural land
- Air Quality

Study Area

Potential indirect effects associated with the Build Alternative were examined within a four-mile wide study area centered along US 287. The study area extends from Business US 287 to IH 45. Discussions with City of Ennis planning officials revealed that no indirect effects resulting from new development associated with US 287 are anticipated to occur beyond two miles of the roadway. The indirect effects study area totals approximately 24,598 acres.

Indirect Effects on Regional and Community Growth as Related to Land Use

Notable Features

US 287, within the project limits, is located entirely within the City of Ennis. The area within the immediate vicinity of the project is primarily vacant and undeveloped with some commercial, institutional, parkland, and industrial facilities. This area has historically been undeveloped with limited established development.

Regional and community growth is expected to continue along present trends. Population estimates from the U.S. Census show that the population of Ellis County grew from 85,167 people in 1990 to 111,360 people in 2000. This represents a growth rate of 30.8% in 10 years. From 1990 to 2000, the population for the City of Ennis has grown from 13,883 people to 16,045 people, representing a growth rate of 15.6% in 10 years. It is projected that the population for the City of Ennis will grow to 28,100 people by 2020 and 37,922 by 2030 (NCTCOG).

The US 287 project corridor is primarily zoned as low-density residential by the City of Ennis, with the remaining zoning for parks and open spaces, retail, commercial, medical, institutional uses, and agricultural land. Currently, development activities are occurring without the proposed widening of US 287; however, City of Ennis officials revealed that the Build Alternative would have an even greater influence on the City's regional and community growth. The improved access resulting from the Build Alternative would attract new development and lead to economic growth for the area as new residents commute within the region.

Direct Effects of the Build Alternative

Direct land use impacts from the Build Alternative would consist of approximately 24.2 acres of land to be converted to public highway ROW.

Identification of Indirect Effects on Regional and Community Growth as Related to Land Use

The City of Ennis' *Thoroughfare Plan* and *Comprehensive Plan* both illustrate the Build Alternative as well as other planned transportation improvements for future construction. According to City officials, US 287 has been instrumental in the development of the 300-acre Ennis Industrial Rail Park, which has approximately 500 additional acres ready for development. The City of Ennis is currently working with six industrial prospects that would occupy this space. In addition, US 287 played a major role in the relocation and development of the 65-acre Ennis Regional Medical Center. The proposed 104-acre Westbar Commons development would abut the Ennis Regional Medical Center and consist of medical office buildings, a retirement center, a daycare facility, a hotel, restaurants, and retail establishments. A 185-acre commercial and retail development is proposed southwest of the Ennis Regional Medical Center on the south side of US 287. The 223-acre Ennis Independent School District (EISD) educational complex has been constructed on SH 34 (W. Lake Bardwell Drive) immediately adjacent to US 287. This complex consists of the 123-acre Ennis High School facility and includes plans for two additional schools that would occupy approximately 100 undeveloped acres at the complex. The proposed 84-acre Arbors Development is just northeast of the EISD educational complex and would consist of 309 single-family lots. A 472-acre private industrial park is proposed on the south side of US 287 west of IH 45. Another private industrial park and associated development totaling 593 acres is proposed on the east side of IH 45 near its intersection with US 287.

Three roadway extensions are proposed to provide mobility for the existing and anticipated development within the US 287 corridor. The proposed approximate 2.25-mile long West Brown Street extension would connect West Brown Street to US 287. This roadway would require approximately 16.5 acres of ROW. The proposed approximate 3.8-mile long Valek Road extension would provide a connection from IH 45 to Lakeview Drive south of US 287. This roadway would require approximately 27.5 acres of ROW. The proposed approximate 1.9-mile long FM 85 extension would provide a connection from IH 45 to US 287. This roadway would require approximately 13.8 acres of ROW.

It is anticipated that the US 287 Build Alternative would serve as a direct means of connecting existing and proposed development along the US 287 corridor to other areas of Ennis, as well as to other major traffic corridors (e.g. IH 45). According to City's growth patterns, the creation of jobs would create a need for single and multi-family housing. The area surrounding US 287 is prime development land for the anticipated population growth.

In summary, the following recently completed or reasonably foreseeable actions have been identified as indirect effects of the Build Alternative:

- Ennis Industrial Rail Park – 500 acres
- Ennis Regional Medical Center – 65 acres
- Westbar Commons (medical office buildings retirement center, a daycare facility, a hotel, restaurants, and retail establishments – 104 acres

- Commercial and retail development – 185 acres
- Ennis Independent School District (EISD) educational complex – 223 acres
- Arbors Development – 84 acres
- Private Industrial Park (west of IH 45) – 472 acres
- Private Industrial Park (east of IH 45) – 493 acres
- West Brown Street extension – 16.5 acres
- Valek Road extension – 27.5 acres
- FM 85 extension – 13.8 acres

The acreage of indirect land use effects under the Build Alternative totals approximately 2,284 acres. **Figure 10** shows the indirect effects on land use under the Build Alternative.

Results of Analysis of Indirect Effects on Regional and Community Growth as Related to Land Use

The results of the data analysis indicate that the indirect effects of the Build Alternative would impact approximately 2,284 acres of undeveloped land in the indirect effects study area. Some of this development has been constructed or is currently under construction in anticipation of the completion of the project. The City of Ennis has zoned the undeveloped land for residential, parks and open spaces, retail, commercial, medical, and institutional uses.

Under the No Build Alternative, new development along US 287 would still occur, but at a lesser extent. There would be no new frontage roads along the north and south sides of US 287 to attract new commercial development. Access to some of the proposed residential subdivisions, institutional, and medical facilities in the area would be limited. Mobility in this portion of Ennis would be constrained.

The Ennis Industrial Rail Park expansion would be scaled back from 500 acres to approximately 380 acres. The 65-acre Ennis Regional Medical Center has already been constructed; however, the proposed 104-acre Westbar Commons development that would abut the Regional Medical Center and the 185-acre commercial and retail development southwest of the Regional Medical Center would not be constructed. Approximately 123 acres of the EISD educational complex have been developed; however, there would be no additional schools proposed at the complex and the additional 100 acres of the complex would not be developed. The proposed 84-acre Arbors Development northeast of the EISD educational complex, the proposed 472-acre private industrial park on the south side of US 287 west of IH 45, and the 593-acre proposed private industrial park and associated development on the east side of IH 45 near its intersection with US 287 would not be constructed.

The proposed West Brown Street, Valek Road, and FM 85 extensions are dependent on proposed development associated with the Build Alternative. These roadway extensions would not occur under the No Build Alternative.

In summary, the following actions have been identified as indirect effects of the No Build Alternative:

- Ennis Industrial Rail Park – 380 acres
- Ennis Regional Medical Center – 65 acres
- Ennis Independent School District (EISD) educational complex – 123 acres

The acreage of indirect land use effects under the No Build Alternative totals approximately 568 acres. **Figure 11** shows the indirect effects on land use under the No Build Alternative.

Mitigation of Indirect Effects on Regional and Community Growth as Related to Land Use

The City of Ennis has jurisdiction over mitigation activities for indirect impacts to regional and community growth, and as such, could potentially forward some or all mitigation responsibility to the individual developers. Land use planning practices such as the ones that are currently being implemented by the City of Ennis (e.g. zoning) would help manage the indirect impacts on regional and community growth.

Indirect Effects on Economic Conditions

Notable Features

Increased development along US 287 within the project limits began several years ago in anticipation of improvements to US 287. The City's *Comprehensive Plan* identifies several factors that are influencing Ennis' population and economic growth:

- Ennis is easily accessible to the Dallas/Fort Worth metropolitan area where development activity continues to increase. The growth and development of surrounding cities will contribute to Ennis' growth potential.
- Ennis holds tremendous potential for development due to the high cost of land in the Dallas/Fort Worth metropolitan area. As a result, the high prices for both housing and industrial sites are leading consumers and manufacturers to seek new, less expensive sites in surrounding communities.
- Ennis maintains an industrial climate due to the influence of the Southern Pacific Railroad which traverses the city. Industrial land served by rail is scarce in the Dallas/Fort Worth metropolitan area, thus increasing the potential for development in Ennis.

Direct Effects of the Build Alternative

During construction of the Build Alternative, there could potentially be a short-term economic gain to the area due to new job opportunities and a temporary boost to the local economy. Long-term benefits would accrue to roadway users, including occupants of abutting property due to ease of access and increased capacity. They would benefit economically from various design improvements, which would reduce vehicle-operating costs and improve operations.

Identification of Indirect Effects on Economic Conditions

The Ennis Industrial Rail Park is directly served by US 287 and is a vital conduit to the Dallas-Fort Worth metropolitan area. The Ennis Industrial Rail Park currently hosts eight major industries employing approximately 2,000 people. The City of

Ennis has invested approximately \$50 million in the purchase of the land for the industrial park as well as the placement of the infrastructure (streets, drainage, water, and sewer) to serve the park. In addition to the current eight major industries, the City of Ennis Economic Development Corporation is working with six major industrial prospects that are anticipated to bring \$2.5 to \$3 billion in construction value and employ up to 3,000 people within the next few years. These industries would be major employers in the City of Ennis and each would directly depend on US 287 for access to their investments.

In addition, US 287 played a major role in the relocation and development of the Ennis Regional Medical Center, a new \$35 million facility that employs approximately 300 people. A new doctor's medical office building is also adjacent to US 287 and will house fifteen physicians and their staff. There are two educational facilities (Ennis Junior High and Ennis High School) that have been constructed immediately adjacent to US 287. These facilities serve approximately 1,500 students and employ approximately 100 staff.

Other proposed generators of property value, employment, and tax revenue in the indirect effects study area include the Westbar Commons development, a commercial and retail development, two additional schools at the EISD educational complex, the proposed Arbors Development single-family residential subdivision, a private industrial park west of IH 45, and an industrial park and associated development east of IH 45.

Results of Analysis of Indirect Effects on Economic Conditions

Development activities, along with their resulting employment opportunities and tax revenues, are occurring without the proposed Build Alternative; however, City of Ennis officials revealed that the Build Alternative would have an even greater influence on the City's overall growth in sales of goods and services, employment, land values, and tax revenues. The City's anticipated total revenue in the study area from growth is \$3.05 billion, and the City expects more than 3,400 jobs resulting from new development. According to interviews conducted with City officials, the City's planning efforts are largely made with the US 287 Build Alternative in mind. Furthermore, the Build Alternative is vital to the economic growth of the City and the quality of life the City plans to offer their citizens.

Under the No Build Alternative, the overall growth in sales of goods and services, employment, land values, and tax revenues in the project study area would be less than that under the Build Alternative. As discussed in the Indirect Effects on Regional and Community Growth as Related to Land Use section, a number of proposed developments would not be constructed under the No Build Alternative. The City of Ennis estimates that under the No Build Alternative, the City could potentially lose up to 2,000 new jobs creations and as much as \$2.5 billion in construction and tax revenue.

Mitigation of Indirect Effects on Economic Conditions

Currently, the City of Ennis US 287 Build Alternative works to promote economic growth within the current city limits and more specifically within the four-mile wide study area centered on the project alignment.

The City of Ennis has jurisdiction over mitigation activities for indirect impacts to economic development. It is not anticipated that the Build Alternative would have an adverse effect on economic conditions in the study area. If adverse impacts were to occur, joint economic development and redevelopment efforts on the part of the City of Ennis and local businesses would likely be the most effective strategy for mitigating the adverse impacts.

Indirect Effects on Floodplains

Notable Features

FIRM map numbers #48139C0215 D (Revised January 20, 1999) and #48139C0220 D (Revised January 20, 1999) show that a floodplain associated with Little Mustang Creek and a tributary of Mustang Creek is within the project limits. This floodplain is classified as "Zone A" (Special Flood Hazard Areas Inundated by 100-Year Flood with no base flood elevations determined). The floodplains within the indirect effects study area total approximately 4,546 acres.

Direct Effects of the Build Alternative

The Build Alternative would cross the floodplain associated with Little Mustang Creek and a tributary of Mustang Creek. The Build Alternative would not adversely affect the floodplain. There would be no effect on the status of the NFIP and no additional need for floodway or floodplain ordinance amendments.

Results of Analysis of Indirect Effects on Floodplains

Potential indirect effects on floodplains from roadway projects include increases in storm water runoff due to additional roadway pavement and induced development on land surrounding the proposed facility. Excessive storm water runoff has the potential to increase the flood or drainage hazards to others, or create unstable floodplain conditions that are susceptible to erosion.

The Build Alternative would contain approximately 20 acres of additional impervious concrete surface relative to the existing roadway facility. As discussed in the Indirect Regional and Community Growth Impacts section, approximately 2,284 acres of induced development is projected within the indirect effects study area. This development would not occur within any floodplains; however, the storm water runoff from impervious surfaces associated with the induced development would impact the floodplains. Impervious surface acreage was determined by using an aerial photograph to measure the impervious surfaces (structures, driveways, parking lots, and streets) of similar developments in the City of Ennis, calculating an average percentage of impervious surfaces relative to open ground (70 percent), and multiplying that percentage by acres of development in the indirect effects study area. Using a 70 percent impermeable surface factor, it is anticipated that the induced development resulting as an indirect effect of the Build Alternative would add approximately 1,599 acres of impermeable surfaces to the indirect effects study area.

The amount of storm water runoff that would impact floodplains from the induced development would be dependent upon the severity and duration of the precipitation event, type of soil, water holding capacity of the soil, permeability of the soil, and the

distances of the floodplains relative to the storm water outfalls. Hydrologic modeling would be required to estimate the volume of storm water that would impact the floodplains, which is beyond the scope of this floodplain indirect effects analysis. Therefore, the acreage of impervious surfaces was the unit of measurement used to quantify the effects on floodplains.

Under the No Build Alternative, storm water runoff from impervious surfaces associated with new development would still impact floodplains, but to a lesser extent than under the Build Alternative. Approximately 568 acres of development is anticipated to occur in the indirect effects study area under the No Build Alternative. Of the 568 acres, approximately 398 acres would consist of impermeable surfaces as determined by using a 70 percent impervious surface factor.

Mitigation of Indirect Effects on Floodplains

Detention ponds could mitigate the indirect effects to floodplains in the project area resulting from increased surface runoff from new land development. Detention ponds are designed to temporarily store a portion of surface water runoff during storm events and slowly release the water over a period of time. Detention ponds are commonly used to control flooding.

The local floodplain administrator (NFIP coordinator) and FEMA would have jurisdiction over mitigation activities for indirect impacts to floodplains, and as such, would determine the mitigation responsibilities of TxDOT and the individual developers.

Indirect Effects on Waters of the U.S.

Notable Features

Little Mustang Creek and two tributaries of Mustang Creek are within the project limits. These waters of the U.S. are regulated by the USACE under the authority of Section 404 of the Clean Water Act. A wetland delineation was conducted in accordance with the USACE 1987 Corps of Engineers *Wetlands Delineation Manual*. Results of the wetland delineation found one wetland adjacent to Little Mustang Creek. The wetland is an intermittently inundated, emergent palustrine wetland located within the 100-year floodplain of Little Mustang Creek. There are no wetlands present at the remaining water crossings or anywhere else along the project.

No data is available to quantify the acreage of streams in the RSA; however, stream lengths in the indirect effects study area can be measured using aerial photographs and topographic maps, and the acreage of wetlands can be determined from National Wetland Inventory (NWI) maps. Therefore, linear mile is the measurement unit used for determining stream impacts and acres is the measurement unit used for determining wetland impacts. Based on aerial photographs, topographic maps, and NWI maps, there are approximately 53 linear miles of streams and approximately 624 acres of wetlands in the indirect effects study area.

Direct Effects of the Build Alternative

The Build Alternative would temporarily impact up to 0.16 acre of wetlands adjacent to Little Mustang Creek during the construction of the proposed bridge for the US 287 northbound main lanes. The Build Alternative would also require a culvert extension that would impact 0.0014 acre of a tributary of Mustang Creek.

Results of Analysis of Indirect Effects on Waters of the U.S.

The potential indirect effects on waters of the U.S. and wetlands from roadway projects include fill and degradation from roadway-induced development. The 2,284 acres of induced development under the Build Alternative has the potential to impact up to approximately 5.6 linear miles of streams and 19.5 acres of wetlands. The USACE has regulatory authority regarding the discharge of fill material into waters of the U.S. and has the enforcement power to stop unauthorized discharges. Impacts to waters of the U.S. require the authorization of a Section 404 permit by the USACE and any development that would discharge fill into waters of the U.S. would be required to obtain USACE authorization.

Under the No Build Alternative, waters of the U.S. would still be impacted from new development, but to a lesser extent than under the Build Alternative because development growth in the study area would be stunted. The 568 acres of indirect land use effects under the No Build Alternative have the potential to impact up to approximately 1.3 linear miles of streams and 6.5 acres of wetlands.

Mitigation of Indirect Effects on Waters of the U.S.

Avoidance or minimization of impacts to waters of the U.S. and wetlands should be performed during the development design phase so that only the least amount of impacts occurs. Mitigation is only conducted when impacts to waters of the U.S. and wetlands cannot be avoided. Typical mitigation for impacts to waters of the U.S. includes the construction of mitigation areas or purchasing credits from a mitigation bank. Mitigation is frequently conducted as a one of the requirements for obtaining a Section 404 permit. The USACE decides what the ratio of the mitigation area would be relative to the acreage of impacts to waters of the U.S. A typical mitigation ratio is three times the amount of acreage impacted, while the minimum mitigation ratio is one time the amount of acreage impacted (i.e. 1:1 ratio). A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or in certain circumstances, preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. Mitigation banks are used in situations where the construction of a mitigation area is not practical. Mitigation banks are a form of "third-party" compensatory mitigation, in which the responsibility for compensatory mitigation implementation and success is assumed by a party other than the permittee. The USACE would have jurisdiction over mitigation activities for indirect impacts to waters of the U.S., and as such, would determine the mitigation responsibilities of the developers.

Indirect Effects on Water Quality

Notable Features

The Build Alternative crosses Little Mustang Creek and two tributaries of Mustang Creek. Little Mustang Creek and the two tributaries of Mustang Creek flow into Lake Bardwell (Segment 0815) and then into Chambers Creek (Segment 0814).

Direct Effects of the Build Alternative

Approximately 44.2 acres of land would be disturbed during construction of the Build Alternative. The greatest potential for direct impacts to water quality as a result of the Build Alternative would be sediment runoff from precipitation events during construction. Storm water runoff from construction sites can also include pollutants other than sediment such as phosphorous, nitrogen, pesticides, petroleum derivatives, construction chemicals (e.g. concrete sealant) and solid wastes (trash, plastic floatables) that may become mobilized when land surfaces are disturbed.

After construction, the Build Alternative would add approximately 20 additional acres of impervious surfaces to the indirect effects study area.

Results of Analysis of Indirect Effects on Water Quality

The 2,284 acres of induced development that would result as an indirect effect of the Build Alternative could impact water quality during and after construction of the developments. Storm water runoff from 2,284 acres of disturbed ground during construction would primarily consist of sediments, but could also contain phosphorous, nitrogen, pesticides, petroleum derivatives, construction chemicals, and solid wastes. After construction is completed, there is still the potential that water quality would be impacted by the developments. According to the Center for Watershed Protection, storm water runoff from urban development typically contains suspended solids, nitrogen, phosphorus, bacteria (fecal coliforms), petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides. As discussed in the Indirect Effects on Floodplains section of this report, the 2,284 acres of induced development would add approximately 1,599 acres of impermeable surfaces to the indirect effects study area as determined by using a 70 percent impermeable surface factor.

The amount of storm water runoff from induced development that would impact water bodies would be dependent upon the severity and duration of the precipitation event, type of soil, water holding capacity of the soil, permeability of the soil, and the distances of the water bodies relative to the storm water outfalls. Hydrologic modeling would be required to estimate the volume of storm water that would impact the water bodies. Storm water sampling and chemical analysis would be required to determine the types and concentrations of pollutants in the storm water. Hydrologic modeling, storm water sampling, and chemical analysis are beyond the scope of this water quality indirect effects analysis. Therefore, typical storm water pollutants were discussed in a qualitative manner and the acreage of impervious surfaces was the unit of measurement used to quantify the effects on water quality.

Under the No Build Alternative, pollutants in storm water runoff during and after the construction of developments would still impact water bodies, but to a lesser extent

than under the Build Alternative. Approximately 568 acres of development and associated ground disturbance during construction is anticipated to occur in the indirect effects study area under the No Build Alternative. Of the 568 acres, approximately 398 acres would consist of impermeable surfaces as determined by using a 70 percent impervious factor.

Mitigation of Indirect Effects on Water Quality

The implementation of water pollution abatement control measures such as BMPs used to address erosion, sedimentation, and post-construction TSS control would help to mitigate impacts to water quality during and after the construction of the Build Alternative and associated induced development. Providing or enhancing vegetative buffers along streams and ponds would provide some filtration to storm water runoff and help to mitigate impacts to water quality.

The City of Ennis has special requirements for developments constructed within the Lake Bardwell, Lake Clark, or Jaycee Park Lake watersheds. The indirect effects study area is primarily within the Lake Bardwell watershed. The special requirements were established to help minimize soil erosion before and after the construction of roads and buildings. Some of the City's special requirements are listed as follows:

- Subdivision of land on steep slopes in the watersheds will be considered if predictable runoff rates do not exceed runoff rate levels of the previous land use.
- Storm water runoff shall not result in the lowering of the water quality in terms of fecal coliform, lead, total organic carbon, total nitrogen, total phosphorus, hydrocarbons-hexane extract, and suspended solids of the subject tract runoff relative to the quality level expected under the criteria which the alternative replaces.
- Roadways shall not be constructed on slopes greater than 25 percent and the roadway clearing width shall not exceed twice the roadway surface width or the width of the ROW, whichever is less.
- For building locations, no cut on any lot will be greater than four feet except for structural excavation.
- No building tracts can contain land within a 100-year floodplain, land within a drainage or utility easement, land on a slope greater than 35 percent, and land containing water bodies such as streams, ponds, or detention basins.

At the state level, the TCEQ has jurisdiction over mitigation activities for impacts to water quality. Developers are required to comply with the TPDES General Permits for Construction Activities requirements that are administered by the TCEQ. In addition, the TCEQ monitors the water quality of water bodies in Texas, prepares reports that describe the status of the waters based on historical data on surface water and groundwater quality, identifies water bodies that are not meeting standards set for their use, and prepares and implements remedial action plans for those water bodies that are not meeting standards set for their use.

Indirect Effects on Vegetation and Wildlife Habitat

Notable Features

The TPWD's 1984 *Vegetation Types of Texas* map shows that the Build Alternative is located within the physiognomic region classified as "other native and/or introduced grasses". According to the TPWD *Texas Natural Regions* map, the Build Alternative is within the Blackland Prairies ecological region.

Dominant plant species that exist along the proposed ROW within the project area consist of bermudagrass (*Cynodon dactylon*), common sunflower (*Helianthus annuus*), goldenrod (*Solidago* sp.), saw-tooth greenbrier (*Smilax bona-nox*), little bluestem (*Schizachyrium scoparium*), annual ragweed (*Ambrosia artemisiifolia*), sugarberry (*Celtis laevigata*), mesquite (*Prosopis glandulosa*), and Eastern red cedar (*Juniperus virginiana*).

Based on site reconnaissance of the existing and proposed ROW, the Build Alternative would have no effect on any of the threatened or endangered species with the potential to occur in Ellis County or their habitats except for the Texas horned lizard and Timber/Canebrake rattlesnake, both of which have the potential to be in the project study area (see **Table 5**).

The land within the indirect effects study area totals 24,597 acres and consists of 11,730 acres of pasture and open land, 2,176 acres of upland woodlands, 6.5 acres of riparian vegetation, and 133 acres of bottomland hardwoods.

Direct Effects of the Build Alternative

The Build Alternative would impact 114.3 acres of existing ROW consisting of 113.3 acres of maintained herbaceous vegetation and 1.0 acre of upland woodlands. Additionally, the Build Alternative would require 24.2 acres of proposed ROW consisting of 20.8 acres of pasture and open land, 0.3 acre of fence line trees, and 3.1 acres of upland woodlands. The direct impacts of the Build Alternative on vegetation total 138.5 acres.

The trees range from six feet to 30 feet in height and three to 10 inches diameter at breast height (dbh). The Build Alternative would also require the removal of one 30-inch dbh sugarberry tree on the east side of US 287, north of the SH 34 intersection.

Results of Analysis of Indirect Effects on Vegetation and Wildlife Habitat

Approximately 2,284 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the Build Alternative. The induced development has the potential to impact approximately 2,031 acres of pasture and open land and 253 acres of upland woodlands.

Under the No Build Alternative, vegetation and wildlife habitat would still be impacted from new development, but to a lesser extent than under the Build Alternative. Approximately 568 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the No Build Alternative. The development has the potential to impact approximately 536 acres of pasture and open land and 32 acres of upland woodlands.

Mitigation of Indirect Effects on Vegetation and Wildlife Habitat

Mitigation for the direct impacts to 3.1 acres of upland woodlands would be conducted. The specific location of the mitigation area would be determined at a later date.

Incorporating parks, open spaces, and riparian corridors around and within developed areas would provide wildlife habitat and shelter. Planting these areas with native fruit or nut-bearing trees and shrubs, and native grain-bearing grasses would provide food for wildlife, and would help to mitigate impacts to habitat used by wildlife.

Indirect Effects on Agricultural land

Notable Features

According to the City of Ennis 2006 Zoning Map, portions of the area surrounding the Build Alternative are currently zoned as Agricultural District. There are approximately 11,730 acres of agricultural land in the indirect effects study area. The agricultural land consists of pasture and open land and was previously discussed in the Indirect Effects on Vegetation and Wildlife Habitat section of this report.

Direct Effects of the Build Alternative

The Build Alternative would require 24.2 acres of proposed ROW of which 20.8 acres are pasture and open land. Some tracts of land that surround the Build Alternative are currently zoned Agricultural District. In accordance with the Farmland Protection Policy Act (FPPA) of 1981, the additional ROW was scored using U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Form AD-1006. The resulting score was 71, which is below the minimum of 160 points requiring further coordination with NRCS. The regulation implementing the FPPA (7 CFR 658.4(c)(2)) states "Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated." No further coordination with the NRCS is required.

Results of Analysis of Indirect Effects on Agricultural land

Approximately 2,284 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the Build Alternative. The induced development would impact approximately 2,031 acres of pasture and open land.

Under the No Build Alternative, pasture and open land would still be impacted from development, but to a lesser extent than under the Build Alternative. Approximately 568 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the No Build Alternative. The development would impact approximately 536 acres of pasture and open land.

Mitigation of Indirect Effects on Agricultural land

It is not practical to mitigate for the loss of agricultural land without bringing non-farmed land into production. This concept is not likely to be economically feasible.

Indirect Effects on Air Quality

Notable Features

The Build Alternative is in Ellis County, which is part of the US EPA designated eight-hour, nine county non-attainment area for the pollutant ozone.

Direct Effects of the Build Alternative

It is not anticipated that the Build Alternative would have adverse effects on air quality. The proposed action's traffic projection does not exceed 140,000 vehicles per day for either the existing or design year and thus is exempt from a Traffic Air Quality Analysis for carbon monoxide because previous analyses of similar projects did not result in a violation of NAAQS.

Because the proposed action's traffic projection does not exceed 140,000 vehicles per day for either the existing or design year, it also has a low potential for adverse MSAT effects. The EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, acrolein, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent.

The DFW region is currently in attainment for all criteria pollutants, with the exception of ozone. The nine county non-attainment area has an attainment date of June 15, 2010. It should be noted that the SIP associated with the new (2004) 8-hour ozone is not due until three years after EPA designates an area in non-attainment for the new standard. The proposed project is consistent with the 2030 MTP (*Mobility 2030: The Metropolitan Transportation Plan*) that was found to conform to the ozone SIP for DFW. The SIP is required by the Clean Air Act Amendments to improve regional air quality for ozone. Although the DFW region remains in non-attainment for ozone, the number of daily exceedances of the federal standards for ozone has decreased within the past decade. There have been year-to-year fluctuations in ozone levels; however, the ozone trend continues to show improvement. This trend is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG's regional clean air initiatives.

Results of Analysis of Indirect Effects on Air Quality

The 2,284 acres of induced development within the indirect effects study area would include residential, industrial, commercial, retail facilities, and associated transportation projects. The new development would increase air emissions from point sources (large industrial facilities), area sources (smaller businesses such as gas stations, paint and body shops, bakeries), on-road mobile sources (motorized vehicles), and non-road mobile sources (lawn mowers, construction equipment).

Under the No Build Alternative, air quality would still be impacted from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with new development, but to a lesser extent than under the Build Alternative. Approximately 568 acres of development is anticipated to occur in the indirect effects study area under the No Build Alternative.

Mitigation of Indirect Effects on Air Quality

The effect of air emission increases from development serving as point sources, area sources, on-road mobile sources, and non-road mobile sources would be minimized as these forms of development are required to comply with state and federal regulations, mandated and enforced by the EPA and TCEQ. These regulations are designed to ensure that growth and urbanization do not prevent regional compliance with the ozone standard or threaten the maintenance of the other air quality standards.

W. Cumulative Impacts

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” (NEPA, Section 1508.7, 1978). Cumulative impacts tend to be less defined than indirect impacts and are therefore more difficult to quantify.

In accordance with TxDOT’s *Guidance on Preparing Cumulative Impacts Analyses* (December, 2006), this analysis follows the following recommended approach:

1. Identify the affected resources
2. Define the study area for each resource
3. Describe the current health and historical context of each resource
4. Identify direct impacts and indirect effects that may contribute to cumulative impacts
5. Identify other past, present and reasonably foreseeable future actions that may contribute to cumulative impacts on the identified resources
6. Assess the potential cumulative impacts to each resource
7. Report the results
8. Discuss mitigation issues for adverse impacts

The resources subject to indirect and cumulative impacts (regional and community growth as related to land use, economic conditions, floodplains, waters of the U.S., water quality, vegetation and wildlife habitat, and farmlands) are discussed below in separate sub-sections. Steps 1, 2, and 5 are discussed collectively for the affected resources. Steps 3, 4, 6, 7, and 8 of the cumulative impacts evaluation process are discussed separately within each resource sub-section.

Step 1 - Identification of Affected Resources

In general, cumulative impacts (both beneficial and adverse) associated with urbanization to social, economic, and environmental resources would continue to follow existing trends, with or without the construction of the Build Alternative. However, according to the City of Ennis, development would proceed more slowly without implementation of the Build Alternative. Implementation of the Build Alternative, while not causing substantial cumulative effects itself, would increase the incentive for residential and commercial development in specific areas along and near the alignment. The cumulative effect of urbanization to environmental resources would be to lessen the amount of natural land and land forms in the area. In turn, some natural vegetation and wildlife communities would be lost or relocated.

If a project does not cause direct impacts or indirect effects on a resource, it will not contribute to a cumulative impact on that resource. This analysis focuses on resources that are affected by the Build Alternative and considered to be at risk, even though the project's direct and indirect impacts may be relatively minor. The resources are listed as follows:

- Regional and Community Growth as Related to Land Use
- Economic Conditions
- Floodplains
- Waters of the U.S.
- Water Quality
- Vegetation and Wildlife Habitat
- Agricultural land
- Air Quality

Step 2 - Resource Study Areas

The Resource Study Area (RSA) for each resource was chosen based on the determination of the potential indirect effects stemming chiefly from changes in land use occurring along US 287, as well as other past, present, and reasonably foreseeable public and private actions that may contribute to cumulative effects.

The RSAs have both temporal and geographic components. The temporal component of an RSA is the timeframe in which effects to resources are expected to occur, which for all RSAs in this analysis is 1990 to 2020. Extending the timeframe forward to 2020 for cumulative impacts matches the City's *Comprehensive Plan* and it provides sufficient data to complete a qualitative or quantitative analysis. Extending the timeframe back to 1990 incorporates an important decennial U.S. Census to account for trends in population growth and demographic change; includes a substantial period of the business cycle (since the last major economic growth occurred in 1990's), which is also a determinant in regional and community growth; and incorporates the US 287 Bypass, which was constructed in or about 1991 - 1992. This thirty-year period should also be sufficient to capture cumulative

impacts resulting from those actions for which construction has been initiated, but not yet completed.

The geographic area of each RSA would vary from resource to resource. **Table 13** lists the affected resources and their corresponding RSAs. Maps of the RSAs are shown in **Figures 12 through 14**.

Table 13: Resource Study Areas for Affected Resources	
Affected Resource	Resource Study Area
Regional and Community Growth as Related to Land Use	City of Ennis Extra-territorial Jurisdiction
Economic Conditions	
Floodplains	Sub-basins of Waxahachie Creek and Walker Creek
Waters of the U.S.	
Water Quality	
Vegetation and Wildlife Habitat	
Agricultural land	
Air Quality	9-county Ozone Non-attainment Area for the DFW Metropolitan Area

Step 5 - Other Past, Present, and Reasonably Foreseeable Actions

The other past, present, and reasonably foreseeable actions discussed in this section of the EA could contribute to the cumulative effects on the resources shown in **Table 13**. Data collection associated with other past, present, and reasonably foreseeable actions included literature reviews; analyses of demographic and economic records; examinations of City of Ennis land use maps; aerial photograph review; and interviews with City of Ennis Planning staff. The City of Ennis's *Future Land Use Plan* shows the Build Alternative and indicates that residential, retail, commercial, light industrial, and heavy industrial uses are the predominant land use activities preferred for the US 287 corridor. Although the *Ennis Thoroughfare Plan* illustrates the Build Alternative as well as other planned transportation improvements for future construction, interviews conducted with City officials revealed that at the present time, there are a limited number of past and present projects or "reasonably foreseeable" development plans within the project area.

The results of the data analysis revealed the following existing or planned development projects within the City's ETJ limits or drainage sub-basins of Waxahachie Creek and Walker Creek that are considered other past, present, and reasonably foreseeable actions:

- Ennis Industrial Rail Park: A 300-acre prime industrial park that currently houses the following industries:
 - Sterilite Corporation – The number one manufacturer of plastic house wares.
 - JTEKT – Major manufacturer and provider for the steering systems placed in Toyota vehicles.

- ASMO – Major manufacturer and provider for wind shield washer systems placed in Toyota vehicles.
- CVS Pharmacy Distribution Center - Services all CVS Pharmacy retail stores in the south west region of the country.
- National Envelope Corporation – The number one manufacturer of envelopes in the world.
- Lowe's Flatbed Distribution Center – Services all Lowes retail outlets in the southwest region of the country.
- Alliance Data Systems – Employs 500 people and is the number two customer service center in the entire United States.
- Independent Order of Odd Fellows Retirement Center: A 100-acre retirement center located at 2302 S. Oak Grove Road.

Existing and planned transportation improvements included in the City's Thoroughfare Plan consist of the following:

- US 287 Bypass Phase I from US 287 to IH 45: Completed in 1991-1992, this facility currently occupies approximately 240 acres.
- US 287 Bypass improvements from south of SH 34 to IH 45. The ROW requirements for proposed improvements to US 287 south of the Build Alternative's southern terminus are estimated to be approximately 25 acres.
- Extend and straighten Preston Street to create a north-south connection through Ennis. Based on the existing ROW width of Preston Street, this facility would require approximately nine acres of additional ROW.
- Construct a railroad overpass at an appropriate location. The ROW requirements are estimated to be approximately five acres.

The results of the data analysis indicate that other past, present, and reasonably foreseeable actions total approximately 679 acres. These other past, present, and reasonably foreseeable actions would displace approximately 679 acres of undeveloped land within the City's 49,651-acre ETJ RSA and approximately 665 acres of undeveloped land within the 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA.

The cumulative impacts on air quality from the Build Alternative and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP (*Mobility 2030: The Metropolitan Transportation Plan*) and the TIP. The proposed project and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the SIP.

Discussion of Cumulative Impacts by Resource (Steps 3, 4, 6, 7, and 8)

Regional and Community Growth as Related to Land Use

Step 3 - Resource Health and Historical Context

Population estimates from the U.S. Census show that the population of Ellis County grew from 85,167 people in 1990 to 111,360 people in 2000. This represents a growth rate of 30.8% in 10 years. From 1990 to 2000, the population for the city of Ennis has grown from 13,883 people to 16,045 people, representing a growth rate of 15.6% in 10 years. It is projected that the population for the City of Ennis will grow to 28,100 people by 2020 and 37,922 by 2030, while the population of Ellis County will grow to 329,476 people in 2020 and 448,588 people in 2030 (NCTCOG). Based on the experienced population growth, the health of regional and community growth is considered “improving”.

Step 4 - Direct and Indirect Impacts

Direct land use impacts from the Build Alternative would consist of approximately 24.2 acres of land to be converted to public highway ROW. Indirect land use impacts resulting from implementation of the Build Alternative would consist of approximately 2,284 acres of induced development. The direct and indirect land use impacts total approximately 2,308 acres.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include land use and development impacts associated with regional and community growth as related to access to the Build Alternative in combination with the effects of other reasonably foreseeable public and private actions. The indirect and cumulative impacts land use data were obtained from correspondence and discussions with the City of Ennis. In general, the City's 49,651-acre ETJ limits were considered a RSA sufficient to capture most cumulative impacts of the Build Alternative on regional and community growth as it is related to land use. The cumulative impacts of land use and development in the RSA under the No Build Alternative were also determined.

Step 7 - Results of the Cumulative Impact Assessment

In general, cumulative impacts (both beneficial and adverse) on regional and community growth as related to land use and development would continue to follow existing trends, even without the construction of the Build Alternative. However, according to City of Ennis officials, the City's planning efforts have been largely made with the US 287 Build Alternative in mind. Implementation of the Build Alternative would be a factor in increasing residential, industrial, and commercial development on available parcels within the City's ETJ.

The cumulative impacts on land use and development resulting from the direct impacts (24.2 acres) and indirect effects (2,284 acres) of the Build Alternative, in combination with the previously described other past, present, and reasonably foreseeable public and private actions (679 acres), would decrease the amount of open spaces in the RSA by approximately 2,987 acres.

Under the No Build Alternative, cumulative impacts on regional and community growth as related to land use and development would still occur, but at a lesser extent. The cumulative impacts on land use and development resulting from the indirect effects of the No Build Alternative (568 acres), in combination with the previously described other past, present, and reasonably foreseeable public and private actions (679 acres), would decrease the amount of open spaces in the RSA by approximately 1,247 acres.

Step 8 - Potential Mitigation

Land use planning practices such as the ones that are currently being implemented by the City of Ennis (e.g. zoning, thoroughfare plan) would help to manage the indirect and cumulative impacts on regional and community growth.

Economic Conditions

Step 3 - Resource Health and Historical Context

Historically, the Ennis economy was supported by railroad operations and agriculture (primarily cotton and livestock production). By the 1970s, Ennis had transitioned into an industrial community where business forms, trophies, furniture, clothing, printing, novelties, and concrete were manufactured. By the 1990s Ennis was part of the Dallas-Fort Worth metropolitan area. Ennis now has more than 50 NAICS coded industries that employ over 5,100 workers. During the past year, three industrial expansions have resulted in investments of more than \$80 million, employed over 5,100 industrial workers, and provided over 1,025 new jobs. Additionally, over the past nine-years, \$506.6 million in industrial investments have occurred as well. The City of Ennis has been cited by the Texas Economic Development Council for Outstanding Achievement in Community Economic Development “in recognition of outstanding community effort to create job growth and development by inspiring creativity, leadership, and partnerships through community improvement” for the following years: 1995, 1996, 1997, 1999, 2000, 2003, 2004 and 2005. The City continues to promote economic development. Based on the growth of employment and industrial investments, the health of economic conditions in Ennis is considered “improving”.

Step 4 - Direct and Indirect Impacts

During construction of the Build Alternative, there could potentially be a short-term economic gain to the area due to new job opportunities and a temporary boost to the local economy. Long-term benefits would accrue to roadway users, including occupants of abutting property due to ease of access and increased capacity. They would benefit economically from various design improvements, which would reduce vehicle-operating costs and improve operations.

Development activities, along with their resulting employment opportunities jobs and tax revenues, are occurring without the proposed Build Alternative; however, City of Ennis officials revealed that the Build Alternative would have an even greater influence on the City’s overall growth in sales of goods and services, employment, land values, and tax revenues. The City’s anticipated total revenue in the RSA from growth is \$3.05 billion, and the City expects more than 3,400 jobs resulting from new

development. According to interviews conducted with City officials, the City's planning efforts are largely made with the US 287 Build Alternative in mind. Furthermore, the Build Alternative is vital to the economic growth of the City and the quality of life the City plans to offer their citizens.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include socio-economic impacts as related to the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The indirect and cumulative impacts projected revenue and employment data were obtained from correspondence and discussions with the City of Ennis. In general, the City's 49,651-acre ETJ limits were considered a RSA sufficient to capture most cumulative impacts of the Build Alternative on economic conditions. The cumulative economic impacts in the RSA under the No Build Alternative were also determined.

Step 7 - Results of the Cumulative Impact Assessment

In general, cumulative impacts to economic conditions associated with urbanization would continue to follow existing trends; however, the Build Alternative would have a large influence on economic development of the City.

The projected \$3.05 billion in growth and 3,400 new jobs resulting from the direct impacts and indirect effects of the Build Alternative, in combination with the previously described other past, present, and reasonably foreseeable public and private actions (three industrial expansions worth \$80 million, 1,025 new jobs, \$506.6 million in industrial investments) would likely result in cumulative impacts totaling approximately \$3.64 billion in total growth and investments and 4,425 new jobs.

In addition, development of available lands with access to the Build Alternative would change travel patterns from what would exist under the No Build Alternative where access to new development would have to be provided via other streets. The Build Alternative would be expected to provide the primary access to these developments.

Under the No Build Alternative, the City of Ennis estimates that it could potentially lose up to 2,000 new job creations and as much as \$2.5 billion in growth and investments. The projected \$550 million in growth and 1,400 new jobs resulting from the indirect effects of the No Build Alternative, in combination with the previously described other past, present, and reasonably foreseeable public and private actions (three industrial expansions worth \$80 million, 1,025 new jobs, \$506.6 million in industrial investments) would likely result in cumulative impacts totaling approximately \$1.14 billion in total growth and investments and 2,425 new jobs.

Step 8 - Potential Mitigation

It is not anticipated that the Build Alternative would have an adverse effect on the economic conditions in the RSA other than the temporary disruption to businesses and residents as a result of construction activities. If adverse impacts were to occur, joint economic development and redevelopment efforts on the part of the City of

Ennis and local businesses would likely be the most effective strategy for mitigating the adverse impacts.

Floodplains

Step 3 - Resource Health and Historical Context

There are approximately 8,726 acres of floodplains (including a portion of Lake Bardwell) in the Waxahachie Creek and Walker Creek drainage sub-basins RSA. Historically, floodplains within the RSA have been utilized for crops and livestock grazing. Developed land uses are minimal within mapped floodplains. The current health of floodplains within the RSA is considered “stable”.

Step 4 - Direct and Indirect Impacts

The Build Alternative would cross the floodplain associated with Little Mustang Creek and a tributary of Mustang Creek. The Build Alternative would not adversely affect the floodplain. There would be no effect on the status of the NFIP and no additional need for floodway or floodplain ordinance amendments.

The Build Alternative would contain approximately 20 acres of additional impervious concrete surface relative to the existing roadway facility. As discussed in the Indirect Regional and Community Growth Impacts section, approximately 2,284 acres of induced development is projected within the indirect effects study area. This development would not occur within any floodplains; however, the storm water runoff from impervious surfaces associated with the induced development would impact the floodplains. Based on aerial photograph review of similar developments in the City of Ennis, it is estimated that the percentage of impervious surfaces associated with a typical development (structures, driveways, parking lots, and streets) is approximately 70 percent with the remaining 30 percent consisting of open ground. Using a 70 percent impermeable surface factor, it is anticipated that the induced development resulting as an indirect effect of the Build Alternative would add approximately 1,599 acres of impermeable surfaces to the indirect effects study area.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include floodplain impacts as related to the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA was considered sufficient to capture most cumulative impacts of the Build Alternative on floodplains because storm water runoff from the southern portion of City of Ennis (where the project is located) is primarily captured in these sub-basins.

Floodplain acreage was determined using NFIP maps. Impervious surface acreage was determined by using an aerial photograph to measure the impervious surfaces (structures, driveways, parking lots, and streets) of similar developments in the City of Ennis, calculating an average percentage of impervious surfaces relative to open ground (70 percent), and multiplying that percentage by acres of development in the

RSA. The cumulative impacts to floodplains in the RSA under the No Build Alternative were also determined.

The amount of storm water runoff that would impact floodplains would be dependent upon the severity and duration of the precipitation event, type of soil, water holding capacity of the soil, permeability of the soil, and the distances of the floodplains relative to the storm water outfalls. Hydrologic modeling would be required to estimate the volume of storm water that would impact the floodplains, which is beyond the scope of this floodplain cumulative impacts analysis. Therefore, the acreage of impervious surfaces was the unit of measurement used to quantify the effects of the Build and No Build Alternatives.

Step 7 - Results of the Cumulative Impact Assessment

Under the Build Alternative, the direct impacts (20 acres of impermeable surfaces) and indirect effects (1,599 acres of impermeable surfaces), in combination with 466 acres of impermeable surfaces associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 2,085 acres of impermeable surfaces in the RSA. These impermeable surfaces would have the potential to increase the base flood elevations of the floodplains in the RSA due to increased surface runoff during storm events.

Under the No Build Alternative, the cumulative impacts on floodplains from indirect land use effects (398 acres of impermeable surfaces), in combination with 466 acres of impermeable surfaces associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 864 acres of impermeable surfaces in the RSA. These impermeable surfaces would have the potential to increase the base flood elevations of the floodplains in the RSA due to increased surface runoff during storm events.

Step 8 - Potential Mitigation

Detention ponds could mitigate the cumulative effects to floodplains in the RSA resulting from increased surface runoff from new land development. Detention ponds are designed to temporarily store a portion of surface water runoff during storm events and slowly release the water over a period of time. Detention ponds are commonly used to control flooding.

The local floodplain administrator (NFIP coordinator) and FEMA would have jurisdiction over mitigation activities for impacts to floodplains, and as such, would determine the mitigation responsibilities of TxDOT and the individual developers.

Waters of the U.S.

Step 3 - Resource Health and Historical Context

There are approximately 103 miles of streams and 627 acres of wetlands within the Waxahachie Creek and Walker Creek drainage sub-basins RSA. Historically, agricultural activities were the primary activities conducted within the RSA. These activities did not require the fill and degradation of waters of the U.S. Waxahachie Creek was dammed to form Lake Bardwell, which was completed in 1965. The lake is used for flood control, storage, and recreation. Due to the creation of the lake,

associated uses, and the emerging urban setting within the RSA, impacts consisting of the bridging, culverting, and filling of waters of the U.S. are occurring more frequently within the RSA. The current health of waters of the U.S. within the RSA is considered “stable”.

Step 4 - Direct and Indirect Impacts

The Build Alternative would temporarily impact up to 0.16 acre of a wetland adjacent to Little Mustang Creek. The wetland is classified as an intermittently inundated, emergent palustrine wetland located within the 100-year floodplain of Little Mustang Creek. The Build Alternative would also require a culvert extension that would impact 0.0014 acre of a tributary of Mustang Creek.

The potential indirect effects on waters of the U.S. and wetlands from roadway projects include fill and degradation from roadway-induced development. The 2,284 acres of induced development under the Build Alternative has the potential to impact up to approximately 5.6 linear miles of streams and 19.5 acres of wetlands.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include impacts on waters of the U.S. resulting from the direct impacts and indirect effects of the Build Alternative, in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA was considered sufficient to capture most cumulative effects of the Build Alternative on waters of the U.S. because the majority of waters within the southern portion of the City of Ennis (where the project is located) are included in these sub-basins. Data is not available to quantify the acreage of streams in the RSA; however, stream lengths in the RSA can be measured using aerial photographs and topographic maps, and the acreage of wetlands can be determined from NWI maps. Therefore, linear mile is the measurement unit used for determining stream impacts and acres is the measurement unit used for determining wetland impacts. The lengths of impacted streams and acres of impacted wetlands were determined by using development overlays for the Build and No Build Alternatives.

Step 7 - Results of the Cumulative Impact Assessment

The direct impacts of the project would temporarily impact 0.16 acre of wetlands and permanently impact less than 0.01 acre of open water. The 2,284 acres of induced development under the Build Alternative has the potential to impact up to approximately 5.6 linear miles of streams and 19.5 acres of wetlands. The previously described 665 acres of other past, present, and reasonably foreseeable public and private actions has the potential to impact up to 1.6 linear mile of streams and 5.6 acres of wetlands. The cumulative impacts of the Build Alternative on waters of the U.S. could be up to 7.2 linear miles of streams and 25.1 acres of wetlands (includes the 0.0014 direct open water impact) in the RSA.

Under the No Build Alternative, the 568 acres of indirect land use effects has the potential to impact up to approximately 1.3 linear miles of streams and 6.5 acres of wetlands. The previously described 665 acres of other past, present, and reasonably foreseeable public and private actions has the potential to impact up to 1.6 linear mile of streams and 5.6 acres of wetlands. The cumulative impacts of the No Build

Alternative on waters of the U.S. could be up to 2.9 linear miles of streams and 12.1 acres of wetlands in the RSA.

Step 8 - Potential Mitigation

Avoidance or minimization of impacts to waters of the U.S. and wetlands should be performed during the development design phase so that only the least amount of impacts occurs. Mitigation is only conducted when impacts to waters of the U.S. and wetlands cannot be avoided. Typical mitigation for impacts to waters of the U.S. includes the construction of mitigation areas or purchasing credits from a mitigation bank. Mitigation is frequently conducted as a one of the requirements for obtaining a Section 404 permit. The USACE decides what the ratio of the mitigation area would be relative to the acreage of impacts to waters of the U.S. A typical mitigation ratio is three times the amount of acreage impacted, while the minimum mitigation ratio is one time the amount of acreage impacted (i.e. 1:1 ratio). A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or in certain circumstances, preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. Mitigation banks are used in situations where the construction of a mitigation area is not practical. Mitigation banks are a form of “third-party” compensatory mitigation, in which the responsibility for compensatory mitigation implementation and success is assumed by a party other than the permittee. The USACE would have jurisdiction over mitigation activities for impacts to waters of the U.S., and as such, would determine the mitigation responsibilities of the developers.

Water Quality

Step 3 - Resource Health and Historical Context

Due to the rural setting of the Waxahachie Creek and Walker Creek sub-basins RSA, few impacts have occurred in the past to water quality within the RSA. The current health of water quality within the RSA is considered “in decline”.

Step 4 - Direct and Indirect Impacts

Approximately 44.2 acres of land would be disturbed during construction of the Build Alternative. The greatest potential for direct impacts to water quality as a result of the Build Alternative would be sediment runoff from precipitation events during construction. Storm water runoff from construction sites can also include pollutants other than sediment such as phosphorous, nitrogen, pesticides, petroleum derivatives, construction chemicals (e.g. concrete sealant) and solid wastes (trash, plastic floatables) that may become mobilized when land surfaces are disturbed. The Build Alternative would contain approximately 20 acres of additional impervious concrete surface relative to the existing roadway facility.

The 2,284 acres of induced development that would result as an indirect effect of the Build Alternative could impact water quality during and after construction of the developments. Storm water runoff during construction would primarily consist of sediments and other previously described pollutants. After construction is completed, there is still the potential that water quality would be impacted by the

developments. According to the Center for Watershed Protection, storm water runoff from urban development typically contains suspended solids, nitrogen, phosphorus, bacteria (fecal coliforms), petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.

As discussed in the Cumulative Impacts on Floodplains section of this report, the 2,284 acres of induced development would add approximately 1,599 acres of impermeable surfaces to the indirect effects study area (assuming a 70 percent impervious surface factor).

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include direct and indirect impacts to the water quality as a result of implementation of the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA was considered sufficient to capture most cumulative effects of the Build Alternative on water quality because storm water runoff from the southern portion of the City of Ennis (where the project is located) primarily drains into these sub-basins.

Impervious surface acreage was determined by using an aerial photograph to measure the impervious surfaces (structures, driveways, parking lots, and streets) of similar developments in the City of Ennis, calculating an average percentage of impervious surfaces relative to open ground (70 percent), and multiplying that percentage by acres of development in the RSA. The cumulative impacts to water quality in the RSA under the No Build Alternative were also determined.

The amount of storm water runoff from induced development that would impact water bodies would be dependent upon the severity and duration of the precipitation event, type of soil, water holding capacity of the soil, permeability of the soil, and the distances of the water bodies relative to the storm water outfalls. Hydrologic modeling would be required to estimate the volume of storm water that would impact the water bodies. Storm water sampling and chemical analysis would be required to determine the types and concentrations of pollutants in the storm water. Hydrologic modeling, storm water sampling, and chemical analysis are beyond the scope of this water quality indirect effects analysis. Therefore, typical storm water pollutants were discussed in a qualitative manner and the acreage of impervious surfaces was the unit of measurement used to quantify the effects on water quality.

Step 7 - Results of the Cumulative Impact Assessment

Construction Impacts

Under the Build Alternative, the direct impacts (44.2 acres of disturbed ground) and indirect effects (2,084 acres of disturbed ground), in combination with the disturbed ground associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 2,993 acres of disturbed ground in the RSA. During storm events, sediments and pollutants in the storm water runoff from the disturbed ground would have the potential to impact water quality.

Under the No Build Alternative, the cumulative impacts from indirect land use effects (568 acres of disturbed ground), in combination with the disturbed ground associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 1,233 acres of disturbed ground in the RSA. During storm events, sediments and pollutants in the storm water runoff from the disturbed ground would have the potential to impact water quality.

Post Construction Impacts

Under the Build Alternative, the direct impacts (20 acres of impermeable surfaces) and indirect effects (1,599 acres of impermeable surfaces), in combination with 466 acres of impermeable surfaces associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 2,085 acres of impermeable surfaces in the RSA. During storm events, pollutants in the storm water runoff from these impervious surfaces would have the potential to impact water quality.

Under the No Build Alternative, the cumulative impacts from indirect land use effects (398 acres of impermeable surfaces), in combination with 466 acres of impermeable surfaces associated with 665 acres of previously described other past, present, and reasonably foreseeable public and private actions, result in a total of 864 acres of impermeable surfaces in the RSA. During storm events, pollutants in the storm water runoff from these impervious surfaces would have the potential to impact water quality.

Step 8 - Potential Mitigation

The implementation of water pollution abatement control measures such as BMPs used to address erosion, sedimentation, and post-construction TSS control would help to mitigate impacts to water quality during and after the construction of the Build Alternative and associated induced development. Providing or enhancing vegetative buffers along streams and ponds would provide some filtration to storm water runoff and help to mitigate impacts to water quality.

The City of Ennis has special requirements for developments constructed within the Lake Bardwell, Lake Clark, or Jaycee Park Lake watersheds. The indirect effects study area is primarily within the Lake Bardwell watershed. The special requirements were established to help minimize soil erosion before and after the construction of roads and buildings. Some of the City's special requirements are listed as follows:

- Subdivision of land on steep slopes in the watersheds will be considered if predictable runoff rates do not exceed runoff rate levels of the previous land use.
- Storm water runoff shall not result in the lowering of the water quality in terms of fecal coliform, lead, total organic carbon, total nitrogen, total phosphorus, hydrocarbons-hexane extract, and suspended solids of the subject tract runoff relative to the quality level expected under the criteria which the alternative replaces.

- Roadways shall not be constructed on slopes greater than 25 percent and the roadway clearing width shall not exceed twice the roadway surface width or the width of the ROW, whichever is less.
- For building locations, no cut on any lot will be greater than four feet except for structural excavation.
- No building tracts can contain land within a 100-year floodplain, land within a drainage or utility easement, land on a slope greater than 35 percent, and land containing water bodies such as streams, ponds, or detention basins.

At the state level, the TCEQ has jurisdiction over mitigation activities for impacts to water quality. Developers are required to comply with the TPDES General Permits for Construction Activities requirements that are administered by the TCEQ. In addition, the TCEQ monitors the water quality of water bodies in Texas, prepares reports that describe the status of the waters based on historical data on surface water and groundwater quality, identifies water bodies that are not meeting standards set for their use, and prepares and implements remedial action plans for those water bodies that are not meeting standards set for their use.

Vegetation and Wildlife Habitat

Step 3 - Resource Health and Historical Context

The City of Ennis was historically a railroad and agricultural community. As such, much of the surrounding woodlands were cleared for crop production, and prairies were cultivated or grazed by livestock. Much of the wildlife habitat and vegetation in the RSA has been heavily grazed for several generations or was cultivated and then returned to native grasses or brush. The original plant cover has been altered. The current health of wildlife habitat and vegetation within the RSA is considered “in decline”.

The land within the 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA consists of 12,424 acres of pasture and open land, 2,853 acres of upland woodlands, 748 acres of riparian vegetation, and 539 acres of bottomland hardwoods.

Step 4 - Direct and Indirect Impacts

The Build Alternative would impact 114.3 acres of existing ROW consisting of 113.3 acres of maintained herbaceous vegetation and 1.0 acre of upland woodlands. Additionally, the Build Alternative would require 24.2 acres of proposed ROW consisting of 20.8 acres of pasture and open land, 0.3 acre of fence line trees, and 3.1 acres of upland woodlands. The trees range from six feet to 30 feet in height and three inches to 10 inches diameter at breast height (dbh). The Build Alternative would also require the removal of one 30-inch dbh sugarberry tree located on the east side of US 287, north of the SH 34 intersection. The direct impacts of the Build Alternative on vegetation total 138.5 acres.

Based on site reconnaissance of the existing and proposed ROW, the Build Alternative would have no effect on any of the threatened or endangered species with the potential to occur in Ellis County or their habitats except for the Texas

horned lizard and Timber/Canebrake rattlesnake, both of which have the potential to be in the project study area (see **Table 5**).

Approximately 2,284 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the Build Alternative. The induced development has the potential to impact approximately 2031 acres of pasture and open land and 253 acres of upland woodlands.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include direct and indirect impacts to the vegetation and wildlife habitat as a result of implementation of the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA was considered sufficient to capture most cumulative effects of the Build Alternative on vegetation and wildlife habitat because these sub-basins contain the streams, floodplains, and the associated vegetative habitat that wildlife (including the Texas horned lizard and Timber/Canebrake rattlesnake) depends on for food, water, and shelter. Acreages of vegetation types in the RSA were determined from aerial photographs and topographic maps. Acreages of impacted vegetation types were determined by using development overlays for the Build and No Build Alternatives. For the purposes of this analysis, it was assumed that any of the other past, present or reasonable foreseeable development would displace all the native vegetation and wildlife habitat within the confines of the development.

Step 7 - Results of the Cumulative Impact Assessment

The cumulative impacts on vegetation and wildlife habitat resulting from the 138.5 acres of direct impacts (i.e. 0.3 acre of fence line trees, 4.1 acres of upland woodlands, 20.8 acres of pasture and open land, 113.3 acres of maintained herbaceous vegetation) and the 2,284 acres of indirect effects of the Build Alternative (i.e. 2,031 acres of pasture and open land, 253 acres of upland woodlands), in combination with the 665 acres of impact to pasture and open land from the previously described other past, present, and reasonably foreseeable public and private actions, would decrease the amount of vegetation and wildlife habitat in the RSA by approximately 3,088 acres. Of this acreage, approximately 0.3 acre of fence line trees, 113.3 acres of maintained herbaceous vegetation, 257.1 acres of upland woodlands, and 2,717 acres of pasture and open land would be impacted.

Under the No Build Alternative, vegetation and wildlife habitat would still be impacted from new development, but to a lesser extent than under the Build Alternative. The 568 acres of impacts (i.e. 536 acres of pasture and open land, 32 acres of upland woodlands) of residential, industrial, commercial, and retail development that are anticipated to occur along the corridor as an indirect effect of the No Build Alternative in combination with the 665 acres of impact (i.e. 665 acres pasture and open land) from previously described other past, present, and reasonably foreseeable public and private actions, would decrease the amount of vegetation and wildlife habitat in the RSA by approximately 1,233 acres. Of this acreage,

approximately 32 acres of upland woodlands and 1,201 acres of pasture and open land and would be impacted.

Step 8 - Potential Mitigation

Mitigation for the direct impacts to 3.1 acres of upland woodlands would be conducted. The specific location of the mitigation area would be determined at a later date.

Incorporating parks, open spaces, and riparian corridors around and within developed areas would provide wildlife habitat and shelter. Planting these areas with native fruit or nut-bearing trees and shrubs, and native grain-bearing grasses would provide food for wildlife, and would help to mitigate impacts to habitat used by wildlife.

Agricultural land

Step 3 - Resource Health and Historical Context

The City of Ennis was historically a railroad and agricultural community. Cotton was the primary crop that was grown and the City had a number of cotton gins, a cottonseed oil mill, and a cotton compress. By 1970, agriculture had become less important and the City had transitioned into an industrial community. Cotton was still grown; however, raising cattle had become more prevalent. By the 1990s, Ennis was part of the Dallas-Fort Worth metropolitan area, and Ennis is now a center for industry and manufacturing. There are approximately 12,424 acres of agricultural land within the 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA. The current health of agricultural land within the RSA is considered “in decline”.

Step 4 - Direct and Indirect Impacts

The Build Alternative would require 24.2 acres of proposed ROW of which 20.8 acres are pasture and open land. Some tracts of land that surround the Build Alternative are currently zoned “Agricultural District”. In accordance with the Farmland Protection Policy Act (FPPA) of 1981, the additional ROW was scored using U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Form AD-1006. The resulting score was 71, which is below the minimum of 160 points requiring further coordination with NRCS. The regulation implementing the FPPA (7 CFR 658.4(c)(2)) states “Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated.” No further coordination with the NRCS is required.

Approximately 2,284 acres of residential, industrial, commercial, and retail development are anticipated to occur along the corridor as an indirect effect of the Build Alternative. The induced development would impact approximately 1.666 acres of agricultural land.

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include direct and indirect impacts on agricultural land as a result of implementation of the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable

public and private actions. The agricultural land consists of pasture and open land and was previously discussed in the Cumulative Effects on Vegetation and Wildlife Habitat section of this report. The 29,486-acre Waxahachie Creek and Walker Creek sub-basins RSA was considered sufficient to capture most cumulative effects of the Build Alternative on agricultural land because new development in the City is projected to occur within these sub-basins. Agricultural land was identified and assessed using aerial photographs and topographic maps. The acreage of impacted agricultural land was determined by using development overlays for the Build and No Build Alternatives.

Step 7 - Results of the Cumulative Impact Assessment

The cumulative impacts on agricultural land resulting from the 24.2 acres of direct impacts (20.8 acres is pasture and open land) and 2,284 acres of indirect effects (2,031 acres is pasture and open land) of the Build Alternative, in combination with the previously described 665 acres of impacts to pasture and open land from other past, present, and reasonably foreseeable public and private actions, would decrease the amount of open spaces in the RSA by approximately 2,973 acres. Of these 2,973 acres, approximately 2,717 acres consists of agricultural land.

Under the No Build Alternative, cumulative impacts on land use and development would still occur, but at a lesser extent. The cumulative impacts on land use and development resulting from the 568 acres of indirect effects (536 acres is pasture and open land) of the No Build Alternative, in combination with the previously described 665 acres of impacts to pastures and open land from other past, present, and reasonably foreseeable public and private actions, would decrease the amount of open spaces in the RSA by approximately 1,233 acres. Of these 1,233 acres, approximately 1,201 acres consists of agricultural land.

Step 8 - Potential Mitigation

It is not practical to mitigate for the loss of agricultural acreage without bringing non-farmed land into production. This concept is not likely to be economically feasible.

Air Quality

Step 3 - Resource Health and Historical Context

The enactment of the Clean Air Act of 1970 authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources. Four major regulatory programs affecting stationary sources were initiated: the NAAQS, SIPs, New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPs). The EPA was created on May 2, 1971 to implement the various requirements included in the Clean Air Act of 1970.

Major amendments were added to the Clean Air Act in 1977. The 1977 Amendments primarily concerned provisions for the Prevention of Significant Deterioration (PSD) of air quality in areas attaining the NAAQS. The 1977 Clean Air Act Amendments also contained requirements pertaining to sources in non-attainment areas for NAAQS. A non-attainment area is a geographic area that does not meet one or more of the federal air quality standards. Both of these 1977 Clean Air Act

Amendments established major permit review requirements to ensure attainment and maintenance of the NAAQS.

The 1990 Clean Air Act Amendments established specific criteria which must be met for air quality. The EPA was authorized to designate areas in “non-attainment” or failing to meet established NAAQS. In July 1997, the EPA announced a new NAAQS for ground-level ozone. The EPA phased out and replaced the previous one-hour standard with an eight-hour standard to protect public health against longer exposure to this air pollutant.

In 2004, the EPA designated nine counties in North Central Texas as non-attainment for the new 8-hour ozone standard in accordance with the NAAQS. Ellis County is located within the designated non-attainment area for ozone. Although the DFW region remains in non-attainment for ozone, the number of daily exceedances of the federal standards for ozone has decreased within the past decade. There have been year-to-year fluctuations in ozone levels; however, the ozone trend continues to show improvement. This trend is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG’s regional clean air initiatives. The current health of the air quality within the RSA is considered “improving”.

Step 4 - Direct and Indirect Impacts

It is not anticipated that the Build Alternative would have adverse effects on air quality. The proposed action’s traffic projection does not exceed 140,000 vehicles per day for either the existing or design year and thus is exempt from a Traffic Air Quality Analysis for carbon monoxide because previous analyses of similar projects did not result in a violation of NAAQS.

Because the proposed action’s traffic projection does not exceed 140,000 vehicles per day for either the existing or design year, it also has a low potential for adverse MSAT effects. The EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, acrolein, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent.

The DFW region is currently in attainment for all criteria pollutants, with the exception of ozone. The nine county non-attainment area has an attainment date of June 15, 2010. It should be noted that the SIP associated with the new (2004) 8-hour ozone is not due until three years after EPA designates an area in non-attainment for the new standard. Currently it is anticipated that the SIP would be due in 2013. The proposed project is consistent with the 2030 MTP (*Mobility 2030: The Metropolitan Transportation Plan*) that was found to conform to the ozone SIP for DFW. The SIP is required by the Clean Air Act Amendments to improve regional air quality for ozone. Although the DFW region remains in non-attainment for ozone, the

number of daily exceedances of the federal standards for ozone has decreased within the past decade. There have been year-to-year fluctuations in ozone levels; however, the ozone trend continues to show improvement. This trend is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG's regional clean air initiatives.

The 2,284 acres of induced development within the indirect effects study area would include residential, industrial, commercial, retail facilities, and associated transportation projects. The new development would increase air emissions from point sources (large industrial facilities), area sources (smaller businesses such as gas stations, paint and body shops, bakeries), on-road mobile sources (motorized vehicles), and non-road mobile sources (lawn mowers, construction equipment).

Under the No Build Alternative, air quality would still be impacted from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 568 acres of new development

Step 6 - Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include direct and indirect impacts on air quality as a result of implementation of the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The nine-county ozone non-attainment area for the DFW Metropolitan Area, which includes Ellis County, was considered as a RSA sufficient to capture most cumulative effects of the Build Alternative on air quality. The cumulative impacts on air quality from the No Build Alternative were also determined.

Step 7 - Results of the Cumulative Impact Assessment

The cumulative impacts on air quality from the Build Alternative and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP. The Build Alternative and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the ozone non-attainment SIP.

Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 2,284 acres of induced development in the indirect effects study area, and other past, present, and reasonably foreseeable public and private actions in the RSA would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.

Under the No Build Alternative, the cumulative impacts on air quality from other past, present, and reasonably foreseeable transportation projects would still be addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP, and would still conform to the ozone non-attainment SIP.

Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 568 acres of development and other past, present, and reasonably foreseeable public and private actions would not adversely affect the

regional ozone standard compliance or maintenance of the other air quality standards.

Step 8 - Potential Mitigation

The cumulative impact of reasonably foreseeable future growth and urbanization on air quality would be minimized by complying with state and federal regulations, mandated and enforced by the EPA and TCEQ. These regulations are designed to ensure that growth and urbanization do not prevent regional compliance with the ozone standard or threaten the maintenance of the other air quality standards.

Direct, Indirect, and Cumulative Impacts Summary

Table 14 provides a summary of the direct, indirect, and cumulative impacts associated with the Build and No Build Alternatives:

Table 14: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No Build Alternatives

Resource	BUILD ALTERNATIVE IMPACTS			NO BUILD ALTERNATIVE IMPACTS		
	Direct Impacts	Indirect Effects	Past, Present, & Reasonably Foreseeable Actions	Cumulative Impacts	Indirect Effects	Past, Present, & Reasonably Foreseeable Actions
Regional and Community Growth as Related to Land Use	24.2 acres.	2,284 acres.	679 acres.	Approximately 2,987 acres.	568 acres.	679 acres.
Economic Conditions	Short term: Potential economic gain during construction. Long term: Improved access and mobility to motorists.	\$3.05 B in growth. 3,400 new jobs.	\$80 M associated with 3 industrial expansions. \$506.6 million in industrial investments. 1,025 new jobs.	Short term: Potential economic gain during construction. Long term: Improved access and mobility to motorists. Approximately \$3.64 B in total growth and investments.	\$550 M in growth. 1,400 new jobs.	\$80 M associated with 3 industrial expansions. \$506.6 million in industrial investments. 1,025 new jobs.
Floodplains	20 additional acres impervious surfaces for storm water runoff.	1,599 additional acres impervious surfaces for storm water runoff.	466 acres impervious surfaces for storm water runoff.	2,085 acres impervious surfaces for storm water runoff.	398 additional acres impervious surfaces for storm water runoff.	466 acres impervious surfaces for storm water runoff.
Waters of the U.S.	Temporary impacts: 0.16 acre wetland. Permanent impacts: 0.0014 acre open water.	Stream impacts: Up to 5.6 linear miles. Wetland impacts: Up to 19.5 acres.	Stream impacts: Up to 1.6 linear miles. Wetland impacts: Up to 5.6 acres.	Stream impacts: Up to 7.2 linear miles. Wetland impacts: Up to 25.1 acres.	Stream impacts: Up to 1.3 linear miles. Wetland impacts: Up to 6.5 acres.	Stream impacts: Up to 2.9 linear miles. Wetland impacts: Up to 12.1 acres.

Table 14: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No Build Alternatives

	BUILD ALTERNATIVE IMPACTS			NO BUILD ALTERNATIVE IMPACTS		
Water Quality	During construction: 44.2 acres of ground disturbance. Associated sediment and pollutant runoff.	During construction: 2,284 acres of ground disturbance. Associated sediment and pollutant runoff.	During construction: 665 acres of ground disturbance. Associated sediment and pollutant runoff.	During construction: Approximately 2,993 acres of ground disturbance. Associated sediment and pollutant runoff.	During construction: 568 acres of ground disturbance. Associated sediment and pollutant runoff.	During construction: 1,233 acres of ground disturbance. Associated sediment and pollutant runoff.
	After construction: 20 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.	After construction: 1,599 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.	After construction: 466 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.	After construction: 2,085 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.	After construction: 398 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.	After construction: 864 additional acres of impervious surfaces for storm water runoff, which may contain suspended solids, nitrogen, phosphorus, bacteria, petroleum hydrocarbons, copper, lead, zinc, pesticides, and herbicides.
Vegetation and Wildlife Habitat	113.3 acres maintained herbaceous vegetation.			0.3 acre fence line trees.		
	20.8 acres pasture and open land.	2,031 acres of pasture and open land.	665 acres of pasture and open land.	113.3 acres maintained herbaceous vegetation.	536 acres of pasture and open land.	32 acres of upland woodlands.
	0.3 acre fence line trees.	253 acres of upland woodlands.		257.1 acres of upland woodlands.	32 acres of upland woodlands.	1,201 acres of pasture and open land.
	4.1 acres upland woodlands.			2,717 acres of pasture and open land.		
Agricultural Land	One 30-inch dbh sugarberry tree.	20.8 acres pasture and open land.	665 acres of pasture and open land.	2,717 acres of pasture and open land.	665 acres of pasture and open land.	1,201 acres of pasture and open land.

Table 14: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No Build Alternatives

	BUILD ALTERNATIVE IMPACTS			NO BUILD ALTERNATIVE IMPACTS		
Air Quality	<p>Minimal to no impacts. The Build Alternative's traffic projection does not exceed 140,000 vehicles per day for either existing or design year. No CO analysis is required and there is a low potential for adverse MSAT effects.</p>	<p>Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 2,284 acres of development would not adversely affect the regional ozone standard or maintenance of the other air quality standards.</p>	<p>Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 2,284 acres of induced development in the indirect effects study area, and other past, present, and reasonably foreseeable public and private actions would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.</p>	<p>The Build Alternative and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the ozone non-attainment SIP.</p> <p>Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 568 acres of development would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.</p>	<p>Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with other reasonably foreseeable public and private actions would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.</p>	<p>Impacts from other past, present, and reasonably foreseeable transportation projects would be addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP, and would conform to the ozone non-attainment SIP.</p> <p>Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 568 acres of induced development in the indirect effects study area, and other past, present, and reasonably foreseeable public and private actions in the RSA would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.</p>

X. Construction Impacts

The Build Alternative would be constructed in the following order: build bridges and retaining walls; build the frontage roads, ramps and connections; build the northbound main lanes; and finally, convert the existing roadway from a two-way facility to one-way southbound main lanes. During construction, temporary lane closures would be required. The length and time of the lane closures would be kept to a minimum and no detours would be required.

Businesses and residences may be inconvenienced during the construction phase of the project; however, this situation would be temporary. Reasonable accommodations such as phased construction and maintenance of access to adjacent property would be implemented to minimize the inconvenience to persons using the roadway during the construction phase.

Construction may temporarily degrade air quality through dust and exhaust gases associated with construction equipment. Measures to control fugitive dust would be considered and incorporated into final design and construction specifications.

No Build Alternative

There would be no construction impacts associated with the No Build Alternative.

Y. Items of Special Nature

There are no items of special nature or interest such as navigation clearances, special permits or agreements involved with this project. The Build Alternative would not affect land or water uses within an area covered by a State Coastal Zone Management Program, nor would it impact coastal barrier resources. Coordination with the USCG would not be required. The Build Alternative would not impact any present, proposed, or potential unit of the National Wild and Scenic Rivers System.

The Ennis Municipal Airport is located approximately 1,100 feet north of the Build Alternative and contains one runway that is 3,999 feet in length. According to the Federal Air Regulations Part 77 *Objects Affecting Navigable Airspace*, the Federal Aviation Administrator (FAA) must be notified if construction is proposed “of greater height than an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport with at least one runway more than 3,200 feet in actual length.” The construction of the proposed bridges would not violate this slope and no mast lighting would be provided that would interfere with this airspace; therefore, notification to the FAA is not required.

No Build Alternative

There would be no items of special nature associated with the No Build Alternative.

V. DETERMINATION OF ASSESSMENT

The TxDOT Dallas District Office, City of Ennis, and Ellis County recommend the Build Alternative, which would upgrade existing US 287 from Business US 287 to south of SH 34 from a two-lane, undivided, rural, asphalt-paved roadway with grass-

lined ditches into a four-lane, divided, rural, grade-separated, asphalt-paved roadway. As shown in **Table 15**, only the Build Alternative meets the proposed project's purpose of improving mobility and safety on US 287. The No Build Alternative would not fulfill the traveling public's transportation needs. Traffic on US 287 would increase as more development occurs in the vicinity of the roadway. The construction of Ennis High School and the Ennis Sixth Grade Center has led to congestion and safety concerns due to the need for drivers entering and exiting these facilities to turn from or onto the only lane of traffic. The Ennis Regional Medical Center, currently under construction, will further contribute to this situation. The Build Alternative meets the proposed project's need and purpose by providing additional capacity; providing grade separation and controlled access; providing frontage roads; and providing new and reconstructed entrance and exit ramps. Given the delays and safety concerns associated with the existing facility, these changes are needed to improve mobility and safety throughout the project area.

Table 15: Alternatives' Ability to Achieve the Project Objectives

Project Objective	No Build Alternative	Build Alternative
To improve mobility	Very low probability	High probability
To improve safety	Very low probability	High probability

The Build Alternative requires the authorization of NWP 14 with a pre-construction notification for up to 0.16 acre of temporary impacts to a wetland adjacent to Little Mustang Creek. Authorization under NWP 14 is also required for 0.0014 acre of impacts to a tributary of Little Mustang Creek. General Condition 21 of the NWP Program requires applicants using NWP 14 to comply with Section 401 of the CWA. Compliance with Section 401 requires the use of BMPs to manage water quality on construction sites. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for Nationwide Permits as published by the TCEQ. These BMPs would address each of the following categories:

- Category I Erosion Control would be addressed by applying temporary reseeding (TxDOT approved seeding specification) and mulch to disturbed areas.
- Category II Sedimentation Control would be addressed by installing silt fences combined with rock berms.
- Category III Post-Construction Total Suspended Solids (TSS) control would be addressed by installing grassy swales.

Other approved methods would be substituted if necessary using one of the BMPs from the identical category.

Under the Build Alternative, the TPDES General Permit for Construction Activities requires that a Notice of Intent be filed with TCEQ stating that TxDOT would have a Storm Water Pollution Prevention Plan in place during construction of this project.

The Contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in staging areas. All materials being removed and/or disposed of by the Contractor would be done in accordance with local, State, and Federal laws and by approval of the Engineer.

The Build Alternative would impact habitat that could be used by the Texas horned lizard and Timber/Canebrake rattlesnake, both of which have the potential to occur in the project area.

Mitigation for the impacts to the 3.1 acres of upland woodlands would be required. The specific location of the mitigation area would be determined at a later date.

In the unlikely event that evidence of archeological deposits is encountered during construction, work in the immediate area would cease and TxDOT archeological staff would be contacted to initiate accidental discovery procedures under the provisions of the Programmatic Agreement between TxDOT, THC, FHWA, and the Advisory Council on Historic Preservation and the Memorandum of Understanding between TxDOT and the THC.

The various engineering, social, economic, and environmental investigations conducted thus far on this proposed project indicate that it would result in no significant adverse impacts on the quality of the human and natural environment. Thus, a Finding of No Significant Impact (FONSI) is anticipated.

DRAFT

APPENDIX A

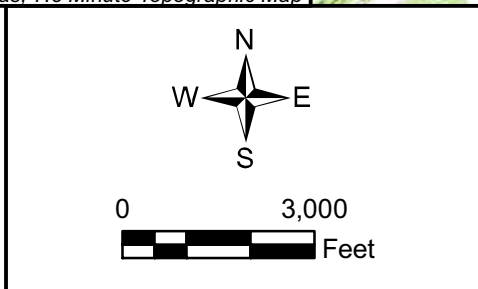
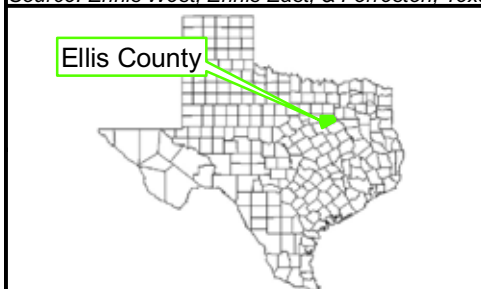
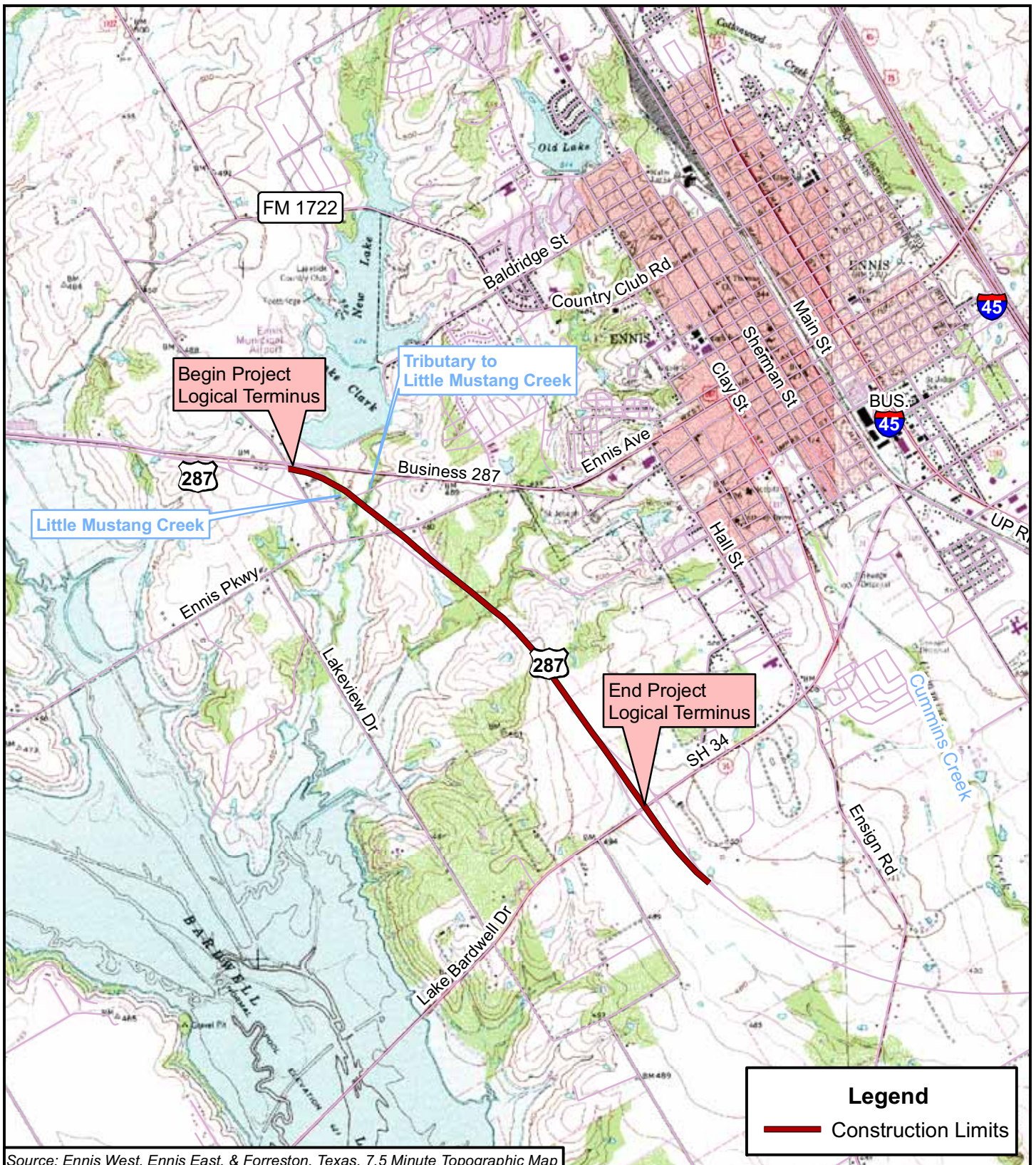
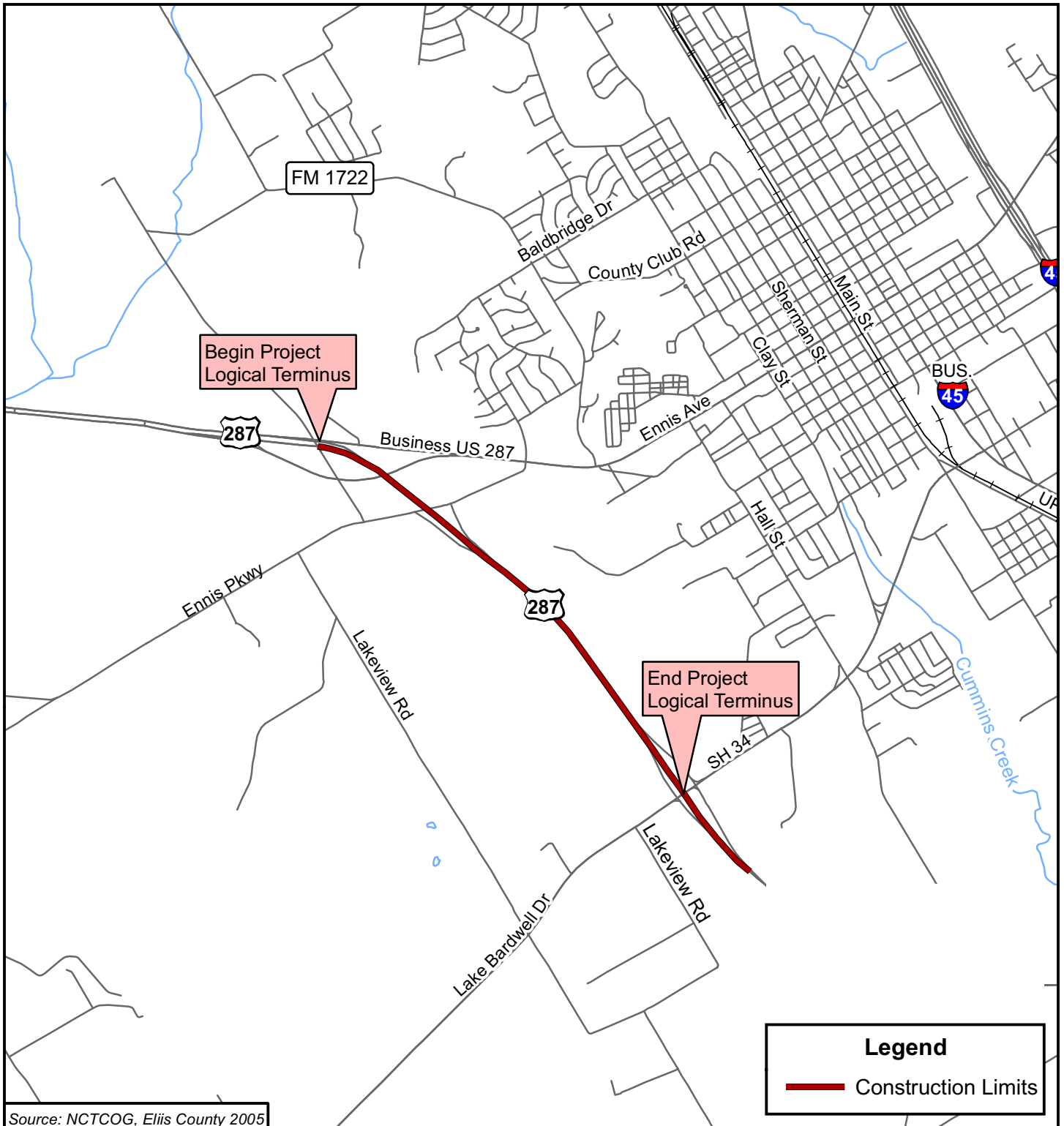


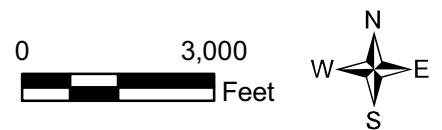
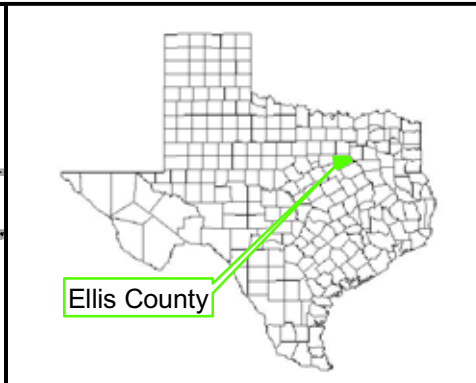
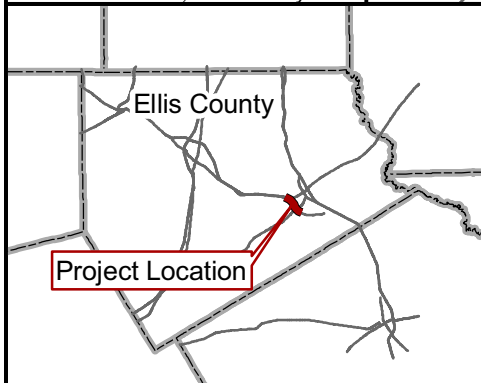
FIGURE 2
USGS TOPOGRAPHIC MAP

US 287
 FROM BUSINESS 287
 TO SOUTH OF SH 34

CSJ: 0172-08-050



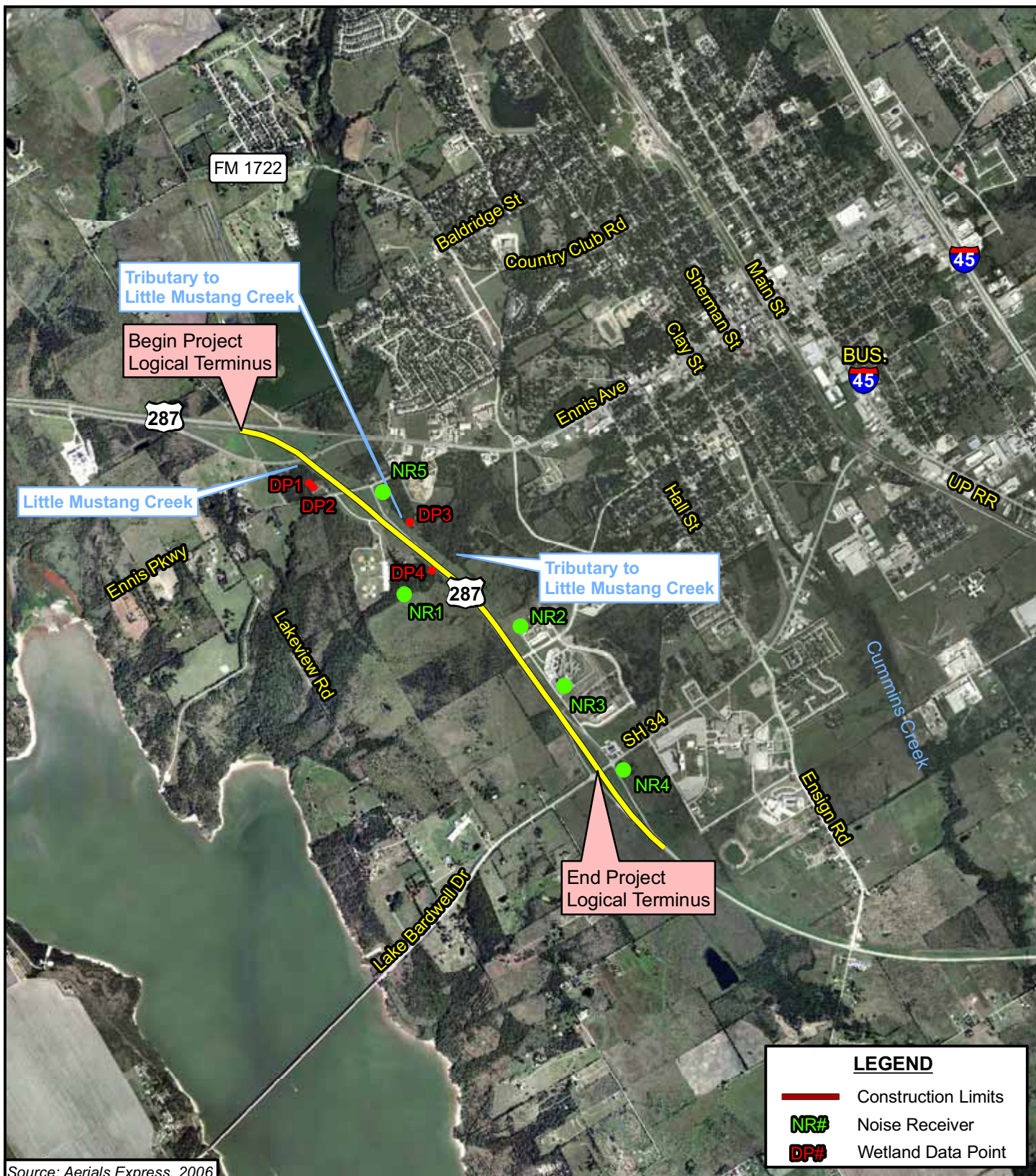
Source: NCTCOG, Ellis County 2005



**FIGURE 1
PROJECT LOCATION MAP**

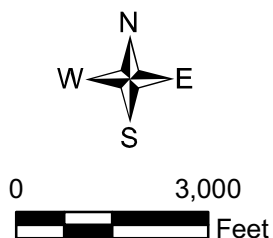
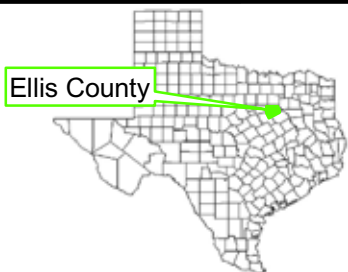
US 287
FROM BUSINESS US 287
TO SOUTH OF SH 34

CSJ: 0172-08-050



LEGEND

- Construction Limits
- NR# Noise Receiver
- DP# Wetland Data Point

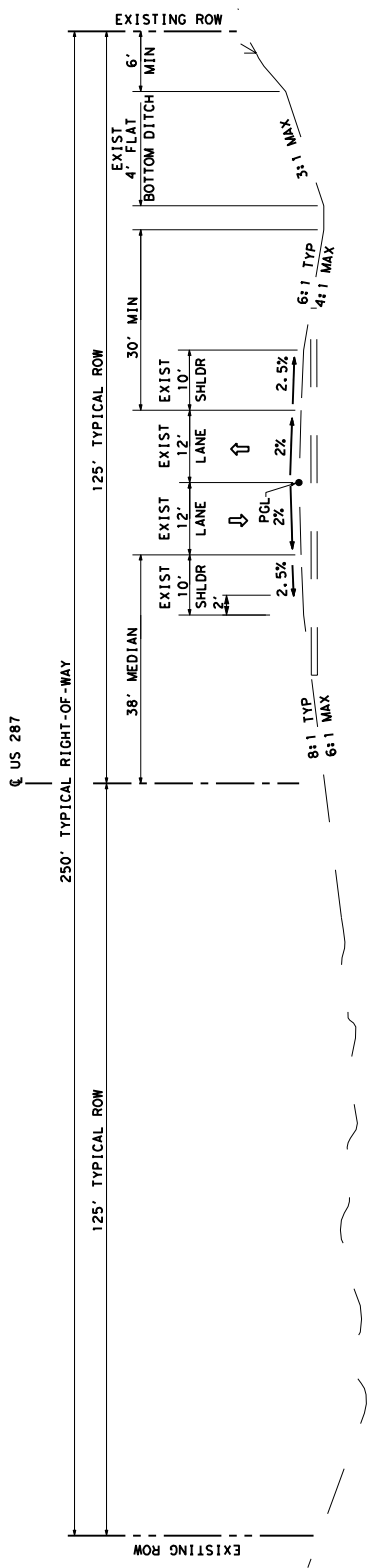


**FIGURE 3
AERIAL MAP**

US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050

NTS



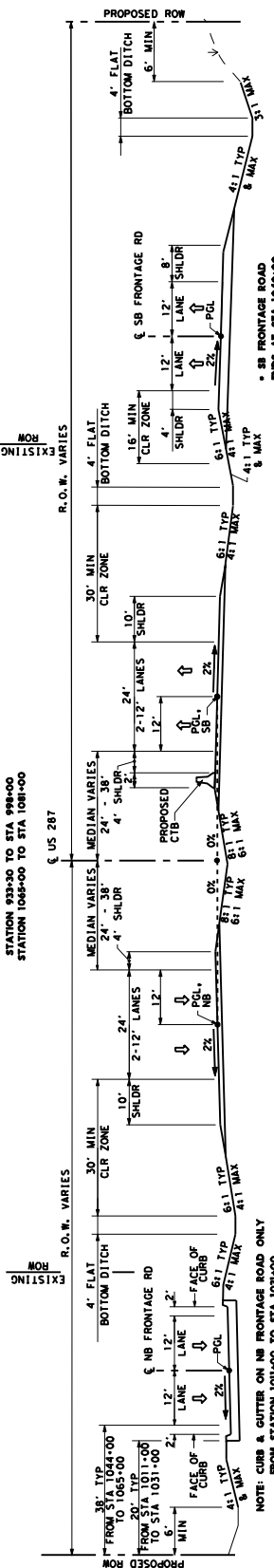
SOURCE: TXDOT

FIGURE 4
EXISTING TYPICAL SECTION
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050

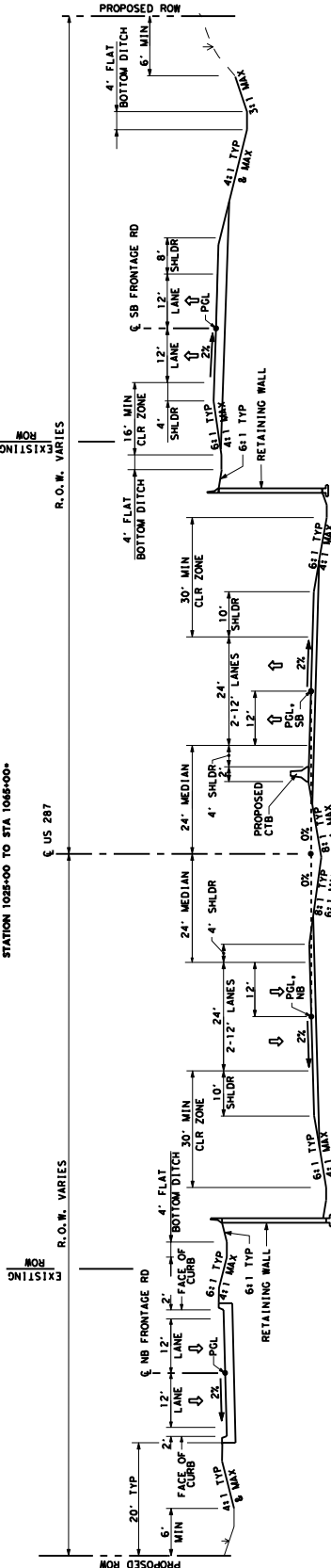
FOR REPORT PURPOSES
ONLY
Not for construction, bidding,
or permit purposes.

Plan view of proposed and existing roadway cross-sections. The diagram shows two cross-sections separated by a centerline marked 'US 287'. The left cross-section is labeled '125' TYPICAL ROW' and shows an 'EXIST' section with a '4' FLAT BOTTOM DITCH' and a '6' MIN' width. The 'PROPOSED' section shows a '38' MEDIAN' and a '4' SHOULDER'. The right cross-section is also labeled '125' TYPICAL ROW' and shows an 'EXIST' section with a '30' MIN' width. The 'PROPOSED' section shows a '38' MEDIAN' and a '4' SHOULDER'. The diagram includes various dimensions, such as '10' SHOULDER', '2-12' LANES', '12' width, and '24' width. It also shows 'EXIST' and 'PROPOSED' lane markings, including 'EXIST LANE', 'PROPOSED LANE', and 'PROPOSED C/TB'. The diagram includes various dimensions, such as '10' SHOULDER', '2-12' LANES', '12' width, and '24' width. It also shows 'EXIST' and 'PROPOSED' lane markings, including 'EXIST LANE', 'PROPOSED LANE', and 'PROPOSED C/TB'. The diagram includes various dimensions, such as '10' SHOULDER', '2-12' LANES', '12' width, and '24' width. It also shows 'EXIST' and 'PROPOSED' lane markings, including 'EXIST LANE', 'PROPOSED LANE', and 'PROPOSED C/TB'.

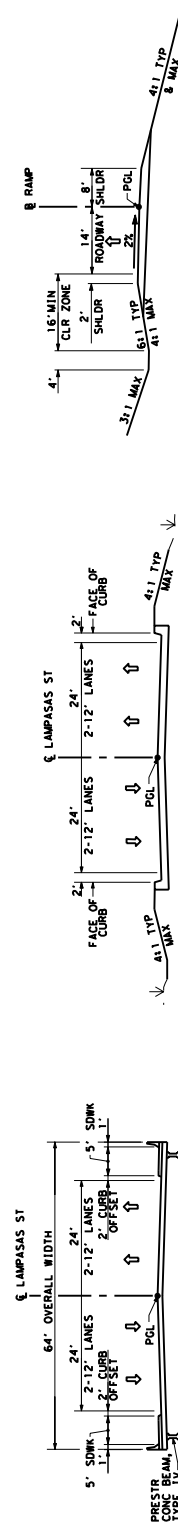
STATION 933+30 TO STA 998+00
STATION 1065+00 TO STA 1081+00



STATION 998+00 TO STA 1002+00
STATION 1025+00 TO STA 1065+00*



STATION 1002+00 TO STA 1025+00



TYPICAL RAMP SECTION

TYPICAL SECTION
AT LAMPASAS STREETTYPICAL BRIDGE SECTION
AT LAMPASAS STREET

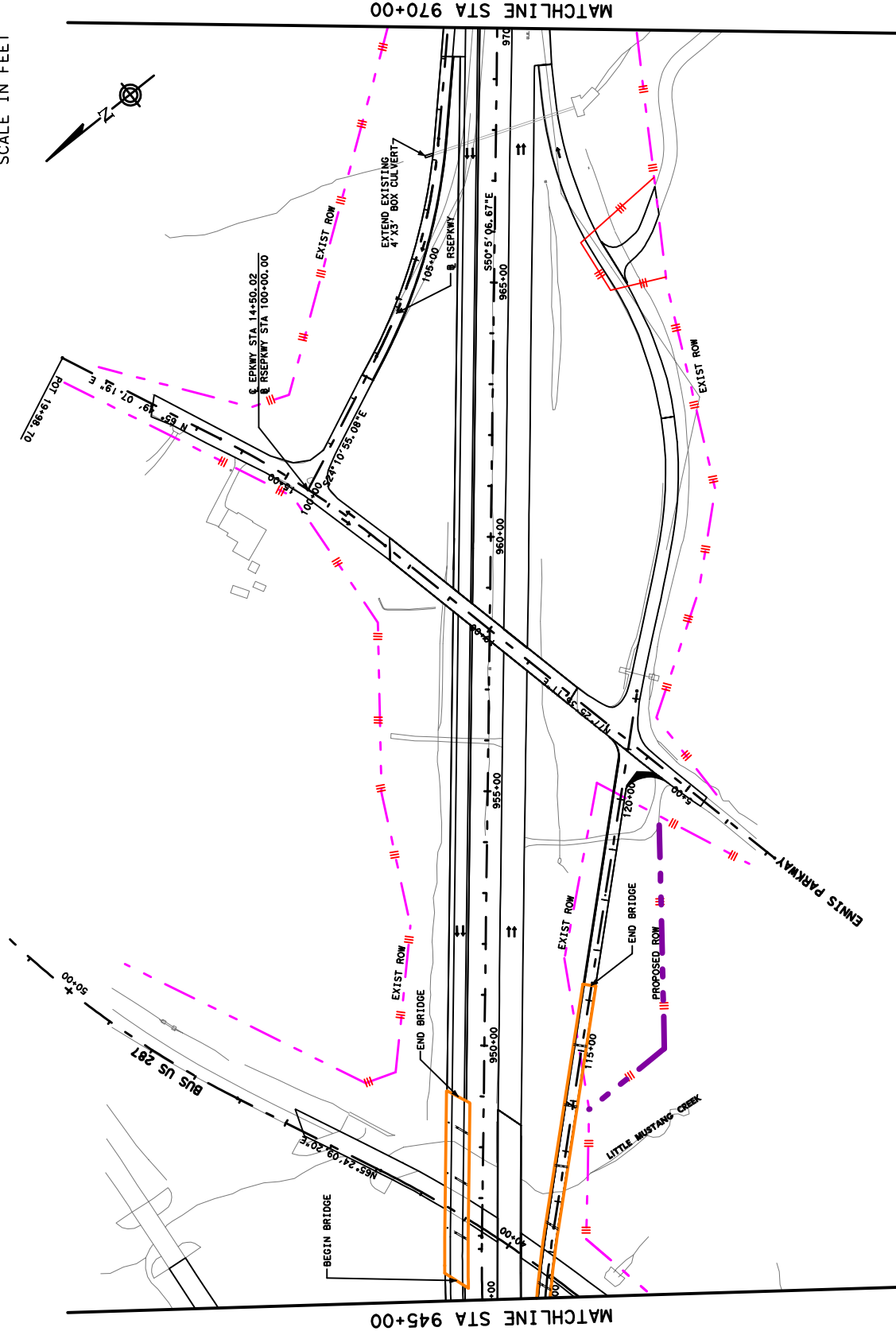
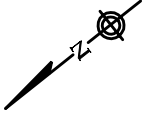
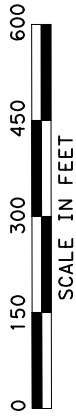
SOURCE: TXDOT

FIGURE 5

ONLY
Not for construction, bidding,
or permit purposes.

US 287

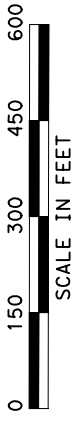
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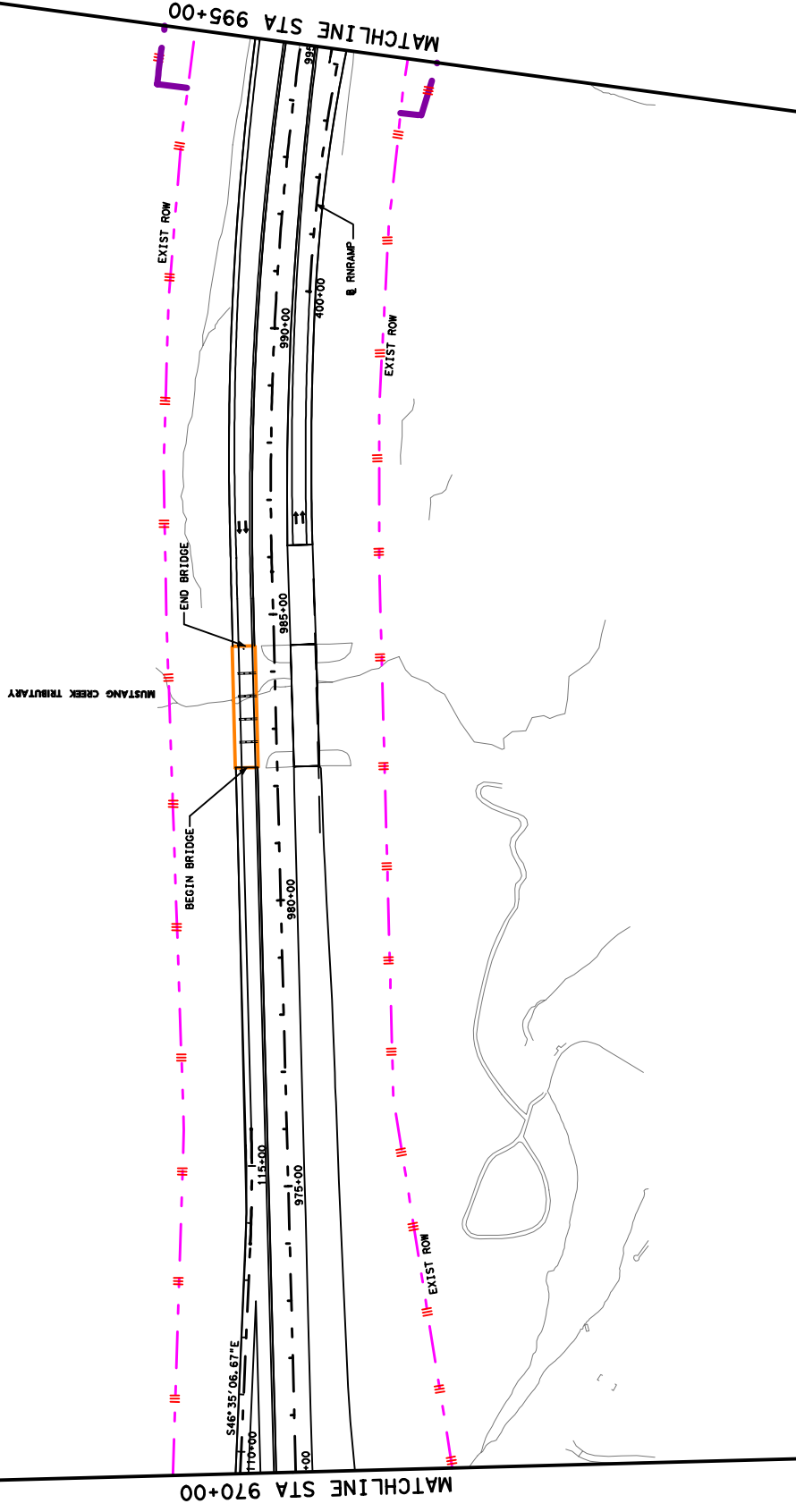
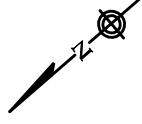
LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

FIGURE 6
EXISTING AND PROPOSED ROW
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 2 OF 7



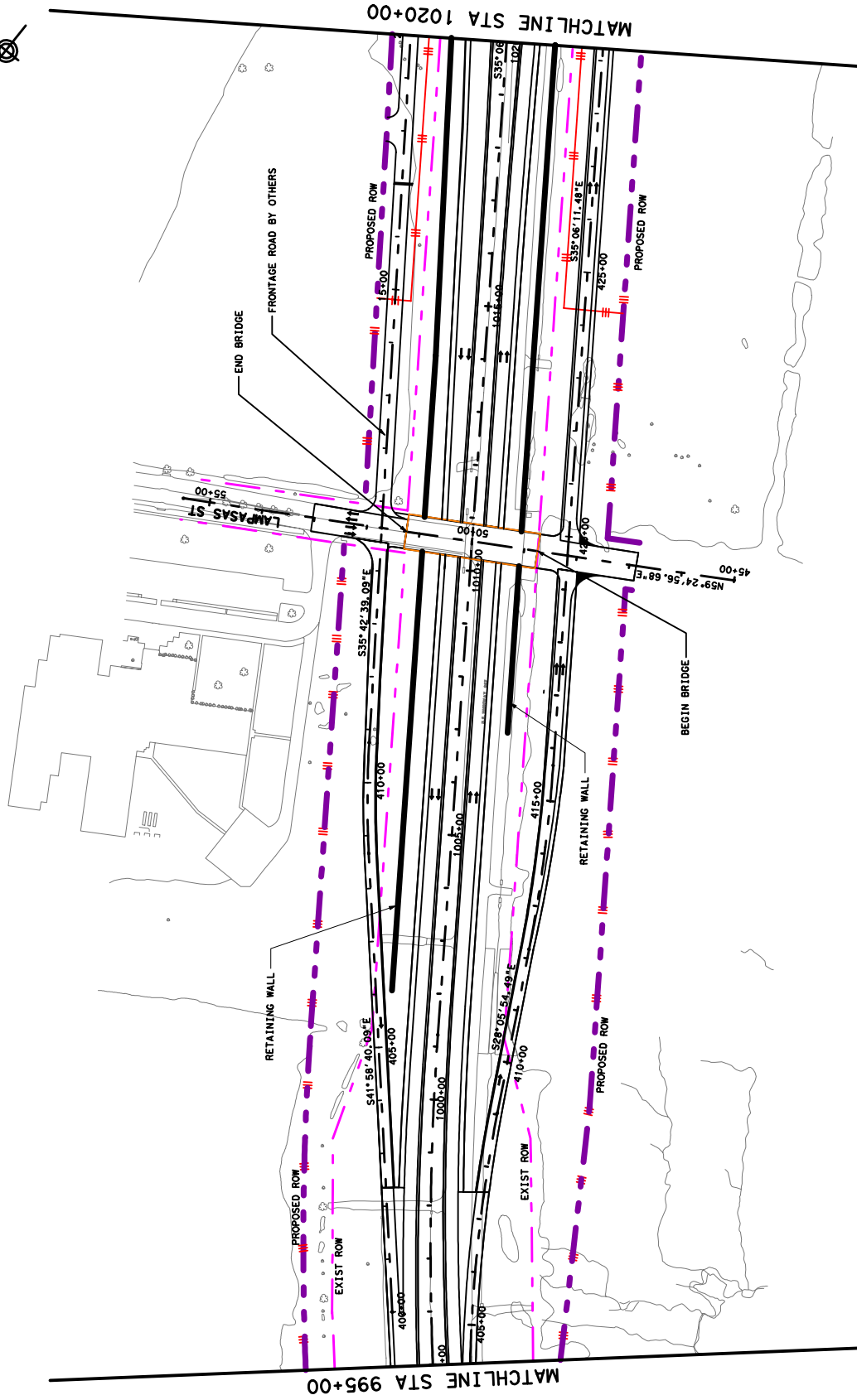
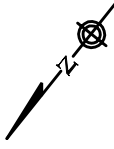
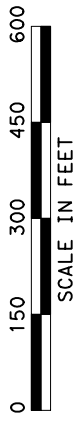
SCALE IN FEET



LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

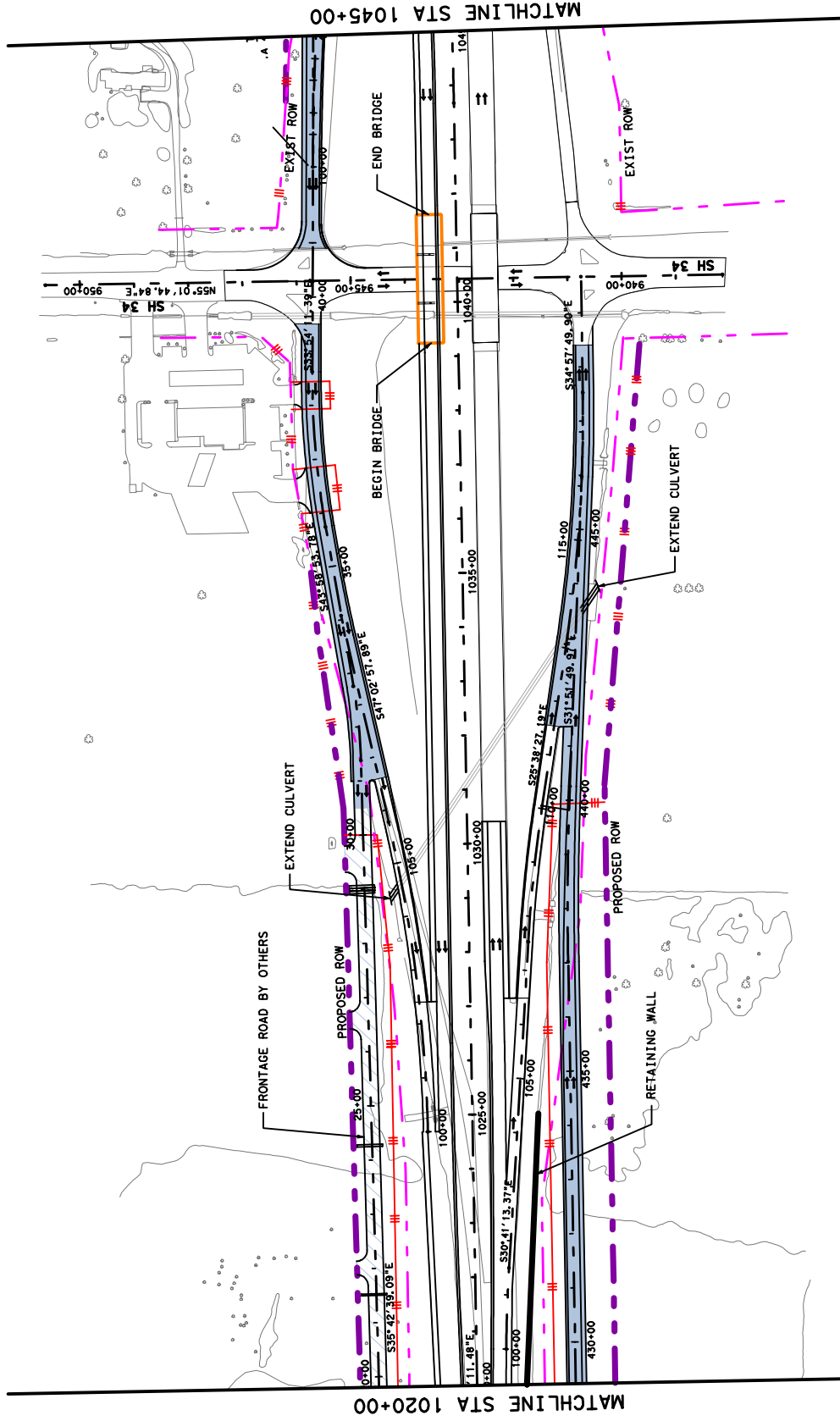
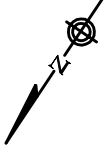
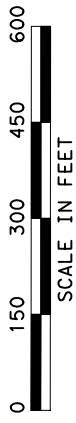
FIGURE 6
EXISTING AND PROPOSED ROADWAY
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 3 OF 7



LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

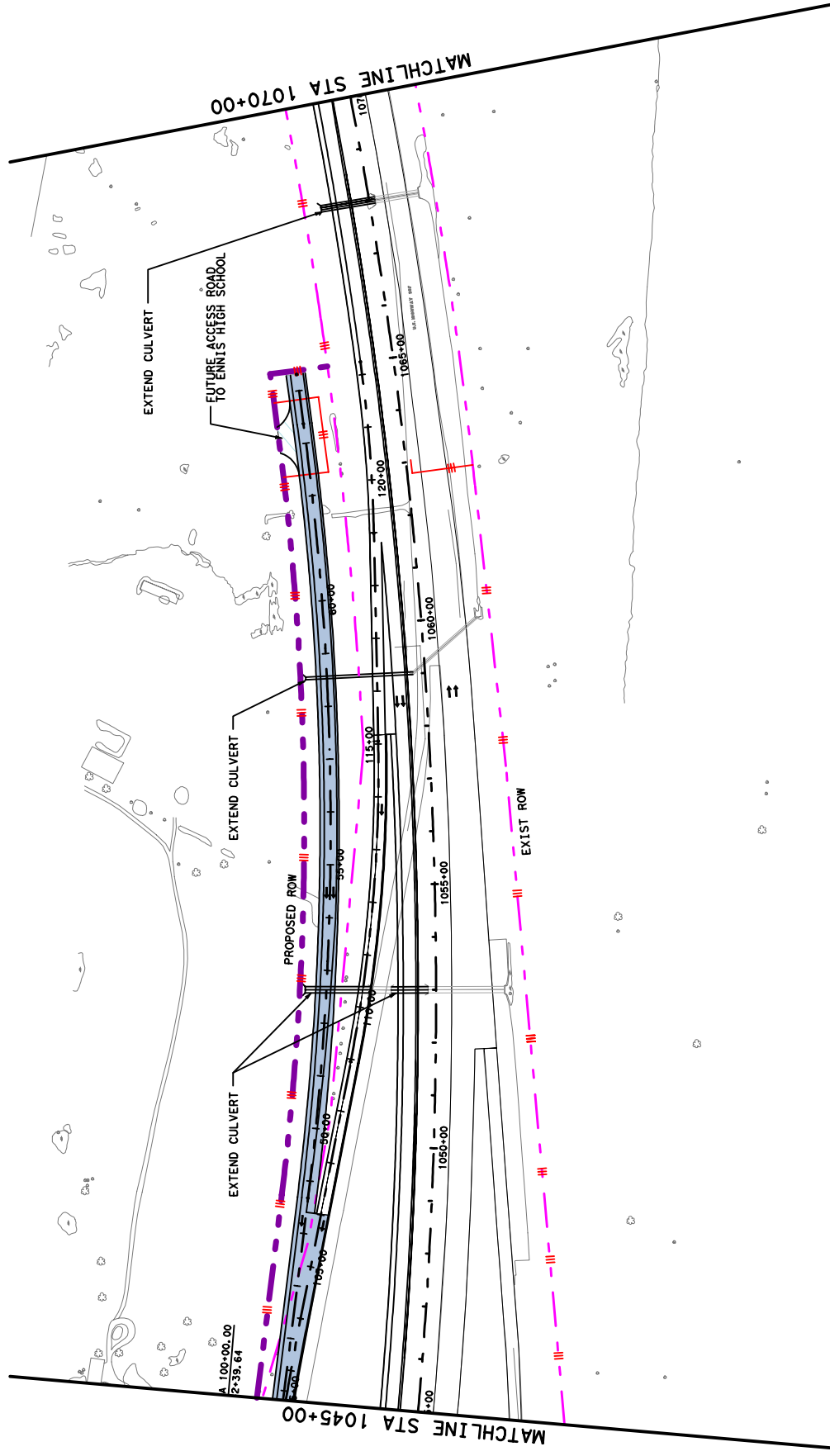
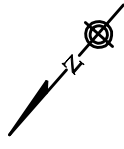
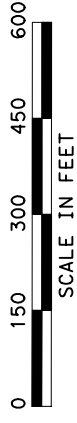
FIGURE 6
EXISTING AND PROPOSED ROADWAY
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 4 OF 7



LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

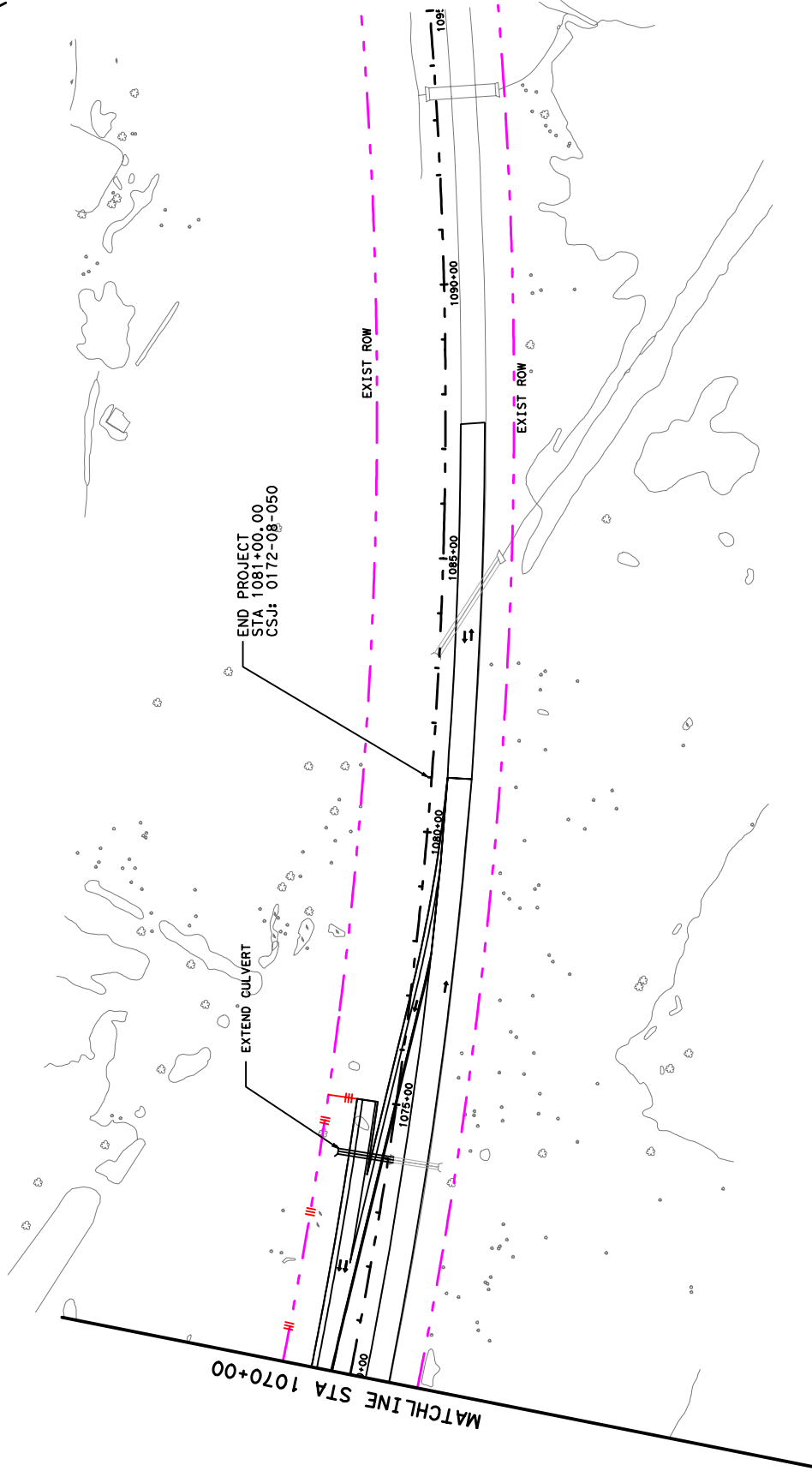
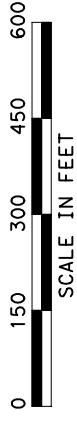
FIGURE 6
EXISTING AND PROPOSED ROADWAY
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 5 OF 7



LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

FIGURE 6
EXISTING AND PROPOSED ROADWAY
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 6 OF 7



LEGEND

- PROPOSED FRONTAGE ROAD
- EXISTING ROW
- PROPOSED ROW
- DESIGNED BY OTHERS
- RETAINING WALL
- CONTROL OF ACCESS TO BE PURCHASED

FIGURE 6
EXISTING AND PROPOSED ROADWAY
US 287
FROM BUSINESS US 287 IN
ENNIS TO SH 34
CSJ: 0172-08-050
SHEET 7 OF 7



Photograph 1: View looking north along US 287, at the southern terminus of the proposed project.



Photograph 2: View of vegetation within the proposed ROW at the southern terminus of the proposed project.

FIGURE 7
PROJECT AREA PHOTOGRAPHS
US 287
FROM Business 287 in Ennis
TO SH 34
CSJ# 0172-08-050
Page 1 of 5



Photograph 3: View of the house (Noise Receiver #4) located at the southeast corner of US 287 and SH 34.



Photograph 4: View of the Exxon gas station located at the northeast corner of US 287 and SH 34.

FIGURE 7
PROJECT AREA PHOTOGRAPHS
US 287
FROM Business 287 in Ennis
TO SH 34
CSJ# 0172-08-050
Page 2 of 5



Photograph 5: View of the 30-inch dbh hackberry tree located on the east side of US 287, south of Lampasas Rd. The Ennis Regional Medical Center (under construction) is on the right and the Ennis 6th Grade Center is on the left.



Photograph 6: View of the Ennis Regional Medical Center (under construction) located at the southeast corner of US 287 and Lampasas St.

FIGURE 7
PROJECT AREA PHOTOGRAPHS
US 287
FROM Business 287 in Ennis
TO SH 34
CSJ# 0172-08-050
Page 3 of 5



Photograph 7: View of the vegetation located within the proposed ROW at the southwest corner of US 287 and Lampasas St.



Photograph 8: View looking west at Little Mustang Creek. The bridge is the existing US 287 facility and would be converted to the southbound lanes.

FIGURE 7
PROJECT AREA PHOTOGRAPHS
US 287
FROM Business 287 in Ennis
TO SH 34
CSJ# 0172-08-050
Page 4 of 5



Photograph 9: View looking west at Mustang Creek Tributary. The bridge is the existing US 287 facility and would be converted to the southbound lanes.



Photograph 10: View of Bluebonnet Park near the northern terminus of the proposed project.

FIGURE 7
PROJECT AREA PHOTOGRAPHS
US 287
FROM Business 287 in Ennis
TO SH 34
CSJ# 0172-08-050
Page 5 of 5

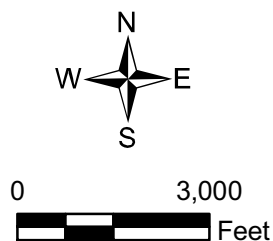
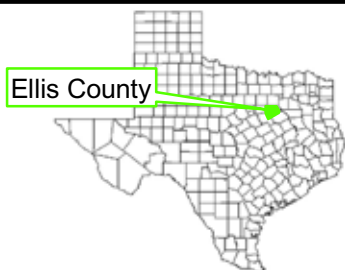
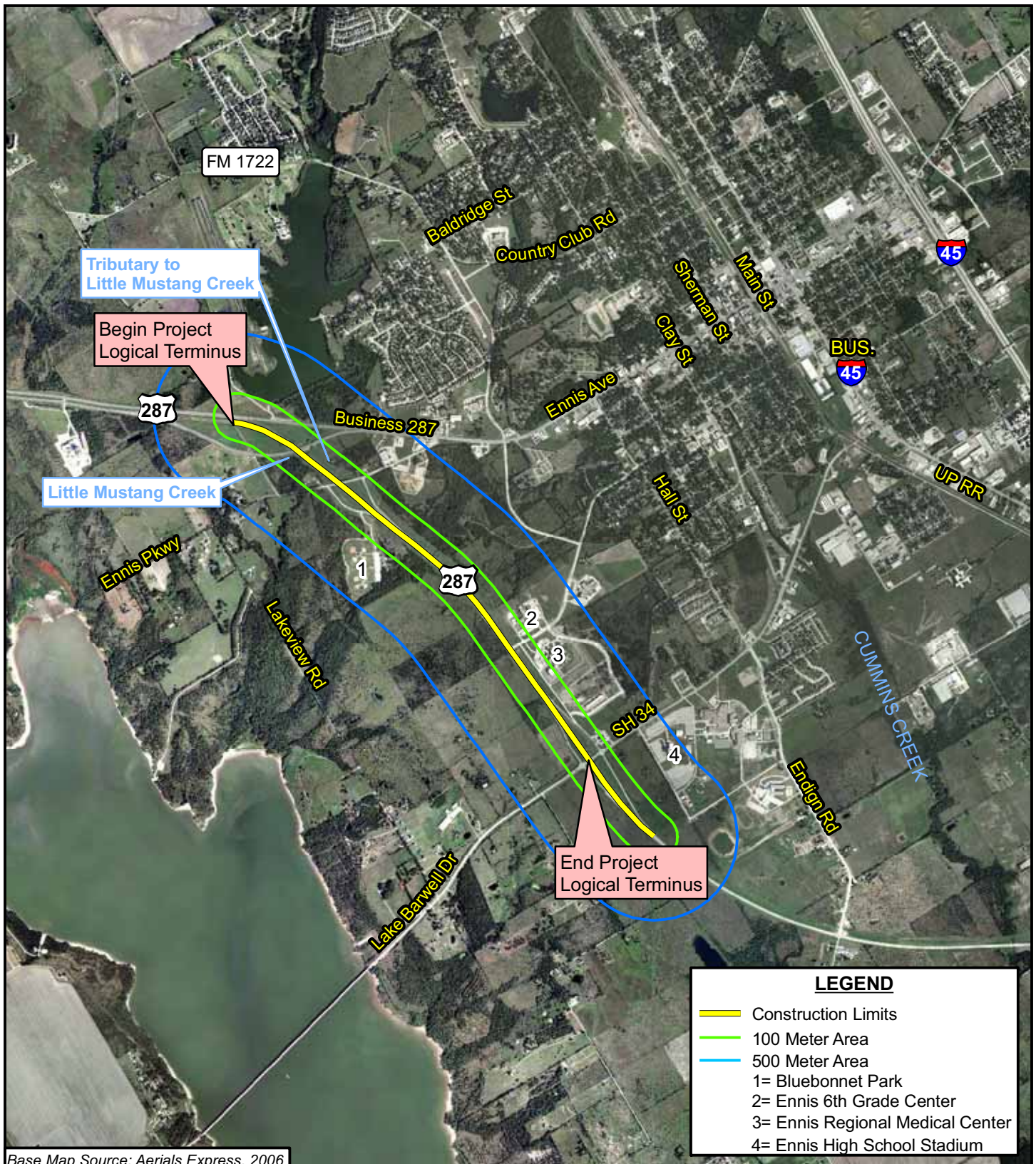
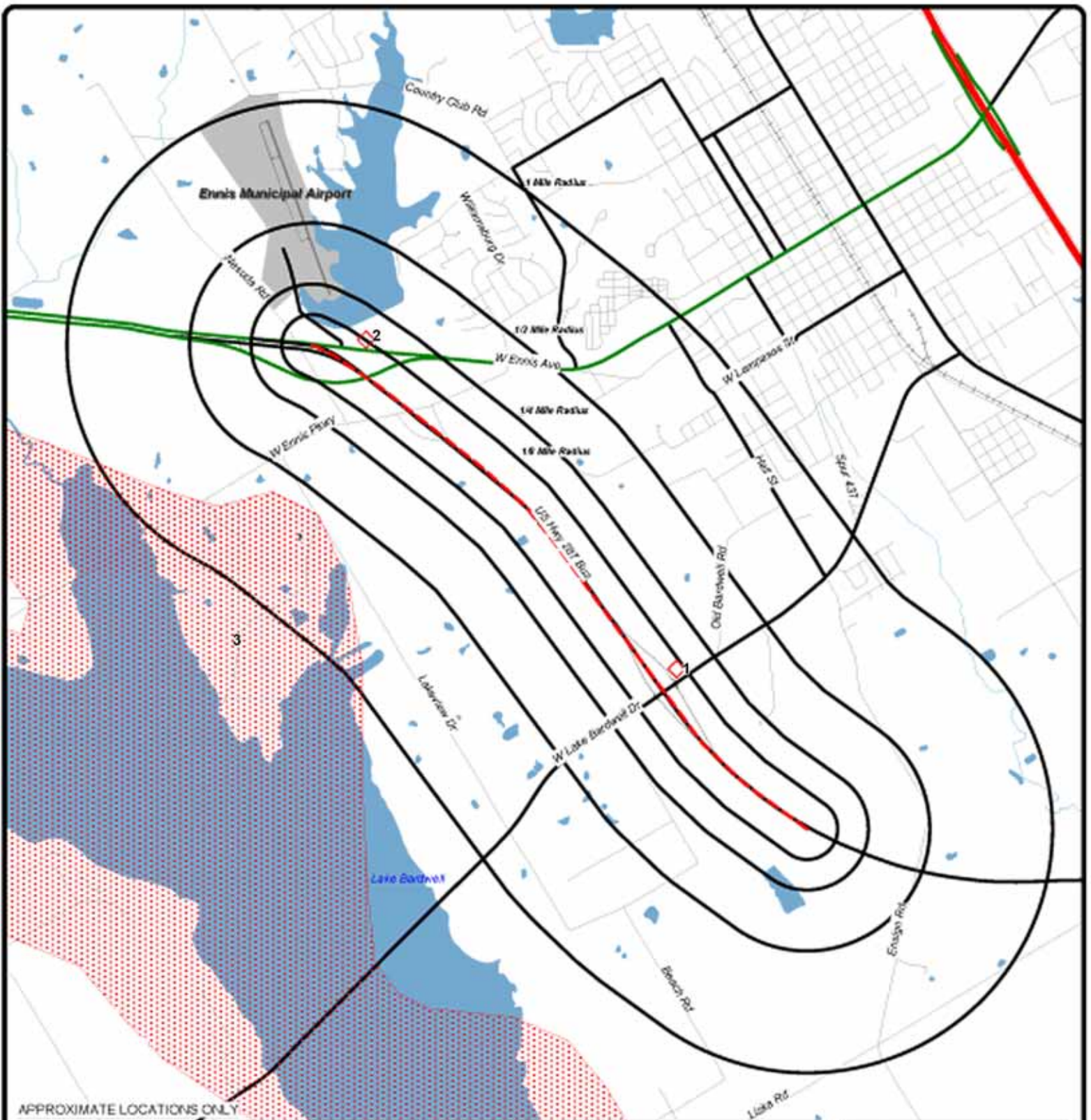
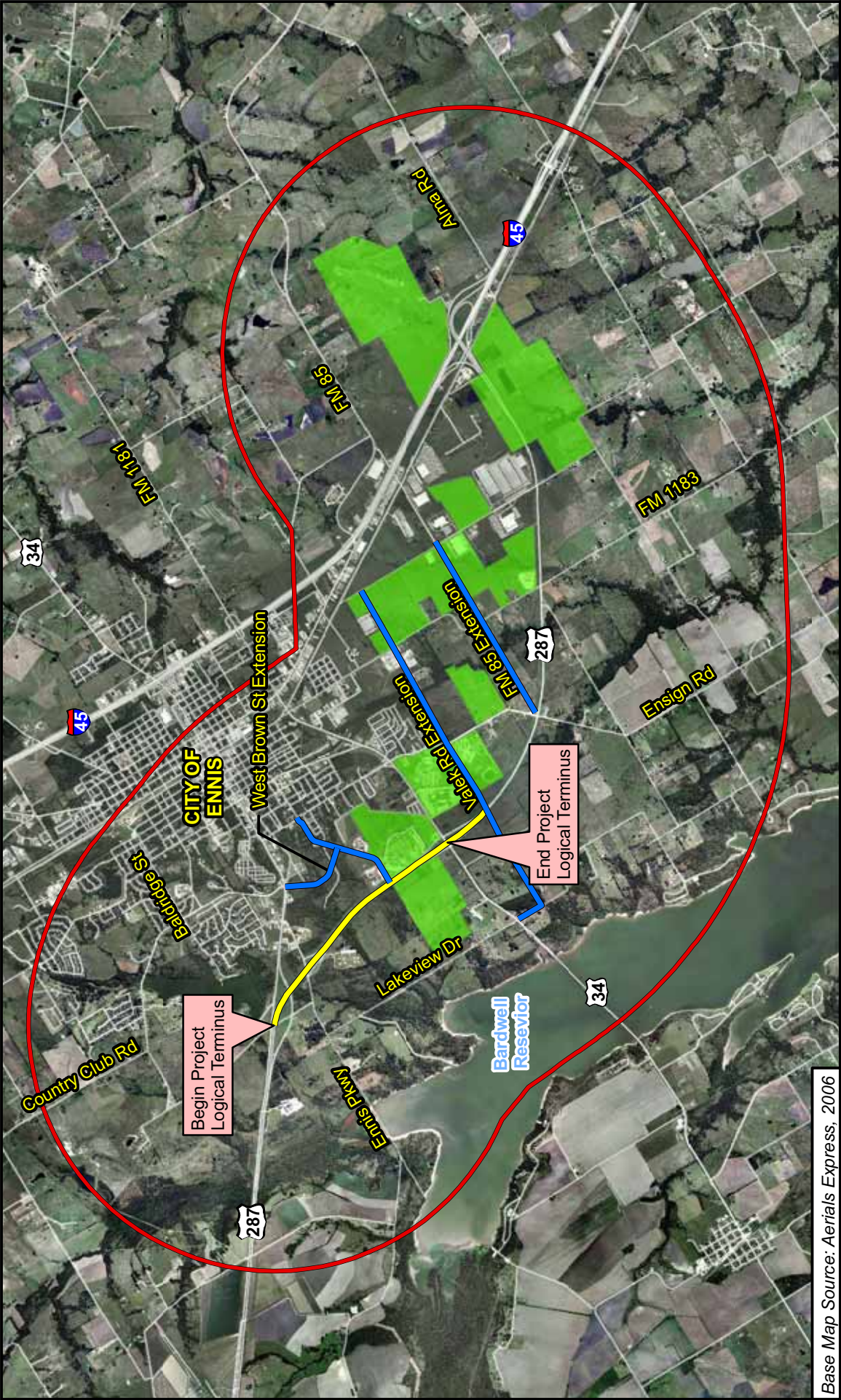


FIGURE 8
MSAT SENSITIVE RECEPTORS
LOCATION MAP

US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050





Base Map Source: Aerials Express, 2006

LEGEND

- Construction Limits
- Indirect Effects
- Study Area Boundary
- Proposed Roadway Extensions
- Indirect Effects
- Indirect Effect Developments

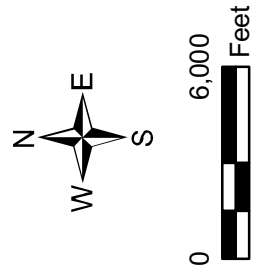
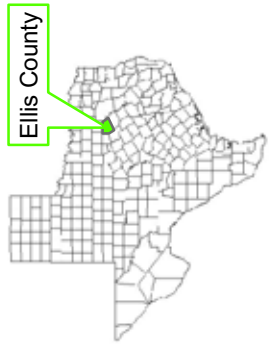
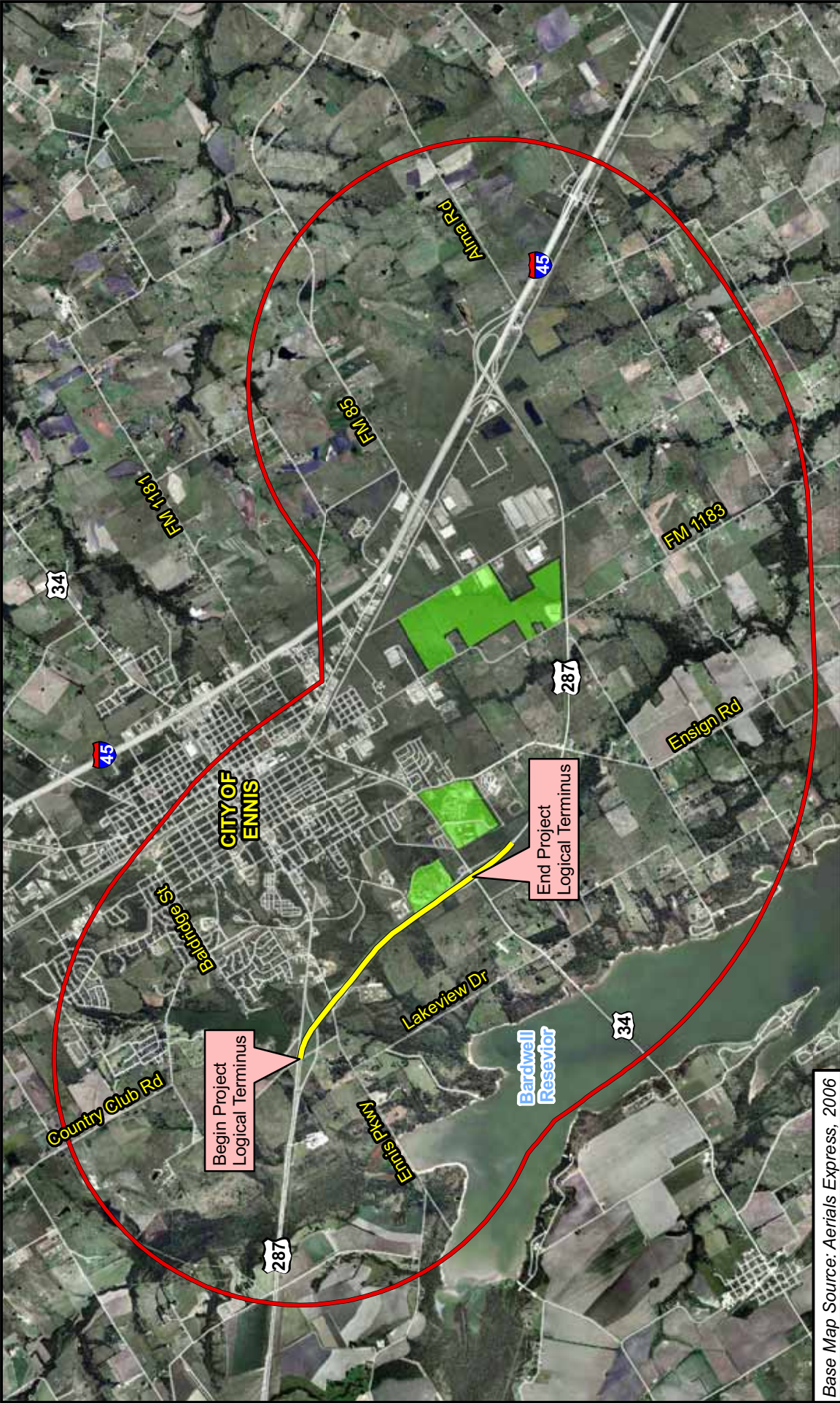


FIGURE 10
BUILD ALTERNATIVE
INDIRECT EFFECTS ON LAND USE

US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050



Base Map Source: Aerials Express, 2006

LEGEND

- Construction Limits
- Indirect Effects
- Study Area Boundary
- Indirect Effect Developments

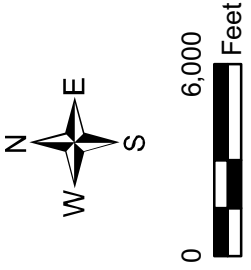
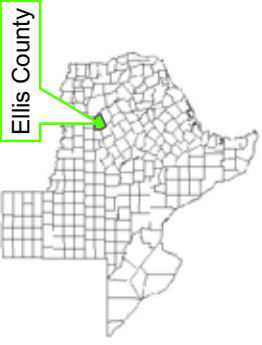
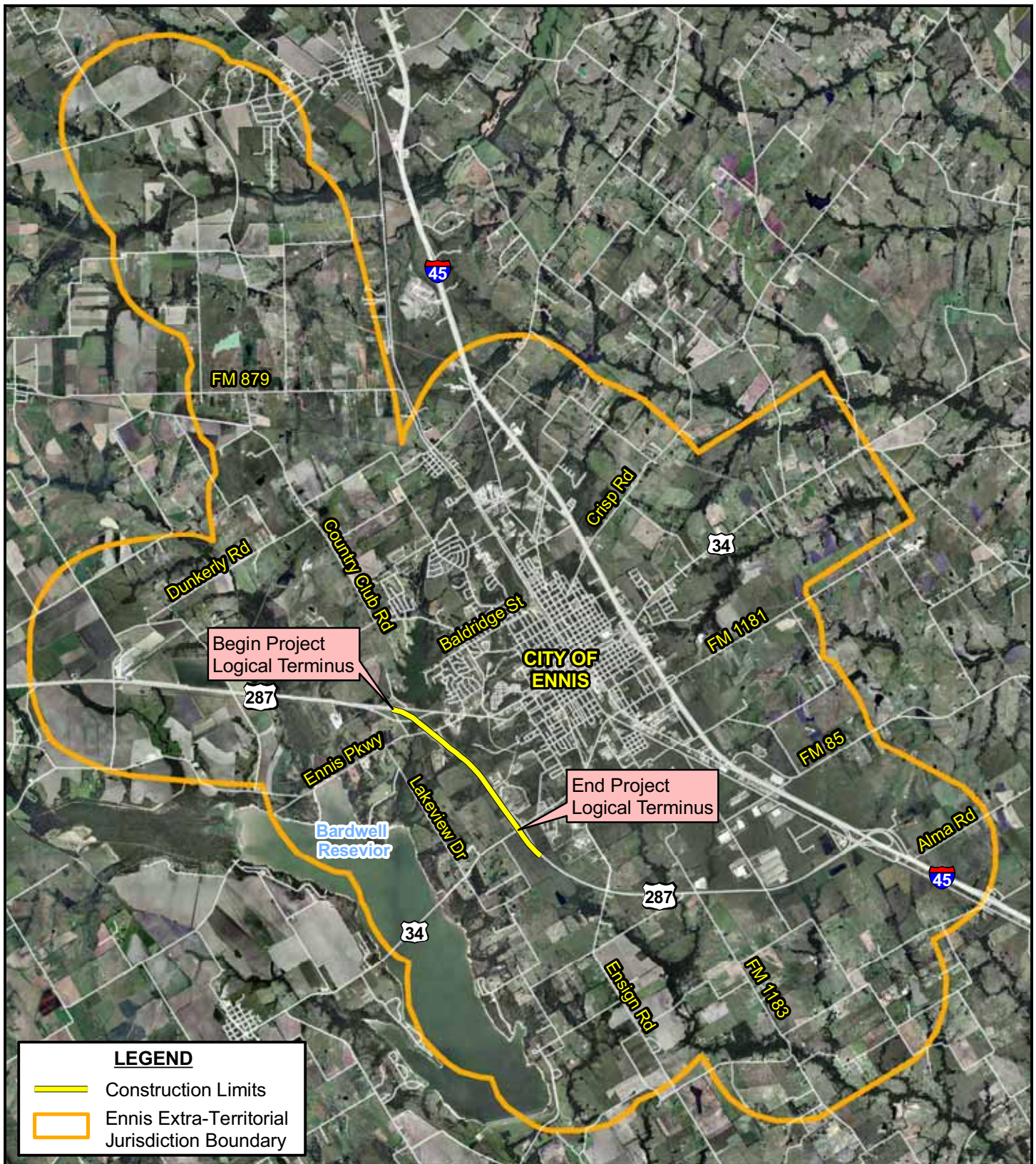


FIGURE 11
NO-BUILD ALTERNATIVE
INDIRECT EFFECTS ON LAND USE

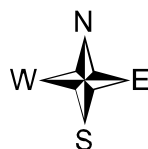
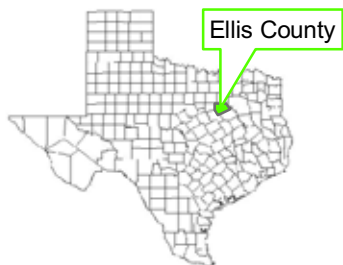
US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050



LEGEND

- Construction Limits
- Ennis Extra-Territorial Jurisdiction Boundary

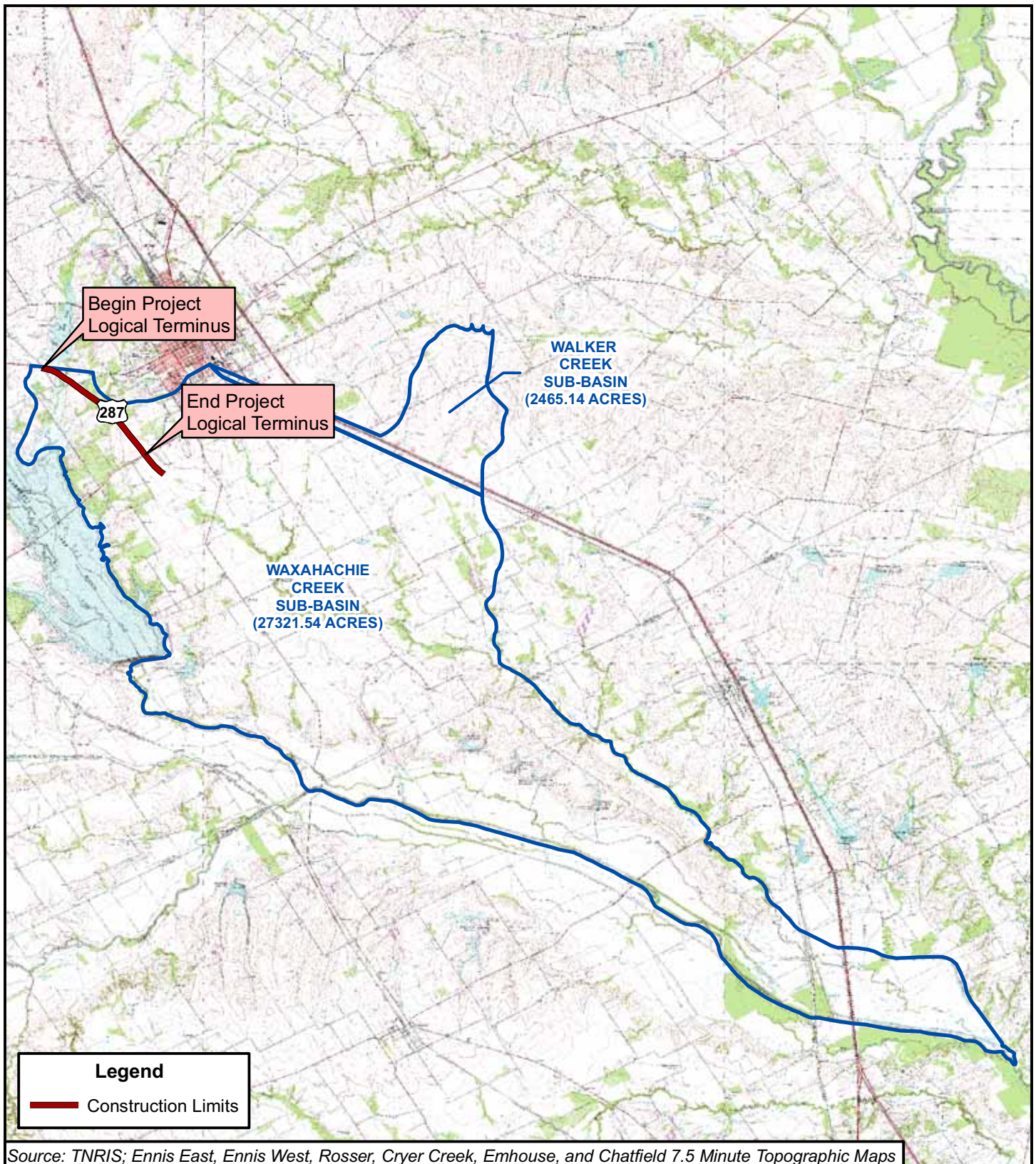


0 8,500 Feet

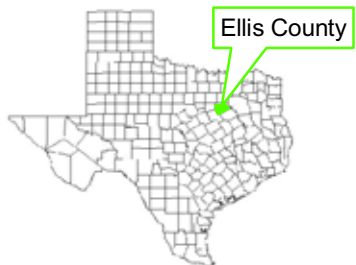
**FIGURE 12
ELLIS COUNTY
EXTRA-TERRITORIAL
JURISDICTION MAP**

US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050



Source: TNRIS; Ennis East, Ennis West, Rosser, Cryer Creek, Emhouse, and Chatfield 7.5 Minute Topographic Maps

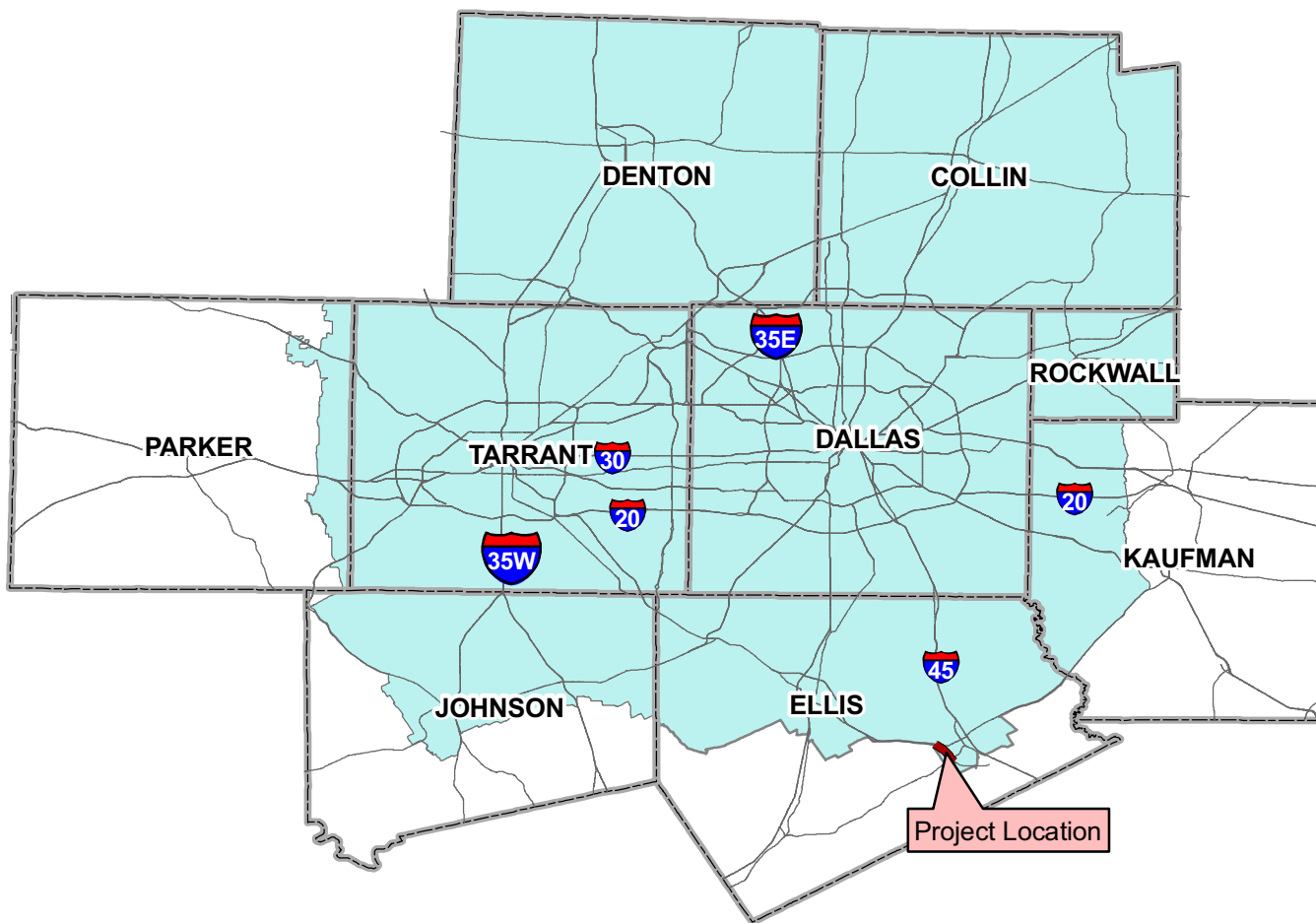


0 12,000
Feet

FIGURE 13
WAXAHACHIE CREEK AND
WALKER CREEK SUB-BASIN
DRAINAGE AREA MAPS

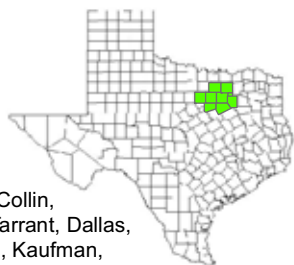
US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050



LEGEND

 Eight-Hour Ozone Non-Attainment Area



Denton, Collin,
Parker, Tarrant, Dallas,
Rockwall, Kaufman,
Johnson, and Ellis Counties



NOT TO SCALE

**FIGURE 14
NINE-COUNTY OZONE
NON-ATTAINMENT AREA FOR THE
DFW METROPOLITAN AREA**

US 287
FROM BUSINESS 287
TO SOUTH OF SH 34

CSJ: 0172-08-050

DRAFT

APPENDIX B

DATA FORM ROUTINE WETLAND DETERMINATION

Project/Site: US 287 from Bus. US 287 to SH 34 Applicant/Owner: Texas Department of Transportation Investigator: CFH	Date: 1/25/08 County: Ellis State: TX
Do normal circumstances exist on the site? Yes Is the site significantly disturbed? No Is the area a potential problem area (if needed, explain or reverse)? No	Community ID: A Transect ID: Plot ID: 1

VEGETATION

#	Dominant Plant Species	Stratum	Indicator	#	Dominant Plant Species	Stratum	Indicator
1.	<i>Eleocharis compressa</i>	H	FACW	8.			
2.	<i>Iva annua</i>	H	FAC	9.			
3.	<i>Paspalum dilatatum</i>	H	FAC	10.			
4.	<i>Rumex crispus</i>	H	FACW	11.			
5.	<i>Cynodon dactylon</i>	H	FACU+	12.			
6.	<i>Sorghum halepense</i>	H	FACU	13.			
7.				14.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 67% FAC Neutral: 50%

Remarks: Area was mowed. Identification of forbs difficult due to winter conditions. No T, S/S, or V species present. Vegetation meets hydrophytic vegetation criterion.

HYDROLOGY

<p>Recorded Data (Describe in Remarks)</p> <p style="margin-left: 40px;">_____ Stream, Lake, or Tide Gauge</p> <p style="margin-left: 40px;">_____ Aerial Photographs</p> <p style="margin-left: 40px;">_____ Other</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p style="margin-left: 40px;">_____ Inundated</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p style="margin-left: 40px;">_____ Water Marks</p> <p style="margin-left: 40px;">_____ Drift Lines</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Sediment Deposits</p> <p style="margin-left: 40px;">_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required)</p> <p style="margin-left: 40px;">_____ Oxidized Root Channels in Upper 12 in.</p> <p style="margin-left: 40px;">_____ Water-Stained Leaves</p> <p style="margin-left: 40px;">_____ Local Soil Survey Data</p> <p style="margin-left: 40px;">_____ FAC-Neutral Test</p> <p style="margin-left: 40px;">_____ Other (Explain in Remarks)</p>
<p>Field Observations:</p> <p style="margin-left: 40px;">Depth of Surface Water: _____ (in.)</p> <p style="margin-left: 40px;">Depth of Free Water in Pit: 4 (in.)</p> <p style="margin-left: 40px;">Depth to Saturated Soil: 0 (in.)</p>	

Remarks: Observation point meets the wetland hydrology criterion.

SOILS Plot 1, Community A

Map Unit Name (Series and Phase):	Tc-Trinity Clay, Frequently Flooded	Drainage Class:	<u>PD</u>
Taxonomy (Subgroup):	Typic Calciustolls	Field Observations	
		Confirmed Mapped Type:	<u>Yes</u>

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16		10YR4/1	NA	NA	Blocky, Silty clay loam

Hydric Soil Indicators:

<u> </u>	Histosol	<u> </u>	Concretions
<u> </u>	Histic Epipedon	<u> </u>	High Organic Content in Surface Layer in Sandy Soils
<u> </u>	Sulfidic Odor	<u> </u>	Organic Streaking in Sandy Soils
<u> </u>	Aquic Moisture Regime	<u> </u>	Listed in Local Hydric Soils List
<u> </u>	Reducing Conditions	<u> </u>	Listed on National Hydric Soils List
<u> X </u>	Gleyed or Low-Chroma Colors	<u> </u>	Other (Explain In Remarks)

Remarks: Soil meets the hydric soil criterion.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<u>Yes</u>	Is This Sampling Point Within a Wetland? <u>Yes</u>
Wetland Hydrology Present?	<u>Yes</u>	
Hydric Soils Present?	<u>Yes</u>	

Remarks: Sampled adjacent to the concrete-lined channel of Little Mustang Creek beneath the US 287 bridge.

DATA FORM ROUTINE WETLAND DETERMINATION

Project/Site: US 287 from Bus. US 287 to SH 34 Applicant/Owner: Texas Department of Transportation Investigator: CFH	Date: 1/25/08 County: Ellis State: TX
Do normal circumstances exist on the site? Yes Is the site significantly disturbed? No Is the area a potential problem area (if needed, explain or reverse)? No	Community ID: B Transect ID: Plot ID: 2

VEGETATION

#	Dominant Plant Species	Stratum	Indicator	#	Dominant Plant Species	Stratum	Indicator
1.	<i>Sorghum halepense</i>	H	FACU	8.			
2.	<i>Cardiospermum halicacabum</i>	V	FAC	9.			
3.	<i>Croton texensis</i>	H	NL	10.			
4.	<i>Helianthus annuus</i>	H	FAC	11.			
5.	<i>Ambrosia trifida</i>	H	FAC	12.			
6.				13.			
7.				14.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 75% FAC Neutral: 0%

Remarks: Area was mowed. Identification of forbs difficult due to winter conditions. No T or S/S species present. Vegetation meets hydrophytic vegetation criterion.

HYDROLOGY

<p>Recorded Data (Describe in Remarks)</p> <p style="margin-left: 40px;">_____ Stream, Lake, or Tide Gauge</p> <p style="margin-left: 40px;">_____ Aerial Photographs</p> <p style="margin-left: 40px;">_____ Other</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators</p> <p style="margin-left: 40px;">Primary Indicators</p> <p style="margin-left: 40px;">_____ Inundated</p> <p style="margin-left: 40px;">_____ Saturated in Upper 12 Inches</p> <p style="margin-left: 40px;">_____ Water Marks</p> <p style="margin-left: 40px;">_____ Drift Lines</p> <p style="margin-left: 40px;">_____ Sediment Deposits</p> <p style="margin-left: 40px;">_____ Drainage Patterns in Wetlands</p> <p style="margin-left: 40px;">Secondary Indicators (2 or more required)</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 in.</p> <p style="margin-left: 40px;">_____ Water-Stained Leaves</p> <p style="margin-left: 40px;">_____ Local Soil Survey Data</p> <p style="margin-left: 40px;">_____ FAC-Neutral Test</p> <p style="margin-left: 40px;">_____ Other (Explain in Remarks)</p>
<p>Field Observations:</p> <p style="margin-left: 40px;">Depth of Surface Water: _____ NA (in.)</p> <p style="margin-left: 40px;">Depth of Free Water in Pit: _____ NA (in.)</p> <p style="margin-left: 40px;">Depth to Saturated Soil: _____ >16 (in.)</p>	

Remarks: Oxidized root channels at 6 inches. No primary and one secondary hydrology indicator present. Observation point does not meet the wetland hydrology criterion.

SOILS Plot 2, Community B

Map Unit Name (Series and Phase):	Tc-Trinity Clay, Frequently Flooded	Drainage Class:	<u>PD</u>
Taxonomy (Subgroup):	Typic Calciustolls	Field Observations	
		Confirmed Mapped Type:	<u>No</u>

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16		10YR4/2	NA	NA	Blocky, Clay loam
0 - 16		10YR5/4	NA	NA	Blocky, Clay

Hydric Soil Indicators:

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed in Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain In Remarks)

Remarks: Soil mixed with pebbles and fill material. Hydric soil indicators were not observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<u>No</u>	Is This Sampling Point Within a Wetland? <u>No</u>
Wetland Hydrology Present?	<u>No</u>	
Hydric Soils Present?	<u>No</u>	

Remarks: Sampled approximately 5 feet east of the boundary of the wetland identified in Plot 1.

DATA FORM ROUTINE WETLAND DETERMINATION

Project/Site: US 287 from Bus. US 287 to SH 34 Applicant/Owner: Texas Department of Transportation Investigator: CFH	Date: 1/25/08 County: Ellis State: TX
Do normal circumstances exist on the site? Yes Is the site significantly disturbed? No Is the area a potential problem area (if needed, explain or reverse)? No	Community ID: B Transect ID: Plot ID: 3

VEGETATION

#	Dominant Plant Species	Stratum	Indicator	#	Dominant Plant Species	Stratum	Indicator
1.	<i>Ambrosia psilostachya</i>	H	FAC-	8.			
2.	<i>Paspalum dilatatum</i>	H	FAC	9.			
3.	<i>Iva annua</i>	H	FAC	10.			
4.	<i>Ipomoea trichocarpa</i>	V	FAC	11.			
5.	<i>Xanthium spinosum</i>	H	FACU	12.			
6.	<i>Sorghum halepense</i>	H	FACU	13.			
7.				14.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 50% FAC Neutral: 0%

Remarks: Area was mowed. Identification of forbs difficult due to winter conditions. No T or S/S species present. Vegetation does not meet the hydrophytic vegetation criterion.

HYDROLOGY

<p>Recorded Data (Describe in Remarks)</p> <p style="margin-left: 40px;">_____ Stream, Lake, or Tide Gauge</p> <p style="margin-left: 40px;">_____ Aerial Photographs</p> <p style="margin-left: 40px;">_____ Other</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p style="margin-left: 40px;">_____ Inundated</p> <p style="margin-left: 40px;">_____ Saturated in Upper 12 Inches</p> <p style="margin-left: 40px;">_____ Water Marks</p> <p style="margin-left: 40px;">_____ Drift Lines</p> <p style="margin-left: 40px;">_____ Sediment Deposits</p> <p style="margin-left: 40px;">_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required)</p> <p style="margin-left: 40px;">_____ Oxidized Root Channels in Upper 12 in.</p> <p style="margin-left: 40px;">_____ Water-Stained Leaves</p> <p style="margin-left: 40px;">_____ Local Soil Survey Data</p> <p style="margin-left: 40px;">_____ FAC-Neutral Test</p> <p style="margin-left: 40px;">_____ Other (Explain in Remarks)</p>
<p>Field Observations:</p> <p style="margin-left: 40px;">Depth of Surface Water: _____ NA (in.)</p> <p style="margin-left: 40px;">Depth of Free Water in Pit: _____ NA (in.)</p> <p style="margin-left: 40px;">Depth to Saturated Soil: _____ >16 (in.)</p>	

Remarks: No primary or secondary hydrology indicators present. Observation point does not meet the wetland hydrology criterion.

SOILS Plot 3, Community B

Map Unit Name (Series and Phase):	HsD3-Houston-Sumter Complex, 5 to 8% slopes	Drainage Class:	<u>WD</u>
Taxonomy (Subgroup):	Houston – Udic Pellusterts Sumpter - Rendollic Eutrochrepts	Field Observations	
		Confirmed Mapped Type:	<u>Yes</u>

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16		10YR2/1	NA	NA	Blocky, Clay

Hydric Soil Indicators:

<u> </u> Histosol	<u> </u> Concretions
<u> </u> Histic Epipedon	<u> </u> High Organic Content in Surface Layer in Sandy Soils
<u> </u> Sulfidic Odor	<u> </u> Organic Streaking in Sandy Soils
<u> </u> Aquic Moisture Regime	<u> </u> Listed in Local Hydric Soils List
<u> </u> Reducing Conditions	<u> </u> Listed on National Hydric Soils List
<u> X </u> Gleyed or Low-Chroma Colors	<u> </u> Other (Explain In Remarks)

Remarks: Sampling location appears to be in the Houston clay portion of the complex. Houston soil has a naturally occurring chroma of one, but it is not a hydric soil. Hydric soil indicators were not observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<u>No</u>	Is This Sampling Point Within a Wetland? <u>No</u>
Wetland Hydrology Present?	<u>No</u>	
Hydric Soils Present?	<u>No</u>	
Remarks: Sampled approximately one foot above the OHWM of a tributary to Mustang Creek.		

DATA FORM ROUTINE WETLAND DETERMINATION

Project/Site: US 287 from Bus. US 287 to SH 34 Applicant/Owner: Texas Department of Transportation Investigator: CFH	Date: 1/25/08 County: Ellis State: TX
Do normal circumstances exist on the site? Yes Is the site significantly disturbed? No Is the area a potential problem area (if needed, explain or reverse)? No	Community ID: B Transect ID: Plot ID: 4

VEGETATION

#	Dominant Plant Species	Stratum	Indicator	#	Dominant Plant Species	Stratum	Indicator
1.	<i>Sorghum halepense</i>	H	FAC-	8.			
2.	<i>Cynodon dactylon</i>	H	FAC	9.			
3.	<i>Ambrosia trifida</i>	H	FAC	10.			
4.	<i>Xanthium spinosum</i>	H	FACU	11.			
5.	<i>Ipomoea trichocarpa</i>	V	FAC	12.			
6.				13.			
7.				14.			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): 60% FAC Neutral: 0%

Remarks: Area was mowed. Identification of forbs difficult due to winter conditions. No T or S/S species present. Vegetation does not meet the hydrophytic vegetation criterion.

HYDROLOGY

<p>Recorded Data (Describe in Remarks)</p> <p>_____ Stream, Lake, or Tide Gauge</p> <p>_____ Aerial Photographs</p> <p>_____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p>_____ Inundated</p> <p>_____ Saturated in Upper 12 Inches</p> <p>_____ Water Marks</p> <p>_____ Drift Lines</p> <p>_____ Sediment Deposits</p> <p>_____ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required)</p> <p>_____ Oxidized Root Channels in Upper 12 in.</p> <p>_____ Water-Stained Leaves</p> <p>_____ Local Soil Survey Data</p> <p>_____ FAC-Neutral Test</p> <p>_____ Other (Explain in Remarks)</p>
<p>Field Observations:</p> <p>Depth of Surface Water: _____ NA (in.)</p> <p>Depth of Free Water in Pit: _____ NA (in.)</p> <p>Depth to Saturated Soil: _____ >16 (in.)</p>	

Remarks: No primary or secondary hydrology indicators present. Observation point does not meet the wetland hydrology criterion.

SOILS Plot 4, Community B

Map Unit Name (Series and Phase):	HsD3-Houston-Sumter Complex, 5 to 8% slopes	Drainage Class:	<u>WD</u>
Taxonomy (Subgroup):	Houston – Udic Pellusterts Sumpter - Rendollic Eutrochrepts	Field Observations	
		Confirmed Mapped Type:	<u>Yes</u>

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 16		10YR2/1	NA	NA	Blocky, Clay

Hydric Soil Indicators:

<u> </u> Histosol	<u> </u> Concretions
<u> </u> Histic Epipedon	<u> </u> High Organic Content in Surface Layer in Sandy Soils
<u> </u> Sulfidic Odor	<u> </u> Organic Streaking in Sandy Soils
<u> </u> Aquic Moisture Regime	<u> </u> Listed in Local Hydric Soils List
<u> </u> Reducing Conditions	<u> </u> Listed on National Hydric Soils List
<u> X </u> Gleyed or Low-Chroma Colors	<u> </u> Other (Explain In Remarks)

Remarks: Sampling location appears to be in the Houston clay portion of the complex. Houston soil has a naturally occurring chroma of one, but it is not a hydric soil. Hydric soil indicators were not observed.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<u>No</u>	Is This Sampling Point Within a Wetland? <u>No</u>
Wetland Hydrology Present?	<u>No</u>	
Hydric Soils Present?	<u>No</u>	
Remarks: Sampled approximately one foot above the OHWM of a tributary to Mustang Creek.		

TxDOT WOODLANDS DATA FORM

GENERAL

Project/Site	US 287: Business 287 to south of SH 34	Date	1/09/07
CSJ	0172-08-050	Investigator	IB, TB
County	Ellis		
Filename			
Project Scope			
Widen the existing two-lane roadway to a four-lane divided roadway			
Description of Wooded Site (riparian, upland, fence line, overstory/understory, disturbed, diverse, etc.)			
Upland overstory and fence line			
Is Site Unusual or Typical of Others in the Area?		Typical	

SPECIES DESCRIPTION

Species by Order of Dominance		
Common Name	Taxonomic Name	Range of Sizes (dbh)
Mesquite	<i>Prosopis glandulosa</i>	2 to 8 inch
Eastern Red Cedar	<i>Juniperus virginiana</i>	4 to 10 inch
Sugarberry	<i>Celtis laevigata</i>	2 to 10 inch
Acreage of Trees to be Removed	3.4	
Density per Acre	650 trees per acre	
Remarks, Description of any Unique, Large, or Mature Trees (>20" dbh)		
One 30-inch dbh sugarberry on the east side of US 287, north of the SH 34 intersection.		

HABITAT VALUE

Is the Site Adjacent to Water?	No
Is the Site in a Developed Area?	No
Do Plants Produce Nuts, Berries, or Acorns?	
Mesquite – Legume pods, Eastern Red Cedar – Berry-like cone, Sugarberry - Drupe	
Land Use in the Project Area.	
Vacant	
Evidence or Sightings of Wildlife in the Project Area?	
No	
Remarks	

TxDOT WOODLANDS DATA FORM

GENERAL

Project/Site	US 287: Business 287 to south of SH 34	Date	1/09/07
CSJ	0172-08-050	Investigator	IB, TB
County	Ellis		
Filename			
Project Scope			
Widen the existing two-lane roadway to a four-lane divided roadway			
Description of Wooded Site (riparian, upland, fence line, overstory/understory, disturbed, diverse, etc.)			
Upland overstory and fence line			
Is Site Unusual or Typical of Others in the Area?		Typical	

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HABITAT VALUE

Is the Site Adjacent to Water?	No
Is the Site in a Developed Area?	No
Do Plants Produce Nuts, Berries, or Acorns?	
Mesquite – Legume pods, Eastern Red Cedar – Berry-like cone, Sugarberry - Drupe	
Land Use in the Project Area.	
Vacant	
Evidence or Sightings of Wildlife in the Project Area?	
No	
Remarks	

Texas Department of Transportation Dallas District Standards for Woodlands Mitigation

In accordance with the Memorandum of Understanding between TxDOT and the Texas Parks and Wildlife Department (TPWD), mitigation should be provided when TxDOT construction activities remove significant amounts of riparian woodlands or other natural plant communities. The following information shall be used to develop mitigation plans for loss of woody vegetation. Ordinarily, mitigation plans shall replace lost vegetation on an acre-per-acre basis (i.e., one acre replanted for each acre removed), not on a plant-per-plant basis. The exact species composition given in the table below may be adjusted due to commercial availability or site specifics; however, the total number of plants shall remain at 30 large trees and 60 small trees/shrubs per acre (90 plants per acre). Only those plants listed below shall be used, unless approved by Dallas Advance Project Development (and TPWD).

Species	Spacing	Quantity	Remarks
Large Trees			
Bur Oak (<i>Quercus macrocarpa</i>)	30-35 ft. o.c.	10 per acre	
Chinkapin Oak (<i>Quercus muehlenbergii</i>)	30-35 ft. o.c.	5 per acre	
Shumard Red Oak (<i>Quercus shumardii</i>)	30-35 ft. o.c.	5 per acre	Check branching structure to avoid Pin Oak hybrids.
Pecan (<i>Carya illinoensis</i>)	30-35 ft. o.c.	10 per acre	Use native variety if available. Plant B&B trees from Jan.15 to Mar.15, containerized from Sep.15 to Apr.15.
Small Trees/Shrubs			
Possumhaw Holly (<i>Illex decidua</i>)	15-20 ft. o.c.	12 per acre	Specify female plants (3:1).
Mexican Plum (<i>Prunus mexicana</i>)	15-20 ft. o.c.	12 per acre	
Common Persimmon (<i>Diospyros virginiana</i>)	15-20 ft. o.c.	12 per acre	Specify female plants (3:1).
Carolina Buckthorn (<i>Rhamnus caroliniana</i>)	15-20 ft. o.c.	12 per acre	
Flameleaf Sumac (<i>Rhus lanceolata</i> or <i>Rhus copallina</i>)	15-20 ft. o.c.	12 per acre	Specify female plants (3:1).

Large trees shall be 1½" to 2" caliper at planting; small trees and shrubs shall be 6' to 8' in height at planting. Standard TxDOT planting details shall be used. A maintenance period lasting at least one full growing season shall be specified for all mitigation plantings. Maintenance shall include: supplemental watering of all plants; maintaining an 8" layer of mulch on all plantings; replacement of all dead plants at the end of the maintenance period. Whenever possible, planting should be scheduled during the fall of the year to improve the survival rate. Additional information is available through Dallas District landscape architect.

DRAFT

APPENDIX C

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	MPO PROJ ID
DALLAS	DENTON	0081-04-025	US 377	E,R	OTHER	
LIMITS FROM:	IH 35E					REV DATE: 06/2008
LIMITS TO:	0.26 MILES SOUTH OF FM 1830					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN RURAL ROADWAY TO URBAN					FUNDING CATEGORY: 11
						MTP REFERENCE: TH1 368.3
REMARKS:	RR UNDERPASS RECONSTRUCTION UNDER SEPARATE CSJ; PENDING FUNDING					
DALLAS	DENTON	0081-13-041	IH 35W	E,R	OTHER	
LIMITS FROM:	EAGLE PARKWAY					REV DATE: 06/2008
LIMITS TO:	SH 114					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	CONSTRUCT NEW FRONTAGE ROAD, INTERCHANGE AT LITSEY, & ADD MAIN LANES					FUNDING CATEGORY: 11
						MTP REFERENCE: FR1 1120
REMARKS:	NO FUNDING COMMITMENT - PLANS BY DENTON COUNTY					
DALLAS	COLLIN	0091-03-021	SH 289	E	OTHER	
LIMITS FROM:	FM 455					REV DATE: 06/2008
LIMITS TO:	GRAYSON CR 60 (GRAYSON COUNTY LINE)					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN RURAL HIGHWAY					FUNDING CATEGORY: 7
						MTP REFERENCE: TH1 202
REMARKS:	NO TIP ENTRY PENDING FUNDING					
DALLAS	COLLIN	0091-04-050	SH 289	E,R	OTHER	
LIMITS FROM:	US 380 INTERCHANGE					REV DATE: 06/2008
LIMITS TO:	FM 455					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	RECONSTRUCT AND WIDEN RURAL HIGHWAY TO URBAN ROADWAY; RECONSTRUCT INTERCHANGE					FUNDING CATEGORY: 11
						MTP REFERENCE: TH1 202
REMARKS:	NO TIP ENTRY PENDING FUNDING					
DALLAS	DALLAS	0092-01-052	US 175	E,R	OTHER	
LIMITS FROM:	IH 45					REV DATE: 06/2008
LIMITS TO:	SH 310					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	REHABILITATE EXISTING PAVEMENT AND STRUCTURES					FUNDING CATEGORY: 1
						MTP REFERENCE: F3001
REMARKS:	TIP ENTRY PENDING FUNDING COMMITMENT					
DALLAS	DALLAS	0094-07-015	SH 183	E,R	IRVIN G	
LIMITS FROM:	1.0 MILE EAST OF LOOP 12					REV DATE: 06/2008
LIMITS TO:	WEST END OF ELM FORK TRINITY RV BR					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN EXISTING FACILITY AND ADD CONCURRENT HOV/MANAGED LNS EACH DIRECTION AND FRONTAGE ROADS					FUNDING CATEGORY: 2
						MTP REFERENCE: FT1 1305,FT1 1310
REMARKS:	PEND FUNDING TO ADD TO STIP					
DALLAS	DALLAS	0094-07-020	SH 183	E,R	DALLA S	
LIMITS FROM:	WEST END OF ELM FORK TRINITY RV BR					REV DATE: 06/2008
LIMITS TO:	IH 35E					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN EXISTING FACILITY AND ADD CONCURRENT HOV/MANAGED LANES EACH DIRECTION_(TOLL)					FUNDING CATEGORY: 2
						MTP REFERENCE: FT1 1315
REMARKS:						
DALLAS	DALLAS	0095-02-096	US 80	E	SUNNYVAL E	
LIMITS FROM:	EAST OF TOWN EAST BLVD					REV DATE: 06/2008
LIMITS TO:	LAWSON RD (DALLAS/KAUFMAN C/L)					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WEST OF LBJ: RECONSTRUCT ROADWAY WITH HOV/ MANAGED LANES; EAST OF LBJ RECONSTRUCT AND WIDEN ROADWAY PLUS FRTG RDS					FUNDING CATEGORY: 2
						MTP REFERENCE: HM1 8530
REMARKS:						
DALLAS	KAUFMAN	0095-03-080	US 80	E	OTHER	
LIMITS FROM:	LAWSON RD (DALLAS / KAUFMAN C/L)					REV DATE: 06/2008
LIMITS TO:	FM 460					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN FREEWAY WITH FRTG RDS AND HOV/MANAGED LANES					FUNDING CATEGORY: 2
						MTP REFERENCE: FT1 1615
REMARKS:						
DALLAS	DALLAS	0095-10-033	US 80	E	MESQUIT E	
LIMITS FROM:	IH 30					REV DATE: 06/2008
LIMITS TO:	EAST OF TOWN EAST BLVD					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	RECONSTRUCT ROADWAY WITH HOV/MANAGED LANES					FUNDING CATEGORY: 2
						MTP REFERENCE: HM1 8530
REMARKS:						
DALLAS	ELLIS	0172-08-050	US 287	E,R	OTHER	11721
LIMITS FROM:	BUS US 287 IN ENNIS					REV DATE: 06/2008
LIMITS TO:	SOUTH OF SH 34					GROUPED PROJECT CSJ: N/A
TIP DESCRIPTION:	WIDEN UNDIVIDED HIGHWAY TO DIVIDED HIGHWAY WITH GRADE SEPARATED INTERCHANGES AND CONTROL OF ACCESS					FUNDING CATEGORY: 10
						MTP REFERENCE: FT1 2027
REMARKS:	ADD TO STIP WHEN FULL CONSTRUCTION FUNDS IDENTIFIED					

**MOBILITY 2030 PLAN:
FUNDED ROADWAY RECOMMENDATIONS**

Revised 06-01-2007
Source: NCTCOG

TxDOT - Dallas District

SEG ID	FACILITY	APPROXIMATE LIMITS ¹		DESCRIPTION	2007 LANES ²	2009 LANES ²	2015 LANES ²	2025 LANES ²	2030 LANES ²	STUDY REFERENCE
		FROM	TO							
US 175										
FT1 2300	US 175 SM WRIGHT	US 175	IH 45	Downgrade to Parkway	6	6	6 PKWY	6 PKWY	6 PKWY	Trinity Pkwy EIS (0092-01-050)
FT1 2305	US 175	IH 45	SH 310	Corridor Improvements	0	6	6	6	6	Trinity Pkwy EIS / Staff Recommendation
FT1 2310	US 175	SH 310	LAKE JUNE ROAD	Reconstruct / Widen	6	6	6	6	8	
FT1 2315	US 175	LAKE JUNE ROAD	IH 20	Reconstruct	6	6	6	6	8	
FT1 2320	US 175	IH 20	BELT LINE ROAD	Reconstruct / Widen	4	4	6	6	6	(0197-02-073)
FT1 2330	US 175	BELT LINE ROAD	FM 741	Reconstruct / Widen	4	4	4	4	6	
FT1 2340	US 175	FM 741	MPA BOUNDARY	Existing	4	4	4	4	4	(0197-02-089)
US 287										
FT1 1408	US 287	OLD FORT WORTH ROAD	BU 287	Existing	4	4	4	4	4	Construction completed (2006)
FT1 1410	US 287	W OF WAXAHACHIE CITY LIMIT	WYATT ST	Existing	4	4	4	4	4	
FT1 2650	US 287	BUS US 287	SH 34	New Staged Freeway	2 ART	2 ART	4	4	4	
FT1 2655	US 287	SH 34	IH 45 SOUTH OF ENNIS	New Staged Freeway	2 ART	2 ART	4	4	4	
WOODALL RODGERS/SPUR 366										
FT1 1735	WOODALL RODGERS	US 75	IH 35E	Existing	8	8	8	8	8	
FT1 1740	WOODALL RODGERS / SPUR 366	IH 35E	BECKLEY AVENUE	New Staged Freeway	0	0	6	6	6	Trinity Pkwy EIS (0196-07-028)

¹ Limits are approximate. Actual limits will be based on environmental approval.

² Number of lanes excludes auxiliary lanes.

³ Anticipated costs excluding streamlining efforts.